

## **Evaluation of feed quality and challenges facing indigenous chicken production in Western Kenya**

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### **Abstract**

Besides generation of extra income, indigenous chicken provide food for majority of households in rural areas in form of quality meat and eggs. A baseline survey was conducted to determine status of indigenous chicken production in Busia, Kakamega and Siaya Counties of Western Kenya; majorly focusing on feed quality, reasons for keeping indigenous chicken and production challenges faced by producers. A total of 180 households were visited with 60 households in each county. Farmers were selected purposively based on chicken population and activeness of farmer groups. The selected farmers participated by filling a questionnaire. Feed samples were collected from first, third and fifth farmers in each group. Proximate analysis of feed was done to determine dry matter (DM %), crude protein (CP %) and ash (ASH %). Data were analyzed using SPSS software version 20 for survey and Genstat 14th edition for feed quality. Cassava had low CP% (2.4%) as compared to groundnuts with 19.9% while home-made rations (HMR) and commercial feeds (Cfeeds) had high ash content of 13% and 18.3%, respectively. Results indicate that reasons for preferring indigenous chickens were Economic (36.7%), Nutritional (21.7%), Cultural (4.4%), Health (31.1%) and others (6.1%). Feed shortages (31%) and predation (27%) were the most common challenges faced by indigenous chicken producers in the region. Findings of this study should be met for improving indigenous chicken production in terms of feed quality and minimizing challenges. In particular, there is dire need to improve quality of locally available indigenous chicken feeds and modernize indigenous chicken production so as to maximise productivity.

**Keywords:** Feed quality, indigenous chicken, poultry production challenges, western Kenya

### **Résumé**

Outre la génération de revenus supplémentaires, le poulet indigène fournit de la nourriture à la majorité des ménages des zones rurales sous forme de viande et d'œufs de qualité. Une enquête de référence a été menée pour déterminer l'état de la production indigène de poulet dans les comtés de Busia, Kakamega et Siaya de l'ouest du Kenya; se concentrant principalement sur la qualité des aliments pour animaux, les raisons de garder les poulets indigènes et les défis de production auxquels sont confrontés les producteurs. Au total, 180 ménages ont été visités, avec 60 ménages dans chaque comté. Les agriculteurs ont été sélectionnés à dessein en fonction de la population

de poulets et de l'activité des groupes d'agriculteurs. Les agriculteurs sélectionnés ont participé en remplissant un questionnaire. Des échantillons d'aliments ont été collectés auprès des premier, troisième et cinquième agriculteurs de chaque groupe. Une analyse immédiate des aliments a été effectuée pour déterminer la matière sèche (MS%), la production de brut (PB%) et les cendres. Les données ont été analysées à l'aide de la version 20 du logiciel SPSS pour l'enquête et de la 14<sup>e</sup> édition de Genstat pour la qualité des aliments. Le manioc avait un faible MS% (2,4%) par rapport aux arachides avec 19,9% tandis que les rations faites maison (RFM) et les aliments commerciaux avaient une teneur élevée en cendres de 13% et 18,3%, respectivement. Les résultats indiquent que les raisons de préférer les poulets indigènes étaient économiques (36,7%), nutritionnelles (21,7%), culturelles (4,4%), sanitaires (31,1%) et autres (6,1%). Les pénuries d'aliments (31%) et la prédation (27%) étaient les défis les plus courants rencontrés par les producteurs de poulet indigènes de la région. Les résultats de cette étude devraient être respectés pour améliorer la production indigène de poulet en termes de qualité des aliments et minimiser les défis. En particulier, il est absolument nécessaire d'améliorer la qualité des aliments pour poulets indigènes disponibles localement et de moderniser la production de poulets indigènes afin de maximiser la productivité.

Mots-clés: Qualité des aliments, poulet indigène, problèmes de production de volaille, ouest du Kenya

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## Introduction

Chickens in particular, play vital socio-economic roles, as gifts, payments for breaking traditional laws or norms and settling disputes, in developing countries (Muchadeyi *et al.*, 2007). Besides generation of extra cash incomes they provide quality meat and eggs for the majority of the people living in rural areas. Indigenous chicken have been here for long hence are well adapted to the local environment and conditions, and account for over 81% of the poultry population in Kenya (Omiti, 2011). Their products offer better prices as compared to that of exotic chicken (Paresh *et al.*, 2016). This makes indigenous poultry farming very popular among rural communities in Western Kenya and South Africa (Mtileni *et al.*, 2009). Therefore, the impact of village chicken in the economy of developing countries and its role in improving livelihood of many smallholders is significant due to its low cost of production (Abubakar *et al.*, 2007). The purpose of this study was to examine indigenous chicken production systems, challenges encountered by indigenous chicken farmers and quality of local chicken feeds in the study area. Findings of this study are beneficial in improving indigenous chicken production especially in terms of feeding and provision of equipment to minimize some of the production challenges.

## Materials and Methods

**Study area.** The baseline survey was carried out in three Counties of Western Kenya namely; Siaya, Busia and Kakamega. Three sub counties were covered per County: Siaya had Gem, Alego and Ugenya, Busia had Teso South, Matayos and Nambale while Kakamega had Lurambi, Lugari and Navakholo. These areas were preferred because of higher indigenous chicken population and presence of active organized farmer groups.

**Sampling.** The survey was conducted with a total of 180 farmers visited, sixty (60) in each County. A multi-stage sampling technique was used. Siaya, Busia and Kakamega Counties were purposively selected based on indigenous chicken population, organization and activeness of local farmer groups. This selection was purposive at all levels; thus county (n=3), sub county (n=9; 3 3), wards/ locations (n=18), farmer groups-2 youth and 2 women groups (n=36) and group members (n=180; 5 36). From each group five members were randomly selected to complete a questionnaire. The survey was conducted from late February to mid-March 2016 with the help of frontline agriculture and livestock extension officers who were well versed in local communities.

**Feed samples:** A total of two hundred and thirty four (234) feed samples were collected from the selected farmers; the first, the third and the fifth farmer in every location. The samples were further sub sampled to sixty (60) samples and stored in a freezer to prevent insect damage and deterioration. These samples were analyzed for dry matter (DM %), crude protein (CP %) and ash (ASH %) by proximate method. Dry matter was determined by pouring 1g of sample in a crucible and weighed using weighing machine OHAUSTM: Item PA413 of OHAUS Corporation USA (www.ohaus.com). The sample was then dried overnight in an oven at 105°C. and dry matter calculated. Crude protein was determined by samples being weighed and poured in a test tube and placed in a digester (Gerhardt Kieldatherm Digester). Distillation was then done using a distiller (Kjeltec 8200 Auto Distillation: Type 10014901, Yr 2011, serial No 91708870 FOSS). Titration was done and the CP determined. Ash was determined by taking 1g of sample and placing in a muffle furnace (Heraeus Hanau, Type MR170, Holland: WC HERAEUS GMBH, HANAU) for 3 hours at 550 °C.

## Results

The reasons why indigenous chicken were kept or preferred more than exotic breeds included economic, nutritional, cultural, and health, amongst other.

**Table 1. Main reasons of keeping indigenous chickens in Western Kenya (Mean %)**

Counties	Parameters (%)				
	Economic	Nutritonal	Cultural	Heath	Other
Busia	31.7	26.7	6.7	30.0	5.0
Kakamega	38.3	21.7	3.3	16.7	10.0
Siaya	40.0	16.7	3.3	36.7	3.3
Mean (%)	36.7	21.7	4.4	31.13	6.1

Local chicken production face many challenges like predation, theft, feed shortages, diseases and others (Table 2). Feed forms an integral part of chicken performance, thus quality analysis of these feeds was necessary and the results are shown in Table 3.

**Table 2. Challenges facing indigenous chicken production**

County	Common poultry production challenges (%)				
	Predation	Theft	Feed shortage	Diseases	Other
Siaya	25	20	28	10	16
Busia	30	10	18	16	25
Kakamega	26	11	48	4	13
Mean (%)	27	14	13	10	18

**Table 3. Mean nutrient composition of various chicken feeds collected in Busia, Kakamega and Siaya Counties**

County	Nutrient (%)			
	Feed	DM	CP	ASH
	Maize	89	8	1
	Sorghum	89.6	10	2.2
	Cassava	89.4	2.4	2.6
	Groundnuts	94	19.9	4.8
	HMR	90.9	11.6	13
	Cfeeds	92.3	11	18.3

Key: HMR-Home-made rations; Cfeeds- Commercial feeds

## Discussion

**Reasons for keeping these chickens.** Most farmers (36.7%) keep indigenous chicken for economic reasons, i.e., to pay school fees, buy household needs, small hospital charges, farm inputs and fare. According to farmers indigenous chickens are not expensive to keep since they can thrive on low inputs/ supplements. Chicken are also kept for health reasons (31.1%) of the respondents indicated that they preferred local chicken meat because it is less associated with cancers and allergies as compared to red meat.

Another reasons: Nutritional reasons 21.7% of the respondents that thy kept local chicken for nutritional reasons such as taste and colour of meat and color of the egg yolk (yellow) which they trusted as a sign of rich nutrient composition. The respondents indicated that the meat and eggs of indigenous chicken was sweeter than those of exotic breeds. Other respondents indicated the exotic chicken were associated with GMOs (genetically modified organisms).

**Others mentioned.** Cultural reasons (4.4%) as a value; these chickens are presented as gifts to relatives, friends and as a sign of respect and good omen to those given or slaughtered for as was also reported by Ochieng *et al.* (2013).

Besides the above reasons, indigenous chicken were preferred by, according to respondents (6.1%) because of availability of the chicken both adults and chicks, hardiness and disease resistance as compared to exotic breeds. These chicken have also mastered their environment and can run away from predators unlike exotic breeds.

### **Challenges**

Most of the farmers (31%) indicated feed scarcity as a major challenge during this study. Chicken were commonly fed with locally available feeds such as maize, sorghum, cassava, groundnuts, commercial feeds and homemade rations although millet, sweet potatoes, fish (locally known as omena) and kitchen leftovers were also used. However, these major chicken feed ingredients face competition with human food demands (Mwesigwa *et al.*, 2015). Feed shortage is a major limiting factor in Kakamega (48%) because humans use these feeds, majorly cereals, as food. Feed scarcity in Busia (18%) and Siaya (28%) was lower because chicken were fed with other types of feed, besides cereals, such as sweet potato roots and cassava. Therefore use of other feed sources such as insects and wild seeds should also be explored to address this scarcity.

Most (27%) respondents indicated predation as a major challenge in indigenous chicken production in western Kenya and also in Northwest Ethiopia as reported by Halima (2007). Their chicken are commonly preyed on by Mongoose, wild cats, kites and eagles as also reported by Fisseha *et al.* (2010). Predation was most common in Busia (30%) as compared to in Kakamega (26%) and Siaya (25%) counties as shown in Table 1.

Theft was also mentioned as a challenge by 14% of farmers who had lost their chicken through theft especially at night. Chicken are exposed to this challenge due to poorly constructed shelters, they are left to roam about as far as sugarcane plantations, and unemployment which causes specially youth to go into stealing. Stealing of chicken in Busia, (10%) and Kakamega (11%) was not as rampant as compared to in Siaya (20%). According to respondents in Busia and Kakamega, this is attributed to village security measures put in place like punishing thugs in public severely so as to discourage others from engaging in such activities.

Some farmers (10%) indicated diseases as a challenge which caused a big economic loss by wiping out the whole flock within a short time. The most common diseases mentioned were; Gumboro (Infectious bursal disease), fowl pox, Newcastle disease, avian coryza coccidiosis and fowl typhoid. According to respondents in Busia (16%) and Siaya (10%), disease was one of the major problems in indigenous chicken production. Management strategies for these chickens should be based on reducing threat of diseases, such as Newcastle Disease (Aklilu *et al.*, 2007) and other common infections and deficiencies.

Other challenges include high feed prices, poor marketing channels and lack of knowledge in chicken production. Feed prices were high according to the respondents which discouraged them from using commercial feeds. This is in agreement with Gura (2008) who reported that increase in prices

of chicken feeds will force chicken producers to look for alternative and locally available cheap feed sources. Nutrition was also indicated as contributing to the challenges especially on how to make home-mixed rations to meet the daily needs of chicken. Marketing channels were poor since chicken were not weighed using any weighing device. Hand estimation of weight was very common and this was viewed by some farmers as an incorrect way of estimating prices. Indigenous chicken producers lacked knowledge on modern methods of chicken production. Therefore, measures should be directed towards educating farmers on this subject.

### Conclusion

Value placed on indigenous chicken by rural households is high, therefore, there is dire need to improve quality of locally available indigenous chicken feeds and modernize indigenous chicken production especially feeding and housing so as to minimize challenges facing producers.

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