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Research paper

## Status and drivers of village poultry production and its efficiency in Ethiopia

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### ABSTRACT

In many developing countries like Ethiopia village poultry makes up a large part of the national poultry meat and egg production and plays important roles economically, nutritionally, and socio-culturally. Households in Ethiopia have not fully benefitted from the potential of village poultry as little attention is given to the sub-sector from research and development efforts. The little research and development efforts tend to explore improvements largely via technical approaches by overlooking the socio-economic and institutional context under which the producers operate. This study aims to identify the technical, household, infrastructural and institutional drivers or barriers that influence village poultry production and its productivity in Ethiopia. Across sectional survey of 5004 households was undertaken in the four highland regions of Ethiopia. Descriptive statistics and econometric tools such as probit and Heckman's two stage models and their marginal effects were used to analyze the status and driving factors of village poultry production and productivity. Distance to all weather roads decreased flock size and the probability of poultry ownership. Contact with development agents and participation in training increased flock size and the probability of purchasing inputs and adopting commercial breeds. Flock size and ownership of commercial breeds raised households' likelihood of purchasing poultry input. Our results indicate that research and development efforts have to improve not only production performance through better use of inputs and technologies but also have to equally emphasize increasing the benefits for smallholder producers by providing infrastructural and institutional support to proper target households.

### 1. Introduction

Many rural households keep poultry in their farmyard especially in the low income countries where extreme poverty is primarily rural phenomenon. This practice which involves production of small flocks of birds largely using scavenging feed resources is commonly referred to as village poultry (Hailemichael, 2007). Village poultry makes up the largest proportion of the national poultry population in most low income countries. In Africa, over 80% of poultry products come from village poultry (de Bruyn et al., 2015). This is viewed as an opportunity because it is sometimes stated that if the suppliers of poultry are smallholder farmers instead of large-scale commercial companies, poultry would better contribute to poverty reduction since there is expanding demand driven by urbanization, population and income growth (Garces, 2002). Village poultry is described as the starting step in climbing the 'livestock ladder' which allows poor people to increase economic activities and escape poverty (Dolberg, 2003). It is also considered as a flexible production system that is easily adaptable to different agro-ecological zones (Ahlers et al., 2009).

Village poultry keeping is associated with the self-reliance of

women. Many poor women in developing countries are involved in poultry keeping. Women own 7 out of 10 birds in Africa (Guèye, 2000). Thus, the link between poultry interventions and improvement of women's status – along with the associated improvements in terms of nutrition and other benefits for the entire family (Quisumbing and McClafferty, 2006) – seems to be direct. It is advocated that interventions to improve village poultry production may be justified, as they can help women and their families to generate social capital and enter a positive spiral of events that may move them out of poverty.

Village poultry keeping in Ethiopia refers to the practice which involves the production of mostly small flocks of birds largely using scavenging feed resources is commonly in rural areas (Hailemichael, 2007). Ethiopia is one of the countries in the world where village poultry plays a dominant role in total poultry production. The national poultry population of Ethiopia was estimated to be about fifty million more than 96% of which belonged to village poultry (CSA, 2013).

Village poultry keeping in the country significantly contributes to the livelihoods of poor households: economically as starter capital, as a means to recover from disasters, as an accessible protein source and for income and exchange purposes, and socio-culturally for hospitality and

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**Table 1**  
Descriptive values of dependent and independent variables included in the regression models.

Variables	N	Mean	Std. Dev.	Min	Max
<b>Dependent variables</b>					
Ownership (yes = 1)	5004	0.60	0.49	0	1
Flock size (number)	2979	14.19	14.84	1	157
Purchasing poultry input (yes = 1,)	2979	0.20	0.40	0	\1
Ownership of commercial breed (Yes = 1)	2979	0.19	0.39	0	1
<b>Independent variables</b>					
Amhara <sup>a</sup> (yes = 1)	5004	0.30	0.46	0	1
Oromia <sup>a</sup> (yes = 1)	5004	0.30	0.46	0	1
SNNPR <sup>a</sup> (yes = 1)	5004	0.20	0.40	0	1
Age of household head (years)	5004	45.54	12.56	18	95
Age square of household head (years)	5004	2231.51	1266.95	324	9025
Sex of household head (Male = 1, Female = 0)	5004	0.81	0.39	0	1
Proportion of adult female family members	5004	0.51	0.20	0	1
Dependency ratio	4950	1.07	0.83	0	6
Highest grade reached by household head (yrs)	5004	2.28	3.13	0	15
Family size (number)	5004	5.91	2.25	1	22
Land size (ha)	5004	1.41	1.37	0	18
Asset (ETB 1000)	5004	17.03	55.16	0	912.8
Cattle production (Yes = 1,)	5004	0.86	0.35	0	1
Sheep and goat production (Yes = 1)	5004	0.53	0.50	0	1
Household contact with DA (Yes = 1)	5004	0.43	0.49	0	1
Distance to livestock market (walking minutes)	4942	87.29	63.48	0	600
Distance to market town (walking minutes)	4981	164.60	114.40	0	720
Frequency of market/week	4899	1.30	0.47	0	7
Distance to all weather road (walking minutes)	4770	47.67	71.21	0	650
Distance to dry weather road (walking minutes)	4506	23.87	34.79	0	480
Training on poultry (Yes = 1,)	5004	0.22	0.42	0	1
Population density (number of persons per hectare)	4976	3.13	3.01	0.46	28.90

<sup>a</sup> Base region is Tigray.

**Table 2**  
Flock size and structure across households that own poultry (N = 2979).

Flock category	Mean ownership	% of flock category
hens	7.66	54
Cocks <sup>a</sup>	2.84	20
pullets	1.85	13
chicks	1.85	13
Total	14.2	100

<sup>a</sup> Cocks also include cockerels.

exchange of gifts to strengthen social relationships (Hailemichael et al., 2008). As animal source foods, poultry meat and eggs contain high-quality protein and micronutrients which can increase nutrient adequacy of traditional diets drawn from staple crops (de Bruyn et al., 2015).

Despite its multiple roles and instrumental potential for livelihood improvements for the poor, village poultry in Ethiopia receives limited attention in research and development efforts. The extant research work on poultry is concentrated on technical aspects with a near total neglect of the socio-economic and institutional aspects of village poultry production and management. This study is, therefore, aimed at analyzing the technical, household, infrastructural and institutional drivers or barriers of village poultry production and its efficiency in Ethiopia and identifying implications for research and development interventions.

## 2. Methodology

### 2.1. Data sources and type

This study is part of a broader project of The Livestock and Irrigation Value Chains for Ethiopian smallholders (LIVES) of ILRI which aimed to explore and integrate the use of technological, institutional and organizational approaches for development of smallholders including poultry keepers in Ethiopia (LIVES, 2011). The results of this study are based on analysis of data drawn from a cross-sectional baseline survey of 5004 smallholder households undertaken by the LIVES project in ten zones of the four highland regions of Ethiopia, viz., Tigray, Amhara, Oromia and Southern regions. These regions are characterized by different agricultural production systems. Amhara and Tigray have cereal based production systems; but most SNNPR and partly Oromia are characterized by horticulture-based production systems.

The study area accounts for about 13.6% of the national area. The data were collected by the LIVES project during 2012–13 from 484 local administrative units called PA's in 71 districts, 10 zones within the four regions. The data collected included household characteristics, flock variables, production inputs and information related to the availability of infrastructure and institutional services. The four major regional states collectively account for about 96% of the total national poultry population (CSA, 2013).

### 2.2. Model specification and estimation techniques

#### 2.2.1. Model specification

As defined in the introduction, village poultry plays a multitude of roles in the livelihoods of rural households in income generation, nutrition, strengthening social relationships, and poverty reduction. If households are to better engage in and get more benefits from poultry production, the research and development initiatives need to holistically understand and overcome not only the technical but also the socio-economic and institutional challenges (Hailemichael, 2007; FAO, 2014). Households cannot use technology and increase poultry production unless they have profitable marketing opportunities (Anandajayasekeram and Gebremedhin, 2009). The integrated use of technological, institutional and organizational innovations is recommended for development of smallholder agriculture (including poultry keeping) if they are to increase and sustain offtake of livestock to contribute to enhanced income and gender equitable wealth creation (Anandajayasekeram and Gebremedhin, 2009).

We identified potential driving factors of households' participation in and level of poultry production and their use of improved inputs based on previous study (Hailemichael et al., 2016). These are grouped as household, flock, market infrastructure, and institutional support related factors. This study aimed to analyze the effect of these factors on poultry production and productivity in Ethiopia so as to identify and target interested households for improved production and increase the producers' benefits from the sector by understanding and developing the institutional and infrastructural environment.

The following econometric models were used to analyze the relevant driving factors of poultry ownership and level of production (model 1) and of the use of purchased inputs and ownership of commercial breeds (Model 2).

$$D_{1i} = \beta_0 + \beta_1 H_i + \beta_2 I_i + \beta_3 S_i + e_i \quad (1)$$

$$D_{2i} = \beta_0 + \beta_1 H_i + \beta_2 I_i + \beta_3 S_i + \beta_4 F_i + e_i \quad (2)$$

Where  $D_1$  refers to the dependent variables of poultry ownership (Yes = 1) and flock size (numbers of birds per household) and  $D_2$  represents the dependent variable related to likelihood of purchase of inputs (Yes = 1) and ownership of commercial breed (Yes = 1). The explanatory variables denoted as H, I and S are respectively, the vectors

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