

Short Communication

Identification of production challenges and benefits using value chain mapping of egg food systems in Nairobi, Kenya



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ABSTRACT

Commercial layer and indigenous chicken farming in Nairobi and associated activities in the egg value chains are a source of livelihood for urban families. A value chain mapping framework was used to describe types of inputs and outputs from chicken farms, challenges faced by producers and their disease control strategies. Commercial layer farms were defined as farms keeping exotic breeds of chicken, whereas indigenous chicken farms kept different cross breeds of indigenous chicken. Four focus group discussions were held with producers of these chickens in peri-urban area: Dagoretti, and one informal settlement: Kibera. Qualitative data were collected on interactions between farmers, sources of farm inputs and buyers of poultry products, simple ranking of production challenges, farmers' perception on diseases affecting chicken and strategies for management of sick chicken and waste products. Value chain profiles were drawn showing sources of inputs and channels for distribution of chicken products. Production challenges and chicken disease management strategies were presented as qualitative summaries. Commercial layer farms in Dagoretti kept an average of 250 chickens (range 50–500); while flock sizes in Kibera were 12 chickens (range 5–20). Farms keeping indigenous chicken had an average of 23 chickens (range 8–40) in Dagoretti, and 10 chickens (range 5–16) in Kibera. Commercial layer farms in Dagoretti obtained chicks from distributors of commercial hatcheries, but farms in Kibera obtained chicks from hawkers who in turn sourced them from distributors of commercial hatcheries. Indigenous chicken farms from Dagoretti relied on natural hatching of fertilised eggs, but indigenous chicken farms in Kibera obtained chicks from their social connection with communities living in rural areas. Outlets for eggs from commercial layer farms included local shops, brokers, restaurants and hawkers, while eggs from indigenous chicken farms were sold to neighbours and restaurants. Sieved chicken manure from Dagoretti area was fed to dairy cattle; whereas non-sieved manure was used as fertilizer on crops. Production challenges included poor feed quality, lack of space for expansion, insecurity, occurrence of diseases and lack of information on chicken management. In Kibera, sick and dead chickens were slaughtered and consumed by households; this practice was not reported in Dagoretti. The chicken layer systems contribute to food security of urban households, yet they have vulnerabilities and deficiencies with regard to disease management and food safety that need to be addressed with support on research and extension.

1. Introduction

Poultry keeping is an important livestock enterprise practised by most Kenyan households (Behnke and Muthami, 2011). In 2014, the contribution of poultry offtake and egg production to the national agricultural gross domestic product was estimated at 1.3% (USD 46.16

million) and 2.9% (USD 103.05 million), respectively (KNBS, 2015). In 2009, the national poultry population was estimated to be 32 million birds (Behnke and Muthami, 2011) with the majority (84%) being free-ranging indigenous chicken, with smaller numbers of commercial layers (8%), commercial broilers (6%) and other species such as ducks, turkeys, pigeons, ostriches, guinea fowls and quails (2%) (Behnke and

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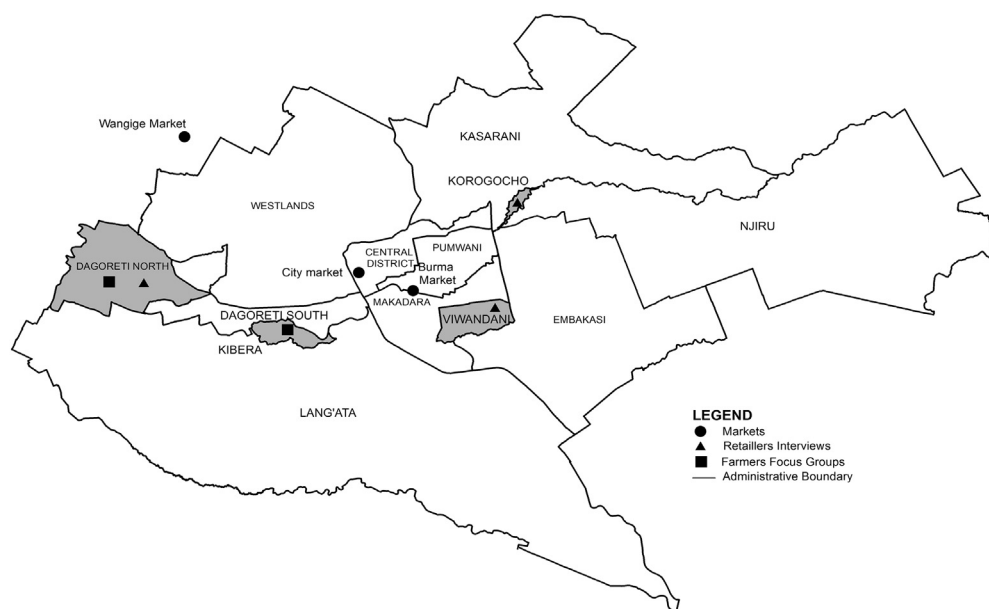


Fig. 1. Map of Nairobi County showing the selected study areas.

Muthami, 2011; FAO, 2007). It was reported that every rural Kenyan household keeps indigenous chickens with an average flock size of 12 (CTA, 2007; Kingori et al., 2010). The major concentration of commercial layers was found in Nairobi County (180,000 birds), in addition to an estimated 260,000 indigenous chickens kept in this County (GoK, 2012). Indigenous chicken kept in Kenya have been described using phenotypic characteristics: fizzled feathered, naked neck, barred feathered, feathered shanks, bearded and dwarfed size (Kingori et al., 2010). These indigenous chickens are a result of uncontrolled cross breeding programmes between various lines of local and exotic breeds of chicken.

Egg production from commercial layers and indigenous chicken is important both in terms of meeting nutritional needs of Kenya, as well as an economic activity. Chickens are a reliable source of nutritious food and income to many resource poor households and are relatively easy to rear. Chicken eggs have high levels of micronutrients including carbohydrates, fats and fatty acids, protein and amino acids, vitamins (D and B12) and minerals (Exler et al., n.d.). According to the report on recommended dietary allowances of the Food and Nutrition Board of the United States, eggs are considered to be rich in essential amino acids: histidine, isoleucine, leucine, methionine and cysteine, lysine, phenylalanine and tyrosine, threonine, tryptophan, and valine (National Research Council, 1989). Based on this report, eggs contain 490 mg/g of the essential amino acids which is above the dietary requirements for infants aged 3 to 4 months old (412 mg/g), 2 years old (320 mg/g), 10–12 years old (220 mg/g), and adults (111 mg/g). Furthermore, the report states that digestibility of egg protein in human is approximately 100%. Other studies have further reported that chicken eggs contain approximately the same amount of animal protein as pork, poultry meat, beef and whole milk cheese (Ondwasy et al., 2006; Seidler and Martin, 2003). Therefore, in urban communities with limited access to land, chicken rearing represents an alternative source of high quality nutrition for poor households.

These positive aspects need to be balanced against possible problems with disease management, particularly of diseases that affect both poultry and humans. Some infectious diseases which affect poultry in Kenyan farms include salmonellosis and Newcastle disease, while risk factors for occurrence of avian influenza have been described (FAO, 2007; Kingori et al., 2010; Nyaga, 2007). Furthermore, organisms like *Salmonella pullorum* and *Salmonella gallinarum* can colonise the reproductive system of chickens and can be transmitted through eggs to chicks which are replacement stock (Ribeiro et al., 2009). Apart from

their effect on lowered farm productivity, poultry diseases present potential public health risks to consumers of poultry products and people in contact with infected farms (Duffy et al., 2012; Kariuki et al., 1997; Lee and Newell, 2006; Svetoch and Stern, 2010).

It also needs to be recognised that the Kenyan poultry sector is changing with greater demands for livestock products in urban areas that are both growing in size and wealth. This indicates that both the positive aspects of the poultry sector (i.e. nutrition and income) and the potential negative externalities (i.e. public health risks) are changing. However, there is a paucity of information on productivity and profitability of the commercial layer and indigenous production systems and their associated value chains in Kenya in general and in urban settings in particular. There is also a lack of information on disease risks generated by these systems and how they are managed within the production systems and value chains. Therefore, the aim of the study was to map value chains for eggs from commercial layer and indigenous chicken farms and identify practices which increase public health risks within the egg supply chains in Nairobi. The results will assist policy makers in understanding challenges that commercial layer and indigenous chicken farmers face within *peri* urban areas and informal settlements.

2. Materials and methods

2.1. Research design and study area

A descriptive study was conducted in 2014 in two areas within Nairobi (Fig. 1). The informal settlement: Kibera, located in Langata sub-County and the peri-urban area: Dagoretti, located in Dagoretti North sub-County. Inhabitants of Kibera migrated from other parts of the country to seek better jobs in the city, and have brought with them livestock farming practices, while in Dagoretti, the natives have practised livestock farming for ages. These areas were purposively selected for different reasons: According to government livestock officers Dagoretti has the largest number of livestock farming activities in Nairobi. Kibera, which is the largest informal settlement in Nairobi, was selected because of the co-existence of commercial layer and indigenous chicken farms. The choice of descriptive study design was considered useful for expanding the understanding and insight in commercial layer and indigenous chicken farming practices in Nairobi, which could support formulation of hypotheses for future studies under similar production systems (Kothari and Garg, 2014). The framework adopted for mapping

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