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Smallholder local chicken production and available feed resources in central Uganda

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Abstract

The poultry industry in Uganda is mainly based on free-range (scavenging) indigenous chickens, kept at the subsistence level. Chicken population rose from 23.5 million in 2005 to 37.4 million in 2008; and most of these chicken (over 80%) were indigenous to the country. A survey was conducted in Central Uganda to assess the available feed resources for chicken. The study involved300 household heads purposively selected. A focus group discussion involving 50 farmers from the same community, was also involved. Issues related to feeds, especially high prices were the main factors contributing to reduced chicken production in the study areas. Less than 5% of the farmers knew the nutritive contents of the chicken feeds. Sixty percent gave alternative feeds depending on season of availability. There was a clear difference between farmers who had some knowledge about feed nutrient composition and those who had no idea. Furthermore, the competition between food and feed furthered the increase in feed prices, thus forcing producers to look for alternative feeds and locally available feeds. The possibility for utilising by-products for poultry feeds need research attention.

Key words: Feed resources, feed competition, indigenous chicken

Introduction

The poultry industry in Uganda is mainly based on free-range (scavenging) chickens, kept at the subsistence level (Mukiibi-Muka (1992). Uganda's chicken population in the meantime, increased from 23.5 million in 2005 to 37.4 million in 2008. Of the current chicken population, over 80% is indigenous to Uganda (MAAIF, 2008). Despite the introduction of exotic chicken breeds, the indigenous chickens still dominate in the country. Elsewhere, Guèye (1998) and Sonaiya and Olori (1999) observed that village poultry represent an important component of rural household livelihood as a source of income, nutrition and as gifts to strengthen social relationships.

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Poultry farming in modern society is no longer done merely for prestige. It is a viable source of side income for many communities in sub-Saharan Africa, and offers full-time employment for a sizable number of households, especially, housewives and school drop outs (Natukunda *et al.*, 2008; Kugonza *et al.*, 2011).

One of the reasons for the fast industrialisation of chicken production in developed countries is the use of concentrated feeds (Gura, 2008). However, Branckaert *et al.*(2000) reported that this development is constrained in developing countries, which are not self-sufficient in cereal production. Various scholars have reported that chicken productivity in most African countries, including Uganda, is poor (Wasake, 2013). Poultry producers in Uganda contend with high cost and low quality of poultry feeds on the market. Thus, feeds are the main limiting factors contributing to the reduced productivity of birds seen in this country.

With the increased production of animal proteins, due to the increased livestock numbers being raised (there is also an increased demand for feed, particularly for ingredients that are high in protein and energy).

Protein and energy feeds contribute more than 90% of all of the required nutrients for poultry rations (Wasake, 2013). However, these major poultry ingredients face market competition with human food demands in Uganda. Gura (2008) reported that the competition between food, feed and agro-fuels is expected to only further increase the prices of poultry feeds, forcing poultry producers to look for alternative and locally available feed sources.

Uganda has many types of feed resources, which can be used as ingredients in feeds, to substitute for the conventional ingredients used in chicken diets. However, chicken producers in Uganda have limited access to information to enable them to utilise alternative feed resources. Recycling of animal protein should take into consideration food safety (Clarke, 2010). Therefore, reviewing the available feed resources and chicken production situation in the country will be a milestone in to improving chicken production in Uganda.

The objective of this study was to establish the status of feed resources available for chicken production in Uganda with a view to propose feed alternatives available in the country.

Material and methods

The study was conducted in Mubende, Mpigi, Nakaseke, Mityana and Mukono districts in Uganda. In Mubende district, the research was conducted in Kalwana and Kasanda sub-counties. In Mpigi district, the research was conducted in Muduma and Mpigi Town Council. In Mityana, it was conducted in Bulera and Myanzi sub-counties; while in Mukono, it was in Wakisi and Najjembe sub-counties.This study area is categorised as one of the regions in Uganda with the highest potential for livestock production.

Farmers in the study area were purposively selected. Rural Development Extensionists (RDEs) actively participated in the selection of representative farmers. Chicken production potential and access were the main criteria considered in the selection of the farmers. Simple random sampling technique was applied to choose

300 indigenous chicken farmers from two sub-counties in each district; giving an equal chance for those farmers who had sold indigenous chickens in the last 12 months.

Data were collected intensively through personal house-to-house interviews, using an organised and pre-tested structured questionnaire. Direct observation was also used to assess available feed resources and feeding practices. A closer visit in and around the residential and gardening areas of the selected households was made in order to obtain first hand observation on feed resources. Data were collected on form of feeding, time of feeding and constraints affecting profitability from individual indigenous chicken farmers and RDEs. Errors in data collection were minimised using carefully trained enumerators, who were retained throughout the course of the field data collection.

The data obtained from the interviews were coded, entered into the computer spreadsheet, and analysed using descriptive analysis procedures of the Statistical Package for Social Scientists (SPSS, 2000). Graphs, frequency tables and percentages were generated as the summaries of the data for the responses recorded. Statistical Package for Social Scientists (SPSS) was used to generate correlation analysis of some variables which could help in the generalisation of the findings and explanation of the existing phenomena.

Results and discussion

There was a significant difference ($P<0.05$) in the way of feeding by farmers, due to possession of knowledge about nutrient composition (Table 1). Less than five percent of the farmers were aware that chicken, like humans required, having their nutrition grouped into energy giving feed (carbohydrates), body building feed (proteins), vitamins, minerals, fats and water. The absence of this knowledge leads farmers to feed chicken on anything they come across, without consideration for a balanced diet. Table 2 shows an inventory of some of the alternative sources highly ranked by majority farmers and the mode in which they are fed to chicken.

The majority of farmers (N=300) fed kitchen on left-overs of *Zea mays* seeds, *Galinsoga perviflora* and *Manihot esculanta* peels with percentages 80, 96, 95 and 60%, respectively. Farmers who fed *Manihot esculanta* leaves used at 17- month's old plants, which gave the highest Vitamin C, Zinc and Calcium levels (Carmen *et al.* (2006).

Galinsoga perviflora was found to provide mineral concentrations exceeding 1% of plant dry weight, and are much higher than typical mineral concentrations in conventional edible leafy vegetables. They are thus recommended for future commercial cultivation (Odhava *et al.*, 2006).

Table 1. Frequency of knowledge category among smallscale poultry farmers in Uganda

Knowledge category	Frequency (N=300)	Percentage
Did not know about nutrient composition	252	84
Knew slightly about nutrient composition	36	12
Knew well about nutrient composition	12	4

Table 2. Replaceable poultry feed ingredients, and suggested mode feeding in Uganda

Local name	Common name of ingredient	Scientific name	Mode in which it is given
Kitchen left-overs	Swill		Cooked
Kafumbe		*Galinsoga perviflora*	Raw/ fresh
Doodo	Pig weed	*Amaranthus* spp.	Raw/ fresh
Akabombo			Raw/ fresh
Paspalum	Paspalum	*Paspalum dilatatum*	Raw/ fresh
Leaves of beans	Leaves of beans	Leaves of *Phaseolus vulgaris*	Raw/ fresh
Leaves of yams	Leaves of yams	Leaves of *Dioscorea* spp.	Raw/ fresh
Insects			
Worms	Earth worms	*Lumbricina*spp.	
Pawpaws	Papaya	*Asiminatriloba*	Ripe
Pumpkins		*Cucurbitapeopo*	Raw/ fresh
Maize seeds		*Zea mays*	Raw/ fresh
Sekoteka			Raw/ fresh
'Empumumpu'	Male part of banana plant	Inflorescence	Raw/ fresh
Banana peels			Raw/ fresh
Millet seeds		*Pannisetumglaucaum*	Raw/ fresh
Sorghum seeds		*Sorghum bicolor*	Raw/ fresh
Cassava		*Manihot esculenta*	Raw/ fresh
Cassava peels		Peels of *Manihot esculenta*	Raw/ fresh
Egg shells			Roasted
Cabbages		*Brassica oleracea*	Raw/ fresh
Russian comfrey	Russian comfrey	*Symphytum x uplandicum*	Raw/ fresh
Nanda	Wandering Jew	*Comelina bengalasis*	Raw/ fresh
Sere	Black jack	*Bidens pilosa*	Raw/ fresh

Maize seed that is fed by 96% of the farmers, was found by Ikram *et al.*(2010)to contain moisture in the range of 9.201-10.908%, ash (0.7-1.3%), fats (3.21-7.71%), protein (7.71-14.60%), crude fiber (0.80-2.32%) and carbohydrates (69.659-74.549%); which shows that the grains of these varieties are rich source of energy.

For farmers who fed chicken on egg shells, there was a chance to introduce Salmonella infections into their flocks (Pinta Size Farm, 2014). The reason why feeding eggshells back to chickens can be bad is because it can transmit diseases, especially salmonella. Chickens carry Salmonella in their digestive tracks, yet lay normal looking eggs. There are no symptoms of Salmonella in an infected chicken. Most research shows that the affected chicken actually lays more eggs than its normal counterparts. Usually Salmonella is on the eggshell. An egg can become contaminated if it is soiled or cracked. Occasionally, a bird can lay an internally infected egg if they have infected ovaries (Pinta Size Farm, 2014). The best way to feed egg shells to chickens is to toast in an oven/toaster oven. This will kill all bacteria and it has the added bonus of

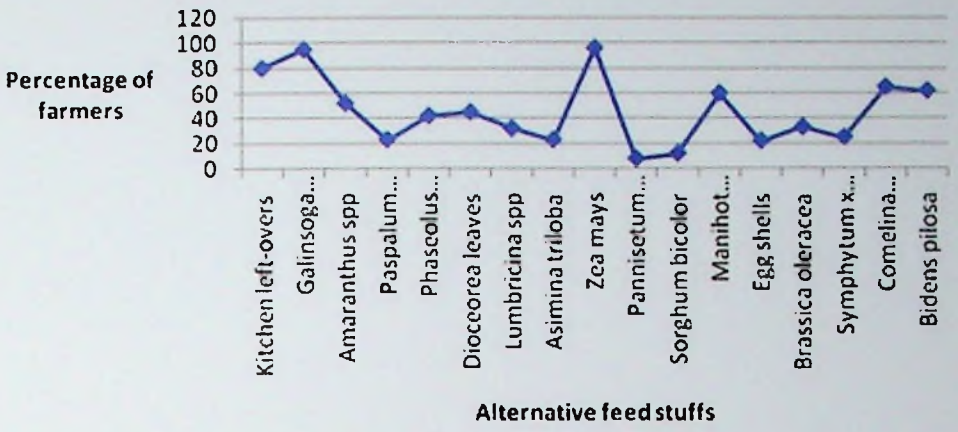


Figure 1. Farmers who regularly fed chicken a particular feed stuff.

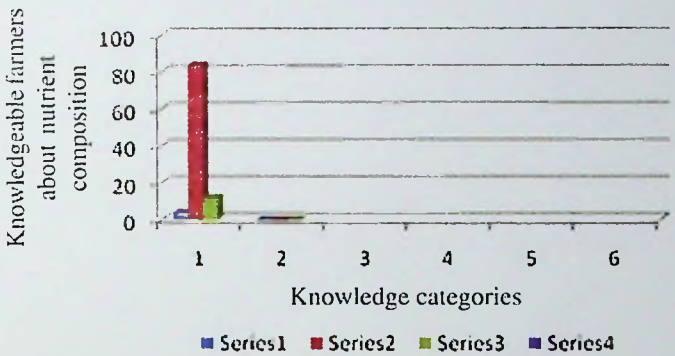


Figure 2. Farmers knowledge about nutrient composition of feed stuffs in Uganda.

making the calcium within the shells easier to absorb (Pint Size Farm, 2014).

It was found that the majority of the farmers (84%) were not knowledgeable about feed nutrient composition. This, coupled with high illiteracy levels, is detrimental to information. Farmers are likely to fail to give their flock a balanced diet just because a particular feed stuff is readily or not readily available. There are also chances of poisoning the chicken with too much of a single ingredient.

Most of the available feed resources in Uganda can be divided into two main categories; conventional and non-conventional. Conventional feed resources are those traditionally used and are facing competition with human foods in Uganda. Whereas, non-conventional feed sources are not commonly and traditionally used as chicken feeds (Younas and Yaqoob, 2005). Gura (2008) stated that the recent feed price increment may upset many of the plans to further develop industrial livestock/ poultry production. The same author added that the competition between food, feed and agro-fuels is expressed to only further increase feed prices. Therefore, pressure on the next alternative, that is locally available feed sources, is very likely to improve costs of poultry feeds. This is in agreement with

FAO (2009) which reported that smallholders, if not protected, may be among those who will suffer most from price increases in local feed sources. Therefore, considerable efforts are being made to utilise more diverse local sources of feed ingredients, in particular protein materials, in many developing countries (Natukunda *et al.*, 2008). However, while replacing alternative ingredients, equivalency of nutritional values, costs and side effects on birds must be assessed and considered. Some ingredients may be toxic to birds when added at levels higher than recommendations. Gradual replacement or substitution of one type of feed or ingredient with another is always advised to adapt birds to such new feeds.

Feed is the most important input for poultry production, and availability of low-priced, high-quality feeds is critical for the expansion of the poultry industry (FAO, 2003). Moreover, Ravindran and Blair (1992) stated that the survival of the poultry industry in most developing countries, in future will depend on the ability of poultry industry to compete with humans for the available food supply. The increasing cost and decreasing supply of traditional feedstuffs are expected to limit the future expansion of poultry production. This situation highlights the urgent need to improve the utilization of the wide range of alternative feed stuffs available in these countries. Increments in the poultry industry have a profound effect on the demand for feed and raw materials. However, the three traditional feed ingredients; maize, soybean meal, and fishmeal cannot meet the demands. Therefore, exploring the usefulness of locally available, alternative feedstuffs in feed formulations is required. Generally, poultry feed ingredients can be categorised as energy, protein or micro-nutrient (mineral and vitamin) source feed stuffs.

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References

Branckaert, R.D.S., Gaviria, L., Jallade, J. and Seiders, R.W. 2000. Transfer of technology in poultry for developing countries. Paper XX1 World poultry congress, Montreal, Canada, 20-24August, 2000.

Carmen Wobeto, Angelita Duarte Corrêa, and Celeste Maria Pato de Abreu, 2006. Nutrients in the cassava (*Manihot esculenta crantz*) leaf meal at three ages of the plant. pp. 865-868.

Clarke, M. 2010. Poultry industries research, development and extension strategy. A national assessment of capabilities to ensure innovation that improves productivity and delivers public good outcomes. A report for Australian Government: Rural industries research and development corporate, egg corporate limited. Australia. 39 pp.

FAO. 2003. Poultry nutrition and feeds. Animal production and health division. A world without hanger, FAO. Rome, Italy. http://www.fao.org/ag/ Accessed on 5th October 2014.

FAO. 2008. Animal production and health division, Emergency Center for Trans-boundary animal diseases socio Economics, production and biodiversity

Unit: Poultry sector country review. Eastern Africa. An analysis of the poultry sector in Ethiopia. FAO. Rome, Italy.

FAO. 2009. Report of the FAO expert meeting on how to feed the world in 2050.FAO. Economic and Social Development Department. 23 pp. 24-26 June 2009. Rome, Italy. ftp://ftp.fao.org/docrep/fao/012/ak542e/ak542e19.pdf. Accessed on 5th October, 2014.

Guèye, E.F. 1998. Indigenous egg and fowl meat production in Africa. *World Poultry Science Journal* 54:73-86.

Gura, S. 2008. Industrial livestock production and its impact on smallholders in developing countries. Consultancy report to the league of pastoral peoples and endogenous livestock development: 65 pp. Germany. www.pastoralpeoples.org Accessed April, 14th 2015.

Ikram Ullah, Muhammad Ali and Arifa Farooqi. 2010. Chemical and nutritional properties of some maize (*Zea mays* L.) varieties grown in NWFP, Pakistan. *Pakistan Journal of Nutrition* 9 (11): 1113-1117, 2010ISSN 1680-5194© Asian Network for Scientific Information, 2010.

MAAIF (Ministry of Agriculture Animal Industry and Fisheries). 2008. A publication on the Plan for Modernisation of Agriculture, Animal Industries and Fisheries, Entebbe, Uganda.

Mukiibi-Muka, G. 1992. Epidemiology of Newcastle disease and the need to vaccinate indigenous chickens in Uganda. In: Newcastle disease in indigenous chickens. Spradbro, P.B. (Ed.). ACIAR Proceedings No. 39, Canberra, Australia. pp. 155-158.

Natukunda, K. Kugonza, D.R and Kyarisiima, C.C. 2008. Indigenous chickens of the Kamuli Plains in Uganda: II. Factors affecting their marketing and profitability. *Livestock Research for Rural Development* 23 (10): 2011

Odhava, B., Beekrumb, S., Akulaa, U.S. and Baijnathc, H. 2006. Preliminary assessment of nutritional value of traditional leafy vegetables in KwaZulu-Natal, South Africa. *Journal of Food Composition and Analysis* 20:430-435.

Pint Size Farm. 2014. Feeding egg shells back to your chickens 20th February, 2014. http://www.pintsizefarm.com/feeding-eggshells-back-to-your-chickens/ visited October 18th, 2014.

Ravindran, V. and Blair, R. 1992. Feed resources for poultry production in Asia and pacific II. Plant protein sources. *World's poultry science Journal* 48: 205-231

Sonaiya, E.B. and Olori, V.E. 1998. Indigenous chicken production in South-Western Nigeria. In: Proceeding of an International Workshop on rural poultry development in Africa, 13-16 November, 1989, Ile-Ife, Nigeria. pp. 243-247.

The Poultry Site, 2007. Economic approach to broiler production. Atlantic Poultry Research Institute. October 2007.

Wasake, D. 2013 Investing in poultry farming in Uganda. October 26th, 2013, Manchen simple science http://www.manchem.co.za/investing-in-poultry-farming-in-uganda/

Younas, M. and Yaqoob, M. 2005. Feed resources of livestock in the Punjab, Pakistan. Livestock research for rural development 17, article #18. http://www.lrrd.org/lrrd17/2/youn17018.htm.