Major Constraints and Opportunities of Poultry Value Chain in Adwa Wereda, Central Zone of Tigray, Ethiopia

Goitom G.[1]   Bezabih E.[2]   Berhanu G.[3]

1.Shire Agricultural TVET College, Shire, Tigray, Ethiopia

2.PhD in HEDBEZ Business & Consultancy PLC, Addis Ababa, Ethiopia

3.PhD in ILRI, Addis Ababa, Ethiopia

Abstract

The objective of this study was to identify the major constraints and opportunities along poultry value chain on 200 poultry producers in Adwa wereda, Central Zone of Tigray, Ethiopia. Poultry production was constrained by diseases, extension service, limited supply of exotic chicken, poor housing and feeding systems. Some of the diseases identified by the sample households were new castle, avian pasterolosis, coccidosis, Salmonellosis, pulorum disease and fowl pox. Traders were also constrained by lack of poultry and egg supply, trade license and diseases. In spite of this, it had also opportunities such as high turnover earning, small feed and space requirement, lower initial cost requirement, and employment opportunities.

Keywords: Value Chain Mapping, Value Addition, Profit Margin, Econometric

1. Introduction

Livestock production is an integral part of Ethiopia's agricultural sector and plays a vital role in the national economy. This livestock sector has been contributing considerable portion to the economy of the country, and still promising to rally round the economic development of the country. Livestock contributes about 20% of the GDP, supporting the livelihoods of 70% of the population and generating about 11% of annual export earnings (SPS-LMM, 2010). Ethiopia has an estimated 52.13 million cattle, 24.2 million sheep, 22.6 million goats, and 44.89 million poultry birds, which exists in private holdings (CSA, 2012).

Ethiopia ranks first in Africa and tenth in the world with respect to the livestock population (Gebregziabher, 2010). However, livestock production is constrained by traditional technologies, limited supply of inputs (feed, breed and water), high diseases prevalence, poor or non-existent of extension service, limited credit services, lack of marketing support service, poor marketing infrastructure and lack of market information.

The growing domestic demand, which results from increased urbanization, higher income due to economic growth, and growing population, offers significant incentive for increased market oriented livestock production (Gebremedhin *et al.,* 2007). Poultry production as part of livestock production could be one alternative income generating mechanism and improving nutritional status for rural households in developing counties (Holloway and Ehui, 2002). Demographic changes and increasing consumer sovereignty are important trends in agro-food systems that agribusinesses must harness. Poultry meat is the fastest growing component of global meat production, consumption, and trade, with developing and transition economies contributing a leading role in the expansion (USAID, 2010).

The Ethiopian poultry value chain is not well developed and is traditional. Marketing of poultry and poultry products at open markets is common throughout the country and both live birds and eggs are sold on road sides (Demeke, 2007).

Poultry production in Adwa wereda offers important opportunity to increase household income, especially for women and landless youth. Efforts to promote market oriented poultry production in the study area have not succeeded mainly due to limited scale of production, severe feed supply, poor genetic potential and poor veterinary services (ILRI, 2013).

2. Materials and Methods

2.1 Description of the Study Area

Adwa wereda is located between 14° 19' 25" North latitude & 39° 4' 27" East longitude in central zone of Tigray. It is found about 925 km North of Addis Ababa and 235 km west of Mekelle. The distance of the study Tabias (Endamariam Shewito, Wedikeshi, Betehanes and Debregenet) from Adwa Town are 14 km, 6 km, 10 km and 18 km respectively.
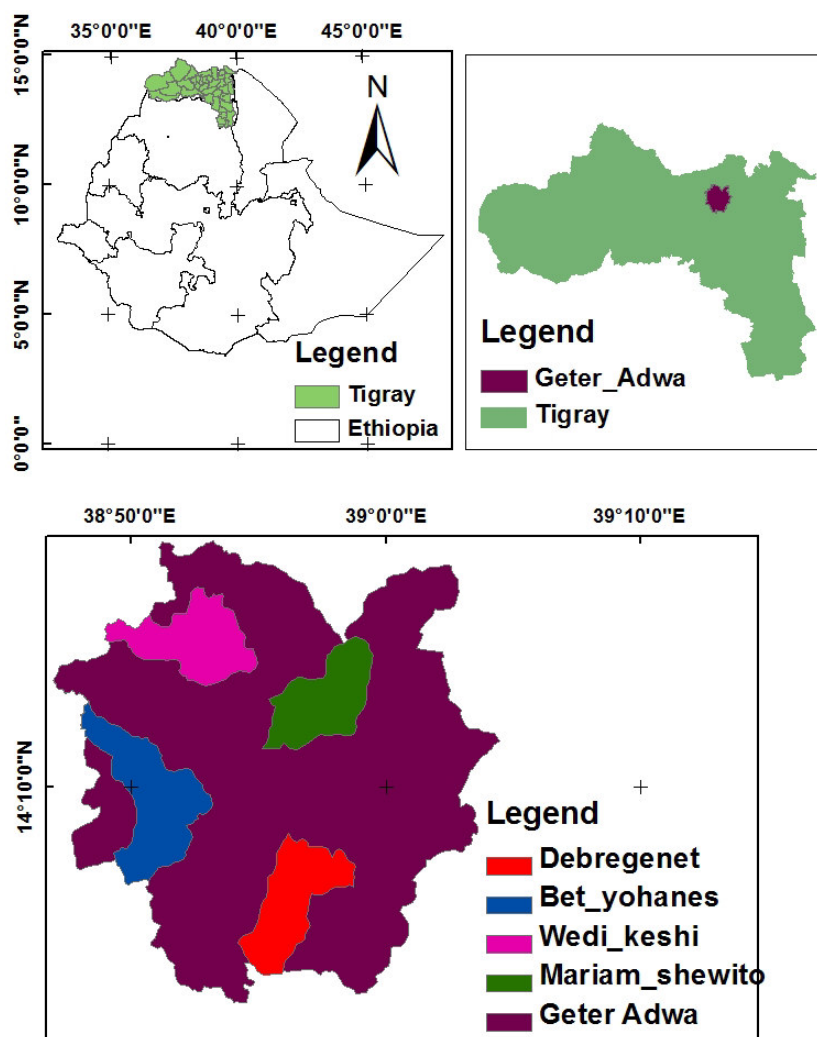
www.iiste.org

Figure 1: Map of the study area

Altitude, Temperature and Rainfall
The altitude of Adwa wereda ranges from 1805-2258 masl. The temperature of the area ranges from 18-28°c and mean temperature of 23°c. The mean annual rainfall of the area ranges from 600-850mm with mean of 725mm (ILRI, 2013).

Human Population
The total population of the wereda was 89,052. Of these population, 44,391(49.8%) and 44,661(50.2%) represented males and females respectively. this number was obtained from agricultural extension of the wereda. Tigrigna is the mother tongue for the population. The cultural food commonly used in the wereda is Injera with dero wet, shiro and keywet.

Livestock Production
Dairy, sheep, goats, poultry and honey bees productions are practiced in the wereda. Most of the production system is traditional and local poultry were dominant in the wereda (ILRI, 2013). Table 1 shows the types of livestock population in the study wereda.

Table 1 : Livestock population

Type	Number		
	Local	Improved	Total
Cattle	57,216	173	57,389
Sheep	46,573	-	46,573
Goats	85,326	-	85,326
Poultry	90,613 (81%)	21602 (19%)	112,215
Honey bee colonies	11,372	4,268	15,640

Source: ILRI, 2013.

Soil type Crop Production
The soil types of the study area are Lithic Leptosols, EutricLeptosols and Eutric Cambisols (ILRI, 2013). Mixed

crop-livestock farming system is common both in the mid and lowlands of the wereda. The main cereal crops growing in Adwa wereda are maize, wheat, teff, sorghum, barely, sorghum and finger millet. The pulses growing in this wereda are Field pea, Faba bean, lentil and chick pea. Maize, wheat, sorghum, barely and sorghum are also the main feeds for poultry in the study area. Therefore, crop production is a source of input for poultry production.

2.2 Research Design

Both quantitative and qualitative research data were collected and a survey type study was conducted in the study area. Descriptive type of research was adopted in this study. Poultry producers were taken as sampling frame purposively and then simple random sampling method was used to take representative respondents. A cross sectional research design was employed because; the study was conducted only in a time manner on small portion of sampled population.

2.3 Data type and source

Both qualitative and quantitative types of data were collected from the study area. In order to get the overall picture of poultry value chain in the study area, the study used both primary and secondary sources of data. The primary data on the poultry value chain functions were collected from poultry value chain actors through interview and focus group discussion.

2.4 Method of Sampling and Sample Size

With regard to sample size, it is believed that more sample households could have better representation of the target population. However, to make the research more manageable (both in time and resources) sample households were selected from the selected sample Tabias. The total numbers of Tabias found in the study area were 18 from which four Tabias were selected purposively based on information obtained from the wereda's bureau of Agriculture and Rural Development Office, accessibility to undertake the research, poultry potential and interest of LIVES project. Households that have chicken were the sampling frame for the study. Based on this, 6,066 households constituted the sampling frame. Totally, 200 respondents were selected according to the sample size determination table at alpha 0.05 (Bartlett *et al*., 2001). Then, respondents were taken using sample proportionate to size. The respondents were stratified in to female and male household heads. Finally, the households were listed with the assistance of DAs and then simple random sampling method was used to select respondents from each selected Tabias. 142 male and 58 female headed households were selected randomly from the listed sampling frame.

Table 2: Number of poultry producer households and sample taken from each Tabia

Name of Tabias	Poultry producers*			Sampled HH		
	Male	Female	Total	Males	Females	Total Sampled
Endamariam Shewito	1161	503	1664	38	17	55
Betyehanes	936	268	1204	31	9	40
Wediqeshi	1025	446	1471	33	15	48
Debregenet	1204	523	1727	40	17	57
Total	4326	1740	6066	142	58	200

*Source: Office of agriculture and rural development and Tabias administrative data, 2015.

In addition to farm households, sample respondents were also selected from the other value chain actors on the basis of their size and availability and were interviewed based on their respective functions in the chain. Therefore, 10 collectors, 2 wholesalers, 17 retailers, 12 processors and 52 consumers were selected in the study area and Adwa town using random and purposive sampling techniques. All licensed (8) and 21 non licensed traders were selected using purposive and simple random sampling techniques respectively. Processors and consumers were also selected randomly.

2.5 Method of Data Collection

Enumerators working as development agents in each of the study Tabia were recruited and trained for data collection. The questionnaire was translated in to Tigrigna and backward to English languages. Then developed questionnaire was pre-tested to evaluate its design and time taken for the interview. Hence, appropriate modifications were made on the questionnaire. During data collection, the trained interviewers collected enough and accurate information or data from poultry producers in each selected Tabias to achieve the objectives of the study and avoid potential bias from the sampled households in responding to questions. Data were collected under continuous supervision of the researcher. The filled-in interview schedule was thoroughly checked for completeness and consistency. Similarly, informal surveys are employed to study the marketing systems of poultry and eggs to obtain additional supporting information for the study. Data was also collected from traders and processors through administering a structured and semi-structured questionnaire.

Key informant interview was utilized to get the relevant data that shows current poultry value chain in the

study area. The key informants' interview was including: extension workers, input and output marketing experts, collectors, retailers, processors, end users, NGOs workers in the study area and poultry experts from BoARD

2.5.1 Focus group discussion
A checklist was developed to guide the sequence of information to be collected from the focus group discussions. Members of the focus group discussion were selected from different groups such as elders, religion leader, Tabia administrator, Tabia's women affairs, model farmers and youth associations so as to collect accurate information or data about poultry value chain functions and the current constraints on value chain of poultry in the study area. Discussions were conducted in each selected Tabias with the size of 8 persons per selected Tabia. The focus group discussion was facilitated and monitored by the researcher and every member of the group was given equal chance to express his/her ideas. Information concerning poultry value chain functions, services, constraints and opportunities were collected from the focus group discussions using checklist.

2.6 Data Processing and Analysis
The collected data was coded and entered in to Microsoft excel to be ready for analysis. The data collected from respondents were analyzed by using SPSS 16, STATA 10 software packages and ranking index.
Ranking analysis:
The Constraints and opportunities of poultry value chain in Adwa wereda were ranked using ranking index method (Musa *et al*., 2006). The ranking index was computed as:
Index =$Rn*C1+ Rn-1*C2….. +R1*Cn/ \Sigma Rn*C1 + Rn-1*C2….. + R1*Cn$; Where, Rn = Value given for the least ranked level (example if the least rank is 5th , then Rn = 5, Rn-1 =4, R1 =1); Cn= counts of the least ranked level (in the above example, the count of the 5th rank=Cn and the count of the 1st rank=C1.

3. Results and Discussion
3.1Constraints and Opportunities of poultry value chain in the study area
3.1.1 Production Constraints
In order to utilize the poultry sub sector, identifying the existing constraints and searching for solutions are of paramount importance. The major constraints that existed in poultry production in the study area has been identified thorough individual interview of producers, focus group discussions and discussions with key informants such as representatives of concerned government and non-government institutions, collectors, processors, retailers, and professionals. As a result, prioritization of the problems was made to identify the most important constraints that hinder the development of poultry sub sector in the study area.

Based on the result of this study, producers suffered from a number of difficulties and challenges that are antagonistic to sustain chick and egg production and marketing. Poultry production problems can affect the chick and egg marketing situations. Therefore, after having identified the major problems facing in the poultry production activities, farmers were requested to list their priority in order of their severity in poultry production. Table 20 summarizes the ranks of poultry production problems. The results show that primarily, disease, feed and knowledge were the major constraints in poultry production as indicated by all of the producers. According to Zeberga (2010), disease, absence of day and night housing, lack of exotic breed, lack of balanced feed, predation, low finance and lack of awareness were the most important constraints in the study area. Shortage of exotic chicken, lack of good management practices, which leads chicken diseases to spread widely as a result, it increases death rate of chicken in the area (Gebregziabher, 2010).
Disease: Disease is among the most important constraints in the production and marketing of village poultry product. As shown in table 20, disease is ranked as the first constraint by the poultry producers. According to the key informants (livestock experts and veterinarians), disease is the most important constraint in the subsector. They also added that *new castle, avian pasterolosis, coccidosis, Salmonellosis, pulorum disease* and *fowl pox* were the most common diseases in the study area.
Traditional treatment: Traditional treatment for the infected chickens was the bottleneck problem in the study area. Due to lack of functional extension service to change the attitude of farmers from traditional treatment to modern method of treatment, most of the farmers have used traditional treatments. This method of treatment is not scientifically supported and it was not also effective in curative for the infected chicken in the study area. Out of 200 sampled households, 172 (86%) farmers used traditional treatments for their chicken and the rest 28 (14%) farmers have tried to treat diseased chickens using modern or scientific method of treatment according to the advice given by the veterinarians (Table 15 in above). But this method of treatment lacks continuity and still they also used traditional treatments.
Lack of balanced feed: The common feed used for chicken reared under backyard poultry production system was only cereal grains which are a source of carbohydrate. Poultry producers did not consider that chicken need different feeds with different nutritional contents. Even the quantity and quality of grain given to the chicken were not enough to fulfill the requirement of the chicken. In backyard poultry production system, chickens get their feed by scratching on the ground and small supplement with cereals at home. The main reasons for this

constraint were not lack of grain and capital in the producers to formulate balanced feed for their chicken. But, lack of knowhow and attitude in the producers were the reasons for poor nutritional status of chicken. As shown in table 20, lack balanced feed is the second major constraint ranked in poultry production.

Lack of knowledge: Table 20 indicated that, lack of knowledge was ranked as the third production constraint. The producers indicated that, they lack knowledge of handling their chicken properly**.** Though producers had long experience in keeping poultry, they did not know the proper poultry management aspects such as disease prevention and treatments mechanisms, types of feeds they need, feeding system, housing and egg handling systems. Farmers in the study area lack know how about the value of sanitation. Due to this reason many farmers miss the benefit that could be obtained from their chicken.

Poor extension service: The extension service provided by the wereda's office of agriculture and rural development and NGOs is evaluated in terms of frequency, intensity and type of service given in the study area. Some farmers replied that, the FTCs and extension agents are found around the main roads which are far from their residence. For this reason, all households were not getting extension service due to poor infrastructure and far distance to the FTCs found in each Tabia. About 40% of the sampled households in the study area had no access to extension service provided by office of agriculture and rural development and other NGOs. As shown in table 20, extension was ranked as the forth problem, which affects expanding of poultry production system and number of poultry in the study area. So, continuity and coverage of extension services were the main constraints in poultry production in the study area.

Poor genetic potential of chicken: Most of the sampled famers in the study area had only local chickens and some of them owned both local and exotic chicken. About 56.5% of the sampled households had only local chickens and 43.5% of them had both local and exotic chickens. The households who had only exotic chickens were 3.5%. In case of the two groups, about 40.6% and 84.7% of the participants and non participants owned local chicken and about 59.4% and 15.3% of the participants and non participants owned exotic chicken respectively (Table 12 in the above). This result indicated that, there was lack of improved poultry breed distributed to the farmers. Local chickens have slow growth, low body weight, small egg size, and low yield. As shown in Table20, breed was ranked as the fifth constraint of poultry production by respondent producers. Therefore, it deserves urgent action from the BoARD and NGOs with regard to introduction of improved breed to sustain poultry production and marketing. In short, these problems are technical and management issues and can affect the production and productivity of poultry production in the wereda. Therefore, much focus has to be given to alleviate the described constraints, to tap the maximum potential of the poultry industry.

Lack of proper housing: Absence and lack of proper housing were other problems in the study area. Basically, farmers had enough local materials and space to construct poultry houses according to their size and age whereas; they gave very less emphasis for poultry housing. The survey study identified that there was no separate housing for the different groups. The house was common for all groups of chickens and was not with enough floor space and short height. Overcrowding and suffocation were faced on chickens and resulted in chick mortality and poor poultry productivity. Some households did not construct a house for their chicken and predation is also mentioned economically important. As one can see from Table 3, lack of proper housing is ranked as the sixth critical problems that affect poultry production in the study area.

Predation: was also the seventh critical problem that affects quantity of chick and egg produced. In addition to the above, finance was also ranked as the eighth problem of poultry production. Therefore, these constraints threat the sustainability of poultry production and marketing.

Table 3: Ranking of major production constraints by poultry producers

Constraints	Ranking index ratio	Rank
Disease	0.28	1
Poor breed	0.21	5
Lack of balanced feed	0.24	2
Lack of knowledge	0.23	3
Lack of housing	0.20	6
Shortage of extension service	0.22	4
Predation	0.193	7
Lack of finance	0.192	8

Source: Survey result, 2015.

As shown in table 4, about 71.9% and 59.7% of the participants and non participants has ranked disease as the first constraint respectively. Lack of balanced feed and knowledge were the second problems ranked by the 30.5% and 28.1% of the participants and 29.2.5% and 34.6% by non participants respectively.

Table 4: Ranking of production constraints by participants and non participants in %

Types constraints	Rank of Constraints							
	1st		2nd		3rd		4 th and above	
	Part. 128	Non part. 72	Part. 128	Non part. 72	Part. 128	Non part. 72	Part. 128	Non part 72
Disease	71.9	59.7	11.7	11.1	2.3	5.6	14.1	23.6
Breed	8	20	1.0	5.6	3.1	4.2	87	69.4
Feed	9.4	6.9	30.5	29.2	36.7	34.7	23.4	29.2
Knowledge	9.4	7.0	28.1	34.6	29.7	26.4	32.8	32
Housing	0	2.8	7	5.6	7	2.8	85.2	88.8
Ext. service	2.3	4.2	22	13.88	20.3	22.2	55.4	59.7
Predator	0	0	0	0	1.6	2.8	91.4	83.3
Finance	0	0	0	0	0	0	86	91.7

Source: Own survey result, 2015.

3.1.2 Poultry production opportunities

Village poultry production system is the most profitable economic activity in rural poor households. According to the focus group discussion, backyard poultry production solves different problems of rural poor households especially women. It serves as a starter capital stock, source of income, source of rich protein and also has crucial social and cultural values. Poultry production can be implemented everywhere by using low labor input in the backyard as a source of financial income especially for women and is easier to slaughter in holidays and to special guests compared to other livestock. It needs small area and small starting capital to run poultry farming. Since farmers have their own land, they can produce grains that are used as poultry feed. The distribution of improved poultry breed by bureau of agriculture and rural development is a great opportunity to run poultry production and improve the livelihood of farmers. Now days, in kind credit such as exotic chickens are running by the government to encourage farmers to engage poultry in the backyard. This kind of credit facilitates in utilizing the resource directly to the targeted strategy. In addition to that free vaccination is given by the government. Due to increasing population size and urbanization, demand for poultry and eggs is becoming increased in the study area. As shown in table 5, poultry need small starting capital, poultry need small space and inputs and presence of high demand were ranked by the producers as the 1st, 2nd and 3rd opportunities respectively. Good source of human nutrition especially for the poor, fast payback period and good source of income especially for women were also ranked by the producers as the 4th, 5th and 6th opportunities respectively. Then availability of grain and good social and cultural values were ranked as the 7th and 8th opportunities respectively. According to the Gebregziabher (2010), supply of manufactured poultry feed, existence of the necessary ingredients, miller and mixer in the farm, supply of exotic chicken in the near future, high turnover earning, small feed requirement, lower initial cost requirement, employment opportunities for poor women, landless farmers and disadvantaged groups are the production opportunities.

Table 5: Ranking Poultry production opportunities by producers

Opportunities	Ranking index ratio	Rank
Need small space and inputs	0.26	2
Need small starting capital	0.27	1
Fast payback period	0.21	5
High demand	0.23	3
Good source of human nutrition	0.22	4
Good source of income	0.20	6
Good social and cultural values	0.14	8
Availability grain	0.19	7
Distribution of exotic chicken	0.05	10
Free vaccination given	0.06	9

Source: Survey result, 2015.

3.1.3 Marketing constraints

Poultry farmers:

The constraints faced by producers in poultry marketing was far distance to the nearest market or wereda market, lack of transport, low number of chickens, disease, lack of market information, seasonal demand due to fasting months and price fluctuation. In addition to that, there was no organized market linkage among producers and traders. As shown in table 6, long distance to the market, low number of chicken and eggs and lack of market information were ranked by producers as the 1st, 2nd and 3rd market constraints that hinder market participation of farmers respectively. Lack of transport, seasonal demand, and price fluctuation were also ranked as the 4th, 5th and 6th important market problems respectively.

Table 6: Ranking major marketing constraints by producers

Constraints	Ranking index ratio	Rank
Distance	0.27	1
Low number of chicken and eggs	0.31	2
Seasonal demand	0.18	5
Lack information	0.22	3
Lack of transport	0.20	4
Price fluctuation	0.17	6

Source: Survey result, 2015.

Poultry traders:

Poultry and egg traders also had marketing constraints. The main constraints mentioned by the traders were lack of supply, disease, poor and absence of relationship among traders and producers, lack of information exchange, lack of knowledge on identifying healthy chicken and eggs, lack of transport, poor poultry breed, lack of marketing place and lack of credit. The licensed poultry traders replied that there were non- licensed traders who sold their chicken cheaper than their selling price. Since the non licensed traders did not pay a tax and house rent, they have sold their chicken in lower price than those traders who have license and pay tax and house rent. According to the licensed poultry traders, there was no organized poultry marketing system and was more traditional. As shown in table 7, lack of poultry supply, poor linkage among marketing actors, lack of credit access, lack of market information and presence of non licensed trader were ranked by sample traders as the 1st, 2nd, 3rd, 4th, and 5th major constraints respectively. Poor poultry breed, lack of shade (permanent marketing place), disease outbreak, lack of knowledge and poor transport facility were ranked by the sample poultry traders as the 6th, 7th, 8th, 9th and 10th major problems respectively. In case of poultry breed, they have replied that, some poultry breeds were refused by the consumers due to small size, rough legs and black color which is not attractive. A according to Zeberga (2010), absence of reliable and adequate information on price, shortage of supply were most frequently mentioned constraints in both chicken and egg marketing system.

Table7: Traders marketing constraints

Constraints	Ranking index ratio	Rank
Lack of supply	0.29	1
poor linkage	0.25	2
Disease	0.207	8
Poor breed	0.209	6
Lack of information	0.221	4
Lack of credit	0.23	3
Lack of knowledge	0.206	9
Lack of shade	0.208	7
Lack of transport	0.205	10
Presence of non licensed traders	0.22	5

Source: Survey result, 2015.

3.1.4 Marketing opportunities

Poultry and egg trading are simple and traders with low capital can run trade easily by using small financial resource. The increasing urbanization and demand of poultry and eggs in the study area makes poultry trade more profitable. According to the traders, poultry trading is less risky than trading other livestock. Transport access to some rural areas and Adwa town are among the poultry and egg market opportunities. This opportunity does not represent for the whole rural areas but only for the rural areas found around the main roads crossed them. A study conducted by Zeberga (2010) depicted that, less capital and labor requirement, less barriers of entry and exit, high profit margin, high demand and less risk are listed as the marketing opportunities.

4. Conclusion

The study was aimed at value chain analysis of poultry in Adwa Wereda, Central Zone of Tigray. The specific objectives of the study include identifying the major constraints and opportunities along the poultry value chain in the study area.

The production problems identified by the sampled households were poultry diseases prevalence, lack of extension service, poor feeding and housing system and lack of exotic chicken input. Distance, low number of chicken and eggs, lack information, lack of transport and seasonal demand and price fluctuation were also among the marketing constraints addressed by producers. Lack of permanent market place for egg and chicken traders, seasonal demand, lack of poultry and egg supply in the market and not considered license as one entry barrier element in the sample markets were some of the identified problems by traders.

The six top identified production opportunities are poultry need small starting capital; poultry need small space and inputs and presence of high demand, good source of human nutrition, fast payback period and good

source of income especially for women respectively. The increasing urbanization and demand of poultry and eggs in the study area makes poultry trade more profitable.

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