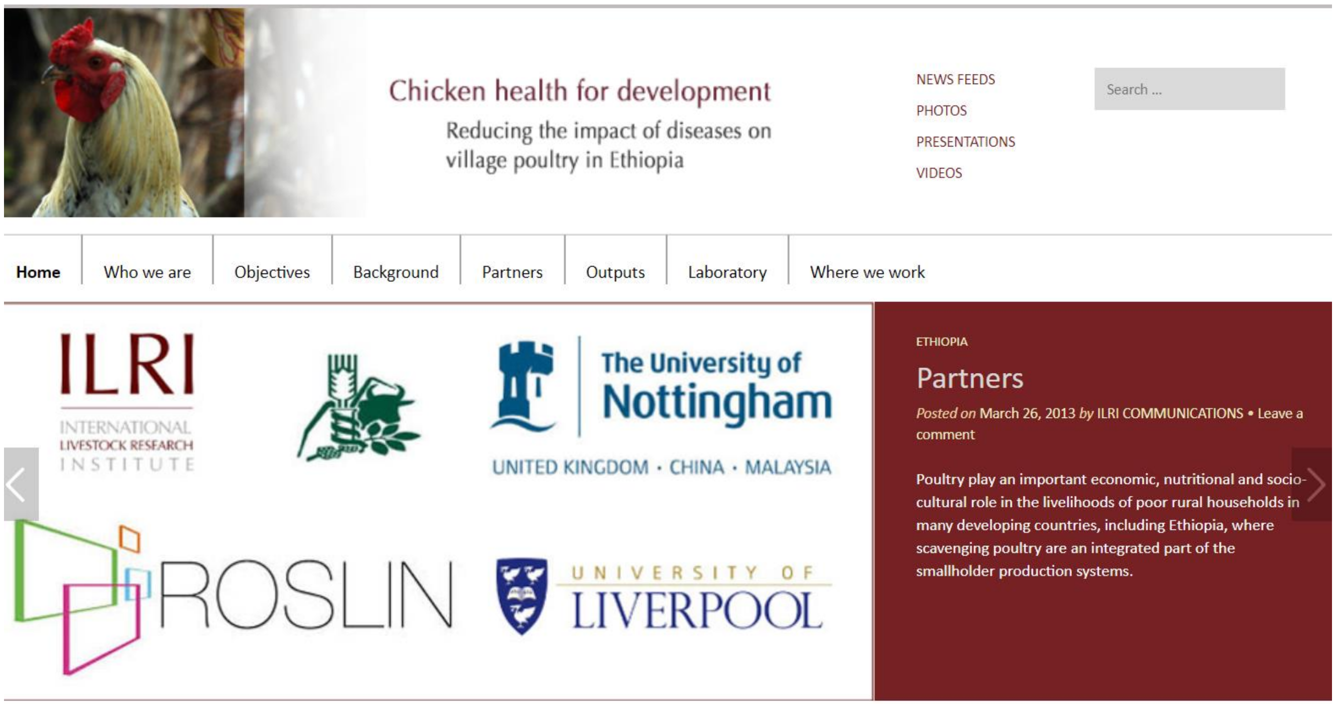
Understanding Farmers' Preference for Traits of Chickens in Rural Ethiopia

Zelalem G. Terfa, S. Garikipati, Girma T. Kassie, Tadelle Dessie and R.M. Christley

18th Nov, 2019

Background


Chicken health for development
Reducing the impact of diseases on village poultry in Ethiopia
NEWS FEEDS
PHOTOS
PRESENTATIONS
VIDEOS
Search ...
Home
Who we are
Objectives
Background
Partners
Outputs
Laboratory
Where we work
ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE
The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA
ROSLIN
UNIVERSITY OF LIVERPOOL
ETHIOPIA
Partners
Posted on March 26, 2013 by ILRI COMMUNICATIONS • Leave a comment
Poultry play an important economic, nutritional and socio-cultural role in the livelihoods of poor rural households in many developing countries, including Ethiopia, where scavenging poultry are an integrated part of the smallholder production systems.

Introduction

- Village poultry plays a key role in poverty alleviation, food security and in the promotion of gender equality in developing countries.
- For many, home grown chickens and eggs are their only source of high-quality protein.
- Owners of poultry sometimes are the landless and the poorest.
- Village poultry production typically uses indigenous genetic resources, which are adapted to a specific harsh environment.
- Indigenous chickens in Ethiopia provide major opportunities for increased protein supply and income for smallholders.
- Indigenous chickens are well suited to the very limited input that poor producers can provide.

Introduction

- Like many other developing countries, development interventions to enhance poultry productivity in Ethiopia focused on introduction of exotic chicken.
- However, increased productivity of the village poultry subsector by using exotic breeds has failed to become sustainable.
- There is a significant danger of losing valuable adaptive and production traits of indigenous chickens.
- A possible intervention to improve village poultry production is to target indigenous breeds based on needs and preferences of smallholder farmers. (+ better management)
- This route to higher village poultry productivity requires diverse indigenous chicken gene pools.

Introduction

- A recent study by Psifidi et al. (2016):

confirmed existence of genetic diversity and supports the feasibility of genetic improvement for enhanced antibody response, resistance to parasitism and productivity within and across indigenous chicken ecotypes in Ethiopia.

- Well-thought-out plans for management of this genetic resources and breeding program are also crucial to improve productivity.

- This requires many decisions that would be easier to make if information on the economic value of populations, traits and processes were available.

- Many of the benefits derived from the existence of traits of indigenous chicken genetic resources are, however, not discretely transacted in the market.

- Therefore, economic valuation of AnGR is essential to guide decision makers.

Methods

- Building on recent advancements in preference and valuation methodologies that are not yet applied in AnGR valuation studies.
- Used Stated preference approach- discrete choice experiment (DCE).
- DCE- theoretical foundation in Lancastrian consumer theory.
- DCE- has econometric base in random utility theory.
- DCE is applied in many applied researches.

Attribute identification and DCE designing

- Designing a DCE requires careful definition of the attributes and attribute level determination as well as generation of statistically efficient and practically manageable DCE design.

- Attribute identification in this study involved a number of steps:
  - Previous research: (Dana et al., 2010).
  - PRA: with farmers in two villages.
  - Multiple discussions with experts (geneticists/breeders, microbiologists, veterinarian/epidemiologists, and economists).

- The final attributes considered in designing the DCE included traits with cultural significance, productive traits and adaptive traits.

Attribute identification and DCE designing

Attributes	Attribute levels	Reference level
Plumage color	Predominantly white Predominantly black Predominantly red	Predominantly red
Eggs per clutch	12 16 20	Used as continuous
Body size	Small Medium Big	Medium
Mothering ability	Poor: Hatch 4 and raise chicks from 12 eggs Moderate: Hatch and raise 8 chicks from 12 eggs Good: Hatch and raise12 chicks from 12 eggs.	Moderate
Diseases resistance	Good: Rarely gets sick Poor: Often gets sick and may die	Poor
Meat and egg taste	Poor Good	Poor
Price	ETB 40 ETB 55 ETB 70	Used as continuous

Attribute identification and DCE designing

- We used SAS software macros to combine identified attributes and attribute levels to generate generic chicken profiles.
- There are 972 (i.e. 3^5*2^2) possible ways to combine the selected attributes and attribute levels to generate profiles.
- However, full-factorial design like this is too tedious and cognitively demanding for respondents to make meaningful choice.
- Therefore, an orthogonal fractional-factorial experimental design was used.
- The design generated 36 chicken profiles.
- Again, these profiles were randomly grouped into 18 chicken choice sets, (+ opt-out).
- hence each respondent could be presented with six choice sets.

The survey

- The formal survey was conducted in Horro district of Ethiopia as part CH4D.
- The survey was conducted by well-trained and experienced enumerators who were postgraduate students from HU & AAU.
- This DCE survey was administered on 450 farmers drawn by employing sampling with probability proportional to the population size of each *Ganda*.

Econometric model

- The model was estimated using the preference space and WTP-space approach.

- The preference space with RPL: $\boldsymbol{U_{njt} = \beta'_n x_{njt} + \epsilon_{njt}}$

- WTP-space with G-MNL: $\boldsymbol{U_{njt} = [\sigma_n \beta + \gamma \eta_n + (1 - \gamma) \sigma_n \eta_n] x_{njt} + \epsilon_{njt}}$

- The utility function as separable in price, P, and non-price, X , attribute can be written as:

$$U_{njt} = \sigma_n \left(-P + (\beta_n'^{*}) X_{njt} \right) + [\gamma \eta_n + (1 - \gamma) \sigma_n \eta_n] X_{njt} + \epsilon_{njt}$$

Results and discussion: Results in Preference Space

	RPL		G - MNL	
	Mean	SE	Mean	SE
Random parameters (RPs)				
Predominantly black plumage color	-0. 206	0. 149	-0.253*	0.129
Predominantly white plumage color	0. 339*	0. 201	0.472**	0.194
Eggs per clutch	0. 113**	0. 053	0. 173***	0.045
Small body size	-0. 706***	0. 238	-0.740***	0. 175
Large body size	0. 335***	0. 153	0. 388***	0. 128
Good meat and egg taste	0. 331*	0. 181	0. 370**	0. 173
Disease resistance	0. 455**	0. 232	0. 425**	0. 214
Poor mothering ability	-2. 133***	0. 698	-2.219***	0. 384
Good mothering ability	1. 274***	0. 352	1.425***	0. 240
Price	-0. 031**	0. 013	-0.020***	0.006
Non-random parameters				
Constant	-4. 506***	1. 675	-2.850***	0. 625
Heterogeneity in mean parameters				
Predominantly white *Orthodox	-0. 514**	0. 206	-0.588***	0. 193
Meat and egg taste * Education	0. 102	0. 068	0.106*	0.062
Disease resistance * Age	0. 008	0.003	0.009*	0. 005
Standard deviation of RPs				
Predominantly black plumage color	0. 050	0. 419	0. 157	0.390
Predominantly white plumage color	1. 075**	0. 488	1.336***	0. 400
Eggs per clutch	0. 065	0.076	0.038	0.060
Small body size	0. 464	0. 702	0.361	0.454
Large body size	1. 720***	0. 622	1. 787***	0. 387
Good meat and egg taste	0. 018	0. 293	0. 039	0. 259
Disease resistance	0. 318	0. 546	0. 191	0. 356
Poor mothering ability	1. 711**	0. 740	1.323***	0. 409
Good mothering ability	1. 009	0. 744	0. 729	0. 448
Price	0.008	011	0.009	0.008
Tau (τ)			0.5	(fixed)
Gamma (γ)			0.375	0. 289

Results and discussion: Results in WTP - Space

	G-MNL: WTP-space	
	Mean	**SE**
Parameters		
Predominantly black plumage color	-2.459**	1.202
Predominantly white plumage color	2.255*	1.186
Eggs per clutch	6.004***	1. 414
Small body size	-18.714***	4. 545
Large body size	9.530***	2. 424
Good meat and egg taste	15.338***	0. 181
Disease resistance	22.044***	4. 901
Poor mothering ability	- 50.489***	11.174
Good mothering ability	38.831***	8. 686
Price	1	(fixed)
Constant	- 1.815***	0. 178
Heterogeneity in mean parameters		
Predominantly white *Orthodox	- 2.784***	1. 073
Meat and egg taste * Education	0. 225	0. 368
Disease resistance * Age	.099***	0.03
Tau (τ)	1	(fixed)
Gamma (γ)	0	(fixed)
Sigma(*i*)	3.258	14.275
Standard deviation of parameters		
Predominantly black plumage color	0. 007	1.521
Predominantly white plumage color	0. 017	1. 268
Eggs per clutch	0. 421	0. 493
Small body size	0. 042	2.507
Large body size	0. 069	1.474
Good meat and egg taste	0. 069	1.739
Disease resistance	0. 056	1. 626
Poor mothering ability	0. 042	3. 015
Good mothering ability	0. 058	1. 910
Price	0	(fixed)

Conclusion

- The government of Ethiopia and international research systems run different programs to improve village poultry productivity, mostly by introducing improved chickens.

- It is important to understand if the aims of these programs are in line with farmers' preferences in the prevailing production and market system.

- This is especially so as the programs could lead to loss of indigenous genetic resources that are valuable to farmers.

Conclusion

- The results of the study revealed that in this semi-subsistent farming system, where chickens are kept for multiple purposes under low/no input, adaptive traits are of considerable importance to farmers.

- Diseases resistance attracted the highest mean WTP implying the economic importance of adaptive traits of chickens.

- In Ethiopia, there exists diverse indigenous chicken gene pool.

- Therefore, an alternative way to improve village poultry productivity is to target locally adaptable genetic resources that farmers value the most.

- This approach could potentially provide improved chickens that are readily acceptable by farmers and facilitates conservation of locally adaptable chicken genetic resources.

Acknowledgement

- We would like to thank the UK BBSRC and DFID for funding this research work.
- Farmers and development agents in Horro district of Ethiopia are highly appreciated for their assistance during survey work.
- We would also like to thank the Chicken Health for Development (CH4D) project team members and enumerators for their cooperation.

Thank you for your attention.