

Identification of Challenges and Opportunities of Extension Interventions Targeted at Women Poultry Producers in Semi Arid Areas of Ethiopia

Alem Tadesse Atsbeha

Department of Animal Science, College of Agriculture, Aksum University, Tigray, Ethiopia

Abstract: The main objective of this study was to identify challenges and opportunities of extension interventions in women poultry producers. Primary data were gathered through interviews/ questionnaires in North Western Zone of Tigray from 2014 to 2015. Descriptive statistics were used to analyze the data. In addition, t and chi-square tests were used to compare extension program participant and non participant women groups. The mean family sizes of the households who have access to extension service and not were 3.24 and 3.12 respectively. The average farm land size of the households was 0.64 hectare. Households with having small land size are more involved in poultry extension services. There is significant difference ($P < 0.028$) in provision of supplementary feed to their chickens between the households who have access to extension service and not. Improved/industrial poultry feed supply is critical problem to all poultry keepers in the study areas. In case of follow up about 31.69% of the women headed households have been never visited by the extension agents. The extension agents did not give special focus and priority to women headed households in the extension program although poultry production is more appropriate sector of women headed households. Therefore, serious attention has to be given to those landless or with small land size households, small family size. This can be achieved by creating sufficient awareness about poultry extension and effective distribution of poultry extension among women households in the study area.

Key words: Socio-economic • Exotic • Breeds • Constraints • Feed

INTRODUCTION

The extension system has been disseminating exotic chicken breeds (dominantly the Rhode Island Red (RIR) in the past years and recently Bovan) as part of a poultry extension package to improve the productivity of local chickens. Poultry extension intervention mainly focused on women backyard poultry producers. Through this extension service, chicken producer women might be benefited by improving egg productivity but unfortunately, no systematic effort has been made to evaluate the performance of these schemes. This is mainly because ownership pattern, control and access of resources, distribution of benefits and marketing have not been adequately addressed in the process of the interventions 1. Chickens and eggs are in many cases the only and most common items women commercialize in the market and they provide women with immediate income to cover household expenses 2. It is therefore important to actively involve women in the process of poultry

improvement. Although Women often have an important role in the development of family poultry production and it is traditionally the role of women in many developing countries 3, they gain less access to training programs on poultry production improvement techniques than men. As the result, an attempt to improve productivity in rural poultry farming suffers 4. In fact the adoption of poultry breeds in Ethiopia generally has been limited by a set of factors such as, lack of strong extension follow-up and complimentary inputs, disease, unavailability of credit services and market problems 5. On the other hand scientists and the government of Ethiopia have been promoting a crossbreeding scheme through distribution of cockerels from selected exotic breeds with the intention of improving the production performance of the local chicken for the last four decades 6. An alternative scheme to improve poultry production is introduction of exotic poultry breeds to backyard poultry producers. However, the productivity of poultry and income improvement of women headed households and the extent in distribution

of exotic breed chickens was not yet studied. Therefore the objective of this study was to identify the challenges and opportunities of extension interventions targeted at women poultry producers in North Western zone of Tigray.

MATERIALS AND METHODS

Description of the Study Area: The study was conducted in three districts of North-Western Tigray. This zone is one of the potential areas for backyard poultry production in the country. In addition, the demand for poultry meat and eggs is high due to the presence of military camps, refugees and urban residents.

North-Western zone is located between 14°00'N latitude 37°50'E longitude and 14.20°N latitude 38.25°E longitude approximately 1078 km north of Addis Ababa. Altitude of the area is ranging from 1600 to 2200 m asl. The study area receives annual rainfall ranging from 700 to 1135 mm with maximum and minimum daily temperature of 35°C & 18°C. The production system is mixed farming, comprised of crop and livestock production.

Sampling Technique and Sample Size Determination: North-West zone has 8 districts out of these, 3 districts were selected based on their potential in poultry production and 2 Tabias from each district were selected randomly. From the total women headed households, those who rear at least one chicken were identified as poultry producers. According to annual report of 7th the total number of women headed poultry producers in the selected districts were 1816. Then sample of women headed poultry producers were taken from each Tabia proportionally and Yemane formula, 8 was applied to determine the total sample size.

$$n = \frac{N}{1 + N(e)^2}$$

where, N= total population, n= sample size, e= the level of precision /Acceptable error

N = 1816 is number of women headed households who rear chickens in the selected districts e = 7% (0.07) level of precision.

$$n = \frac{1816}{1 + 1816(0.07)^2} = 183$$

According the above formula, 183 samples were taken from women headed poultry producers.

Data collection and Analysis Method: Data was collected by interviewing the producers using a semi-structured questionnaire. The questionnaire was tested in one Tabia to examine and to correct some technical mistakes. Secondary data like number of exotic chickens distributed in the past 5 years; breed type of chickens and type of poultry extension services were collected from the Wereda and Tabia Agriculture and Rural Development office. Statistical analysis of the primary quantitative and qualitative data was made using SPSS 20 software. Simple descriptive statistics such as mean, range, standard deviation and percentile were employed in the form of tables and figures. In addition, chi-square tests were used to compare extension program participant and non participant women sample groups Significance difference was analyzed at P<0.07 level of significance.

RESULTS

Respondents Personal and Socio-Economic Characteristics: Age of respondents was assumed as one of the factors that determine whether the households have access to poultry extension or not. Accordingly, in the study area, the average age households with access to extension service was 25 years while no access to extension service was 29 years with minimum and maximum age of 25 and 75 years (Table 1).

Table 1: Age of respondents

Age	Access to extension Percent	No access to extension Percent	Total Percent
25-35	21.31	9.83	31.14
36-45	16.40	13.21	29.64
≥46	22.85	16.40	38.22
Total	60.56	39.44	100
Mean			
St.Dev			
MD	3.00		
Min			
Max			
t value	0.9510	P value	0.8273

Table 2: Household size of respondents

Household Size	Access to extension Percent	No access to extension Percent	Total Percent
≤3	36.06	24.60	60.56
4-6	22.95	14.75	37.70
≥7	1.55	0.00	1.55
Total	60.56	39.44	100
Mean			
St.Dev			
MD	0.12		
Min			
Max			
t value		P value	0.3800

Table 3: Educational Status of the respondents in percent

Status of Education	Access to extension	No access to extension	Total
Illiterate	24.59	18.04	42.23
1-4	9.83	6.55	16.40
5-8	4.92	4.92	9.83
9-10	13.11	4.92	18.03
11-12	8.20	3.28	11.47
≥12	0.00	1.34	1.34
Total	60.65	39.35	100
Mean			
St. Dev			
MD	.402439		
t value	-1.2006	P value	

Result in Table 2 depicted that above 36% of the households who have access to extension service and 24.6% of the households who have not access to extension service have less than 3 family members. This is in contrary to the report of Adisa and Akinkunmi 9 which stated that majority (60.3%) of the women headed household size is between 6-8 people. The mean family size of the households is 3.24 and 3.12 for the households who have access to poultry extension service and for those households who have not access to extension service respectively. This shows that, households with relatively large family size are more involved in poultry production.

Most of the respondent's education level is very low. As depicted in Table 3 more than 42 % of the poultry producer households were illiterate, 26.2% from grade 1 to 8, 29.5% of the households were from grade 9 to 12 and the education level of the rest 1.3% of the households were above 12 grade. This finding is in line with those of Muhammad *et al.* 10 who found that majority (59.9%) of the respondents were illiterate, followed by 15.7 and 9.7% that attained primary and middle education, respectively whereas this is directly in opposite to the report of Adisa and Akinkunmi 9 that literacy level of women poultry producers in Oyo state; Nigeria is as much as tertiary education (71.2%).

Experience of the women headed household in poultry production is one of the factors that affect the access of poultry extension services. Table 4 shows that 39.44% of the households who have access to extension service had more than 10 years, 9.8% of the households have in the range of 6-10 years and 11.3% of the households had less than 5 years experience. On the other hand 32.9% of the households who have not access to poultry extension service had above 10 years experience, 3.3% had 6 to 10 years experience and the remaining 3.3% of the households who have not access to extension service had less than 5 years experience. In the case of

farm experiences Muhammad *et al.* 10 reported that, 42.9 and 42.5% of the respondents were below 10 and 11 to 25 years respectively, whereas only 14.5% of the respondents were above 25 years of age.

As depicted in Table 5 Majority of the households (57.8%) owned less than one hectare, 28% have 1 to 2 hectares and 14.5% possessed greater than 2 hectares. The mean farm land size of the households is 0.64 hectare with standard deviation of 0.477. This result is slightly varied from the reported that about 65% of participants and 24.3% of non-participants cultivated land areas of between 1.0 and 3.0 hectares while approximately 44% of non participants cultivated less than one hectare 11. Most of the households who have access to extension service (39.4%) had less than one hectare but only 1.4% of the participants have more than 2 hectares. On the other hand 18% and 13.11% of the non participant households have less than 1 hectare and greater than 2 hectares.

Poultry Feed, Housing and Health Management: As shown in Table 6, more than 73% of the women headed households who are beneficiary of poultry extension service supplement their chicken with grains where as 27% of the households do not supplement their chickens. From the non beneficiary households 51% of them provide grains as supplementary feed to their chickens but 49% of these households did not supplement their chickens. According to the respondents improved/ industrial poultry feed supply is critical problem to all poultry keepers in the study areas. Indeed lack of improved poultry feed is common problem of Tigray region. In case of poultry house majority of the households (82.9%) who have access to poultry extension service had construct separate poultry house whereas 58.3% of the non beneficiary households had not separate poultry house. About 54% of the extension participant households vaccinate their chickens whereas 81.9% of the households who have not access to extension service did not vaccinate their chickens.

Poultry Extension Services: Most of the women headed households (63.9%) have information about the extension service. There is significant different in access of information between the households who have access to extension service and not. Similarly, Umunna *et al.* 12 confirmed that a larger proportion of the farmers (30.8%) got information on poultry production through extension agents. According to the respondents, there is no separate poultry extension service run independently,

Table 4: Years of poultry Farming Experience in percent

Experience in years	Access to extension	No access to extension	Total Percent
	Percent	Percent	
≤5	11.29	3.28	14.75
6-10	9.83	3.28	13.11
≥10	39.44	32.88	72.14
Total	60.56	39.44	100
Mean			
St.Dev			
MD	6.49		
Min			
Max			
t value		P value	0.0814

Table 5: Farm land holding in hectare

Farm land in hectare	Access to extension	No access to extension	Total Percent
	percent	Percent	
< 1	39.44	18.03	57.47
1-2	19.72	8.30	28.02
>2	1.40	13.11	14.51
Total	60.56	39.44	100
Mean			
St.Dev			
MD	.0432566		
Min			
Max			
t value		P value	0.3820

Table 6: Provision of supplementary feed, housing and health management by women headed households

Household's response	Access to extension	No access to extension	X ² value	P value
Feed supplement				
Yes	73.87 %	51.39%	7.122	0.028
No	26.13%	48.61%		
Total	100	100		
Separate Poultry house				
Yes	82.9	41.67%	15.974	0.000
No	17.1	58.33%		
Total	100	100		
Vaccination				
Yes	54.05%	18.06%	12.163	0.002
No	45.95 %	81.94%		
Total	100%	100%		

rather it is handled as ingredient of the overall extension program. The respondents were also revealed that, most of the extension service is focused on irrigation and crop production programs. As illustrated in Table 7, 31.7% of the women headed households have been never visited by the extension agents, 44.8% have been visited once a month, 18.9 % have been visited twice a month and the remaining 3.3% and 1.6% of the households have been visited three and four times per month respectively. Statistically significant difference ($P < 0.000$) was observed between the households who have access to extension service and not. Majority of the households have been

visited at maximum of once a month. This fortifies the above mentioned limitations of poultry extension services. In line with this result Umunna *et al.* 12 reported that, the substantial portion (40.7%) of the respondents had varied frequency of access from once in two months to once in a year. Type of poultry extension service is more focused on provision of exotic and cross breed chickens. Results in Table 7 showed that 39.3% of the households have no access to poultry extension services. From the households who have access to extension services however, 33.9% of them have got poultry breeding service which is primarily the distribution of different improved

poultry breeds. The rest 11.5%, 4.9% and 3.3% of the women headed households have got poultry health service, poultry housing and feeding services respectively and the remaining 7.1% of the households have got all types of poultry extension services.

Distribution of Exotic Poultry Breeds: According to bureau of Agriculture in the study area, 88.6% of the total distributed exotic poultry breeds/strains in the past six years were Bovans Brown birds followed by a Barred Plymouth Rock (6.5%) and white leghorn birds (4.9%). Livestock experts of the respected districts described that, women headed households benefited from the distribution of exotic chickens in 2006 E.C were 100 in Tahtay koraro, 281 in A/tsimbla and 112 in M/zana districts. These are 1.2%, 4.5% and 0.97% of the total women headed households in T/koraro, A/timbla and M/zana respectively.

Figure 2 illustrated that 97.3% and 48.6% of the women headed households who have access to extension services had cross and exotic breeds respectively whereas 0.9% and 1.39% of the households who have not access to extension services reared cross and exotic breeds of chickens respectively. The probability of keeping cross breed chickens is significantly associated ($P < 0.008$) with the households who have access to extension services.

Table 7: Information and access of extension service to women headed households

Household's response	Percent	X^2 value	P value
Do you have any information about poultry extension services?			
Yes	63.9	23.536	0.000
No	36.1		
Total	100		
How many times the extension agents visit your house?			
Never	31.69	24.943	0.000
Once a month	44.81		
Twice a month	18.58		
Three times a month	3.28		
4 times a month	1.64		
Total	100		
What type of extension service have you got?			
Poultry feed	3.28	32.686	0.000
Poultry health	11.48		
Poultry breeding	33.9		
Poultry housing	4.9		
All type	7.1		
No access	39.34		
Total	100		
Did you get any training on poultry production?			
Yes	19.67	1.672	0.184
No	80.33		
Total	100		

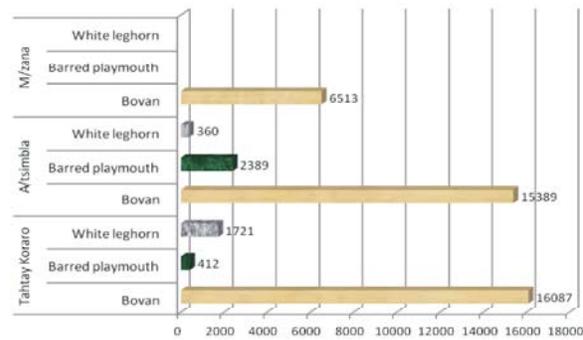


Fig. 1: Exotic poultry breeds distributed to three districts of North Western zone from 2001 to 2006 EC

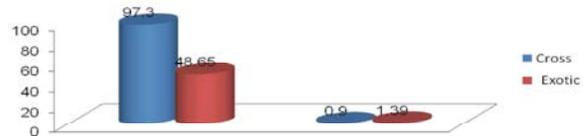


Fig. 2: Women headed households reared exotic and cross breed chickens

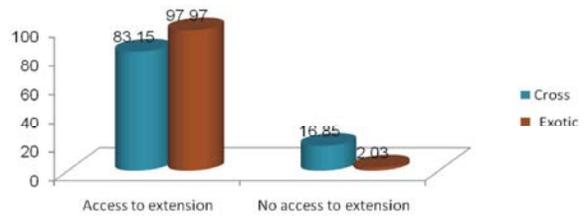


Fig. 3: Percent of exotic and cross breed chickens reared by women headed households.

Figure 3 also show that 97.97% and 83.15% of the total exotic and cross breed chickens are owned by the women headed households who have access to extension services respectively.

Poultry breed preference of the women headed households as indicated in Table 8 is that 40.5% and 32.4% of the households who have access to extension service preferred cross and exotic breeds respectively while majority (55.5) of the households who have not access to extension service preferred to rear local birds followed by 27.8% cross and 16.7% exotic breeds. The major reason of the households to prefer exotic and cross breed chickens were high productivity of exotic chickens (60.7%) and good disease resistance of the cross breeds (30.6%). Solomon *et al.* 13 also reported that due to low productivity of village chickens, 98.1% of the farmers indicated their interest towards having exotic breeds. The main reason of the rest households who prefer local chickens were disease resistance (40.3) and broodiness nature of the birds (30.7).

Table 8: Poultry breed preference of women headed house and their reason

Description	Access to extension		No access to extension		X^2 value	P value
	Frequency	Percent	Frequency	Percent		
Breed preference						
Local	30	27.03	40	55.5	14.542	0.002
Cross	45	40.54	20	27.83		
Exotic	36	32.43	12	16.67		
Total	111	100	72	100		
Reason for preference						
Productivity	67	60.36	21	29.16	14.127	0.007
Disease resistance	34	30.63	29	40.28		
Broodiness	10	9.01	22	30.56		
Total	111	100	72	100		

Table 9: Major poultry production constraints in the study area

Description	Percent
Major poultry production constraints in the area	
Predators	15.85
Shortage of extension	40.44
Loabour shortage	4.92
Disease	25.14
Feed shortage	13.1
Land shortage	0.55
Total	100

Poultry Production Constraints: As shown in Table 9 out of the total constraints lack of poultry extension service was the highest (40.4%) followed by poultry disease (25.1%), Predators (15.9%), Feed shortage (13.1%) and loabour shortage (4.9%). A very small percent of the women headed households were indicated land shortage as constraint (0.55%). This implies that land size has no effect on traditional poultry production system. This result is in agreement with Ja'afar-Furo and Gabdo 14 who reported that lack of awareness extension program was the highest (100%) as all the respondents reported. Similarly Ovwigho *et al.* 15 recommend that stressed improving extension services as a need to stir the minds of chicken egg producers is essential towards adopting the best chicken management system.

DISCUSSION

Respondent's Characteristics: Age difference between the women households who have access to poultry extension and have not access to poultry extension is not significant. This implies that age of the respondents within the specified age range has no effect on their access for poultry extension. This is because more than 60% of the respondents were in the age range of 25 to 45 years. This shows that most of the households are within the productive age range. This age range is similar to the report of Muhammad *et al.* 10 which stated that 51.07% of

the respondents fall under the category of 26 to 50 years but this is slightly higher than the report of Umunna *et al.* 12 from Nigeria that most of the farmers (50.7%) were within the age range of 20-29 years. In addition households with relatively large family size are more involved in poultry production.

Most of the households involved in rural poultry production were illiterate. There is no significant difference in their level of education between the households who have access to poultry extension service and have not access to extension service. The illiterate women household heads definitely are more participating in poultry extension service than the households with education level of greater than or equal to grade 12. This indicates that, when the education level of the households increased their assumption towards the sector will be changed. They consider poultry production as secondary activity because their settlement in the village will be on and off. Poultry farming experience of the women headed households has significant relationship with the access of poultry extension services of the households at 10% level of significance. Expectedly, the more the numbers of years of experience in poultry keeping, the better the ability to manage the poultry business. This shows that households who have long years of experience are more attracted to participate in the poultry extension services provided by Bureau of Agriculture in the study area. Similarly 11 reported that majority of the participants in women in Agriculture program (67.6%) and only about 27% of non-participants had farming experience of between 12 to 21 years. Female headed households with small land size are more involved in poultry extension services. This means owning large farm land size leads the households to focus on other farming activities like crop production and their participation to extension services is more skewed to crop production extension service other than to poultry extension services.

Poultry Management: There is significant difference ($P < 0.028$) between the households who have access to extension service and not in provision of grains as supplementary feed to their chickens. This implies that the households who have access to extension service have better knowledge and understanding on poultry feed and feeding management than the rest non beneficiary households. In line with this Tsegaw *et al.* 16 reported that much fewer households provided full supplementation of feed to their chickens in North Gondar. Housing is also highly associated ($P < 0.000$) with the households who have access to extension services. These findings are in agreement with Moges, *et al.* [17] who reported that only 22.1% of farmers provide separate overnight houses for village chickens. Lack of knowledge and awareness and poor attention to poultry extension services provided by bureau of agriculture were some of the reasons for not constructing separate chicken house. Yakubu 18 also stated that Proper housing does not only provide good environment but also provides adequate ventilation for the birds to lay eggs in nest boxes, as well as to feed and sleep in comfort and for security purposes. The households who have access to extension service are significantly different from the non participant households in vaccinating their chickens ($P < 0.002$). The highest percentage of the households who did not vaccinate their chickens was from the non participant of poultry extension services. This might be due to lack of information hence their contact with the extension agents could be very low. This is in agreement with the reported that, farmers used modern medicine were small 18%, because low veterinarian accessibility, lack of awareness and inadaptability to use modern medicines 19.

Training and Distribution of Exotic Breeds: Type of poultry extension service given to the households who have access to extension service and the households who have not access extension service are significantly different ($P < 0.000$). Over 80% of the respondents were not trained on any of poultry management practices. Distribution of exotic breeds only is not the way to improve productivity of poultry but also capacitate the knowledge and skill of the producers through training is indispensable. According to the respondents training had a positive impact on improvement of egg production. Previous findings of Abida *et al.* 20 revealed that egg production per bird was higher after (75.2%) than before (37.7%) training. The higher egg production could be

recognized to better care and management of the birds and rearing of more productive strains or improved breeds. Lack of training has also impact in the distribution of exotic breeds in the area. Very small participation of women headed households in the distribution of improved exotic birds implies that, the extension agents did not give special focus and priority to women headed households although, poultry production is more appropriate sector to women headed households.

The highest flock size in the households who have access to extension services could be due accredited to their access of information about improved poultry production provided by the extension agents hence their rate of visit to farmers training center is higher than the households who have not access to extension services. In line with this result Abida *et al.* 20 reported that the increase in flock size per household after training could be attributed to improved practices learned by the women poultry keepers and increased knowledge of the importance of rural chicken in survival income generation. Households have different reasons in preferring poultry breeds for rearing. There is significant difference ($P < 0.007$) between the households in their reasons. Some farmers use local birds to incubate eggs from exotic breeds hence exotic chickens lack their broodiness behavior. Although rearing exotic breeds is appreciated to have better egg production, keeping local chickens is also essential to conserve and sustain the genetic diversity of the local chickens.

CONCLUSIONS

From this study it was concluded that poultry production is more appropriate sector to land less women headed households or with small size of farm land, small family size and low educational background. There is no separate poultry extension service provided independently, rather it is treated as a component of the overall extension program. Though provision of industrial poultry feed is critical problem in the study areas, there was significant difference in poultry feeding, housing and vaccination between the households who have access to extension service and not. Therefore, serious attention has to be given to women headed households those landless or with small land size households and small family size. This can be achieved by creating sufficient awareness about poultry extension and effective distribution of poultry extension among women households in the study area.

REFERENCES

1. Sonaiya, E.B., 1990. The context and prospects for development of smallholder rural poultry production in Africa. In proceedings, CTA Seminar on Smallholder Rural Poultry Production, pp: 35-52.
2. Aklilu, H.A., C.J.M. Almekinders and A.J. Van Der Zijpp, 2007. Village poultry consumption and marketing in relation to gender, religious festivals and market access. *Tropical Animal Health and Production*, 39: 165-177.
3. Tadelle, D. and B. Ogle, 2001. Village poultry production system in the central high lands of Ethiopia. *J. Tropical Animal Health and Production*, 33: 521-537.
4. Mengesha, M., B. Tamir and D. Tadelle, 2008. Socio-economical contribution and labor allocation of village chicken production of Jamma district, South Wollo, Ethiopia. *Livestock Research for Rural Development*, 20(10).
5. Teklewold, H., L. Dadi, A. Yami and N. Dana, 2006. Determinants of adoption of poultry technology: a double hurdle approach. *Livestock Research for Rural Development*, Volume 18, Article # 40. Retrieved May 23, 2006 a. from <http://www.cipav.org.co/lrrd/lrrd18/3/tek118040.htm>.
6. Fisseha, M., T. Azage and D. Tadelle, 2010. Indigenous chicken production and marketing systems in Ethiopia: Characteristics and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 24. Nairobi, Kenya, ILRI.
7. Agriculture and Rural Development Office, 2013. Annual report on agricultural extension practices in North-Western zone of Tigray, Ethiopia.
8. Yamane, T., 1967. *Statistics, An Introductory Analysis*, 2nd Ed, New York: Harper and Row.
9. Adisa, B.O. and J.A. Akinkunmi, 2012. Assessing Participation of Women in Poultry Production as a sustainable Livelihood Choice in Oyo State, Nigeria. *IJPAES*, 2: 73-82.
10. Muhammad, Z.H., M.B. Tahir, F.K. Muhammad, M. Khalid, Mahr-un-Nisa, Abd R. Ur I. Naveed, M. Nasir and H. Munawar, 2012. Impact of poultry extension services for the rural women. *African Journal of Agricultural Research*, 7(12): 1893-1900.
11. Tologbonse, E.B., M.M. Jibrin, S.J. Auta and M.A. Damisa, 2013. Factors influencing women participation in Women In Agriculture (WIA) Programme of Kaduna State Agricultural Development Project, Nigeria. *International Journal of Agricultural Economics and Extension*, 1(7): 047-054.
12. Umunna, M.O., A. Adeeko, O.T. Onifade, O.S. Adigun and A.N. Apapa, 2012. Poultry Farmers' Access to Extension Services in Atisbo Local Government Area of Oyo State, Nigeria. *African Journal of Basic & Applied Sciences*, 4(6): 221-225.
13. Solomon, Z., K. Binyam, A. Bilatu and A. Ferede, 2013. Village chicken production systems in Metekel zone, Northwest Ethiopia. *Wudpecker Journal of Agricultural Research*, 2(9): 256-262.
14. Ja'afar-Furo, M.R. and B.H. Gabdo, 2010. Identifying Major Factors of Poultry Production as Sustainable Enterprise among Farmers Using Improved Methods in Rural Nigeria. *International Journal of Poultry Science*, 9(5): 459-463.
15. Ovwigho, B.O., L. Bratte and J.O. Isikwenu, 2009. Chicken management systems and egg production in Delta State, Nigeria. *Int. J. Poult. Sci.*, 8: 21-24.
16. Tsegaw, F., A. Birhanu and K. Tesfu, 2013. Small-scale family poultry production in north Gondar: characteristics, productivity and constraints; *Livestock Research for Rural Development*, 25(9).
17. Moges, F., A. Mellese and T. Dessie, 2010. Assessment of village chicken production system and evaluation of the productive and reproductive performance of local chicken ecotype in Bure district, Northwest Ethiopia. *African Journal of Agricultural Research*, 5(13): 1739-1748.
18. Yakubu, A., 2010. Indigenous chicken flocks of Nasarawa state, Nigeria: their characteristics, husbandry and productivity. *Tropical and Subtropical Agroecosystems*, 12: 69-76.
19. Melkamu, B.Y. and A. Wube, 2013. Constraints and Opportunities of Village Chicken Production in DebsanTiKara Keble at GonderZuriaWoreda, North Gonder, Ethiopia. *International Journal of Scientific and Research Publications*, 3(9): 1-8.
20. Abida, P., H.K. Sohail, R. Abdul and A. Mian, 2013. Impact of Training on Rural Chicken Production Reared By Women in Islamabad/ Rawalpindi, Pakistan. *Annual Review & Research in Biology*, 3(4): 714-723.