Social-economic impact of chicken production on resource-constrained communities in Dodoma, Tanzania

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ABSTRACT Chickens, in many households, are kept by women and the youths, providing employment and means of increasing family economic gains. However, little information on the social-economic contribution of chickens’ production in Dodoma is available. This study examined the potential of chickens’ production in Kongwa district and Dodoma municipality in Tanzania. A cross-sectional questionnaire survey (with Likert scaling) was conducted, and in-depth interviews were used to gather information from the local livestock keepers. A total of 200 were interviewed, and of these, 33.93% were male and 66.07% were female. The entire family was responsible for chicken management in 66.07% of the households, whereby, in 25% of the households, only women were involved, and in 7.01% of the households, only men were involved in rearing chickens. Chicken production contributed socially and economically through meat, manure, offerings, source of income, aesthetic value (beauty), provision of school fees, and source of employment. The contribution of chicken production socially and economically among these categories varied significantly (Kruskal-Wallis statistical test = 33.36, P < 0.001). The potential customers for the chicken and their products were nearby shops (60.71%), individuals (retails) (85.71%), animal market place (Mnadaní) (62.5%), travelers (55.35%), and restaurants (61.71%). The average selling price for the chicken was 12,500 Tanzanian Shilling (Tsh), whereas, for cocks, it was 13000 Tsh, and hens were sold at 10,000 Tsh. Chicken keeping is a very important sector in resource-constrained families as it provides for family proteins and income which support family health care, education, and other social needs. However, the productivity is not encouraging, so more education and support on chicken keeping is essential to enhance a positive economic impact on the local communities.

Key words: chicken, local community, production, socio-economic

INTRODUCTION

Chicken production in many parts of rural and urban areas in African countries has contributed significantly as sources of protein, food security, employment, and income in resource-constrained communities (Kabir et al., 2015; Ngongolo et al., 2019). A study by Kryger et al. (2010), described how chicken production contributed significantly to food security and positioning women as contributors to the family’s social-economic strengths. Chicken domestication, including the introduction of new strains, has been observed in rural and urban areas in many regions in Tanzania, including Dodoma (Andrew et al., 2019). Other studies elsewhere have shown various challenges including markets, diseases, and predation that can affect productivity of chicken. For instance, a study by Ngongolo et al. (2019) reported predation from wildlife, diseases, and markets are among the few challenges in chicken production. In addition, Chuma (2019) reported parasite infestations and diseases such as Newcastle disease, Infectious bursa disease, and Coccidiosis as stump-blocks to the growth of the chicken industry in Tanzania. Studies on socioeconomic activities in relation to chicken production have been carried out mostly in rural areas where local chickens are the only breed kept. Furthermore, most of the studies on the socioeconomic impacts of chicken production have not been focused on semi-arid regions like Dodoma. However, the understanding of how the chicken contributes to socioeconomic benefits and income generated from chicken production at household level is not well documented in the semi-arid region Dodoma.

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Received October 16, 2020.
Accepted December 5, 2020.
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Dodoma region ethnicities are Gogo who literally engage in agriculture and livestock farming, production of chickens being one among them. Being official, operating as the capital city, the population is expected to rise and so the needs for animal products such as chicken meat. In view of this, more studies need to be carried out in Dodoma to determine various potentials of chicken industry growth and contribution in terms of socio-economic gains to the local communities. Dodoma city was selected by chance among the cities in Tanzania. Dodoma city represents few cities in Tanzania if not in Africa, whereby both categories of chicken breeds namely local chicken and improved chickens (layers and broilers) are kept. Local chicken keeping in Tanzania is dominated by farmers from rural areas while improved breed chicken is dominated by farmers from urban cities. Dodoma city is unique in that; chicken production involves both local and improved chicken breeds (United Republic of Tanzania, URT, 2007).

The findings from this study serve as the basis for chicken production improvement with regard to the management perspectives. This is because chicken production is an easy venture to reduce poverty, where everyone can get engaged regardless of his or her economic level (Bounds and Zinyemba, 2018). The findings also are helpful in improving health and productivity of

![Figure 1. Map showing the districts in Dodoma region including the districts discussed in the study.](image)

| Categories          | Classification       | Criteria        | % Categories (n = 400) | P value |
|---------------------|----------------------|-----------------|------------------------|---------|
| Family size (n)     | High                 | 1–3             | 18.52                  | <0.0001 |
|                     | Minimal              | 4–6             | 48.15                  |         |
|                     | Low                  | 7 and above     | 33.33                  |         |
| Sex                 | Male                 |                 | 30.36                  | >0.05   |
|                     | Female               |                 | 69.64                  |         |
| Age                 | Old                  | >40             | 43.64                  | <0.0001 |
|                     | Adult                | 31–40           | 34.55                  |         |
|                     | Young                | 21–30           | 21.82                  |         |
| Education level     | None                 | No formal education | 0                     | 0.392   |
|                     | Primary              | Acquired standard seven | 72.22 |         |
|                     | Secondary            | Acquired secondary education (O or A level) | 9.26 |         |
|                     | Tertiary             | Acquired education colleges or university, i.e., diploma, degree | 18.52 |         |
chickens so as to meet the demands of the growing Dodoma populations and improving the livelihoods of the chicken-keeping communities.

MATERIALS AND METHODS

Ethical Clearance

The ethical clearance was provided by the University of Dodoma for undertaking this study with reference number MA.84/261/02.

Study Area

The study was conducted in Kongwa and Dodoma municipal district from July 2020 to October 2020 (Figure 1). From each district, the wards were selected randomly. These wards were, Mlali, Kongwa, and Morisheni in Kongwa district and Nkuhungu, Chang’ombe, and Mnadani in Dodoma municipal. The selection of wards was based on the presence of small-scale farmers’ who depend on chicken keeping for households’ socioeconomic strength. Chicken keepers were selected randomly using a random number selector from the list obtained from the offices of the livestock field officers.

Data Collection on the Socio-Economic Contribution of Chicken

A cross-section survey using a semi-structured questionnaire was used to collect data from respondents in 2 districts. The respondents were selected randomly in each ward from the list of the households where chickens are kept in the study areas. The list of households was provided by the livestock field officers in the study areas. A total of 400 interviewees were interviewed; 200 participants were from Kongwa District,

Table 2. Responses for each category in the classification of chicken production and socio-economic importance.

| Categories                        | Classification | Criteria | % In each categories (n = 400) | P value |
|-----------------------------------|----------------|----------|--------------------------------|---------|
| Socio-economic importance (Likert score) | Very high      | 5        | 38.62                          | <0.0001 |
|                                   | High           | 4        | 18.97                          |         |
|                                   | Moderate       | 3        | 16.90                          |         |
|                                   | Low            | 2        | 14.48                          |         |
|                                   | Very low       | 1        | 11.03                          |         |
| Chicken production (number of chickens kept) | Very high     | >40      | 16.07                          | <0.0001 |
|                                   | High           | 31-40    | 12.50                          |         |
|                                   | Moderate       | 21-30    | 23.21                          |         |
|                                   | Low            | 11-20    | 35.71                          |         |
|                                   | Very low       | 1-10     | 12.50                          |         |
and 200 participants were from Dodoma municipal. The sample size was determined based on the existing population of Dodoma, which is around 2 million (Tanzania Population and Housing Census, 2012), and is more than 1 million (Survey Monkey, 2020). The questionnaire comprised of closed and open-ended questions. Some questions needed to be ranked from 1 to 5 using Likert scaling categorizing the answers as very high, high, moderate, low, and very low if they scored 5, 4, 3, 2, and 1, respectively (Nemoto and Beglar, 2014). The questions were set to address the socio-economic importance of chicken to household, including provisions for meat, manure, offerings to God, family income, aesthetic value, school fee, and employment. Furthermore, information on human demographics and revenue return per chicken to household was also gathered using the questionnaire.

**Statistical Analysis**

The variation in opinion on responses among interviewees were analyzed using either Kruskal-Wallis or Mann-Whitney statistical test (U) because of nonparametric nature of data (Mann and Whitney, 1947; Kruskal and Wallis 1952). The variations were considered significant if \( P < 0.005 \).

**RESULTS**

**Demographic Information of Chicken Keepers**

A total of 400 respondents were interviewed. More females, 69.64%, than males, 30.36% were interviewed, and 43.64% of the respondents were older than 40 yr. Most respondents, 72.22%, had a primary level of education and were coming from the households with an average of 4–6 (48.15%) household members (Table 1).
Chicken Stocking Rate

The overall average chicken stocking rate per household per flock life span was 28.08 ± 3.097. The difference in chicken stocking rate per household per flock life span between the study sites was insignificantly higher in Kongwa, mean = 30.35 ± 4.53, than in Dodoma municipal, mean = 24.07 ± 16.687 (U = 748.5, P = 0.35). With more household-kept hens and chicks, the stocking rate for hens and chicks was significantly high as compared to that of other age groups (U = 93.219, P < 0.0001) (Figure 2).

Chicken Keepers’ Perception on Socio-Economic Importance of Chicken

Most respondents, 38.62% (n = 400), had a very high feeling that chicken contributed significantly to their socio-economic stability. However, 35.71% (n = 400) felt that, chicken production was low (Table 2).

Table 3. Potential market place for chicken products.

| s/n | Potential market place                  | Yes or No | Dodoma municipal (n = 192) | Kongwa district (n = 192) |
|-----|----------------------------------------|-----------|---------------------------|--------------------------|
| 1   | Nearby shops                           | Yes       | 82.76                     | 69.39                    |
|     |                                        | No        | 17.24                     | 30.61                    |
| 2   | Retails (individuals)                  | Yes       | 96.55                     | 97.96                    |
|     |                                        | No        | 3.45                      | 2.04                     |
| 3   | Strategic market places (Mnadan/Sokoni) | Yes       | 79.31                     | 71.43                    |
|     |                                        | No        | 20.69                     | 28.57                    |
| 4   | Travelers                              | Yes       | 79.31                     | 63.27                    |
|     |                                        | No        | 20.69                     | 36.73                    |
| 5   | Urban (Dodoma city)                    | Yes       | 3.44                      | 4.08                     |
|     |                                        | No        | 96.55                     | 95.92                    |
| 6   | Selling outside Dodoma region          | Yes       | 3.44                      | 2.04                     |
|     |                                        | No        | 96.55                     | 97.96                    |
| 7   | Restaurants/Hotels                     | Yes       | 89.66                     | 61.22                    |
|     |                                        | No        | 10.34                     | 38.78                    |

Socio-Economic Contribution of Chicken at the Household Level

Contribution of each component socio-economically varied significantly (KWS = 211.138, P < 0.0001), whereas, use as source of protein or source of income scored high as compared to others (Figure 3).

In Kongwa, chickens were kept more as a source of protein, mean = 3.5 ± 0.25, as compared to Dodoma municipal, mean = 3.78 ± 0.14. On the other hand, in Dodoma municipal, chickens were more kept as a source of income and employment, mean = 2.35 ± 0.2, and employment (Figure 4).

Marketing of Chicken Products

Most chicken keepers sold their products on retail, 97.96%, whereas, very few, 2%, sold their products in Dodoma city or outside the Dodoma region. The mean variations in the market sources were not statistically significant (U = 86.00, P = 0.58) (Figure 5).

The responses of farmers varied in the two districts, for instance, the results showed that sales from retailers (individuals) were the highest in both Kongwa, 97.96%, and Dodoma municipal, 96.55%. Selling to restaurants/hotels was higher in Dodoma municipal, 89.66%, than in Kongwa district, 61.22% (Table 3).

Quarterly Gain from Chicken Product per Household

The overall average income form chicken production was Tsh 904,375 per household per lifespan of the flock, where Tsh 831,333 was from selling live chicken and Tsh 89,808 is from selling eggs. The number of eggs sold per household was significantly higher than live chicken sold (U = 8.00, P = 0.005) (Figure 6). In contrast, the income generated from live chicken sold per household was significantly higher than that gained from eggs sold (U = 63.500, P = 0.001) (Figure 7). The variation in eggs sold and their corresponding price was significantly different (Table 4) while being insignificant for the live chicken sold and their corresponding income (Table 4).
DISCUSSION

Chicken production is an important economic venture which considers both genders male and female. In this study, it was eminent that, chicken production is dominated by females, 69.64%, of age above 21 yr and 72.22% of them being primary school leavers. This agrees with findings from other studies. For instance, a study carried out in Tanzania and Zambia showed that women and youth are engaged and are the key beneficiaries from chicken production (Queenan et al., 2016). Chicken production is an interesting economic activity in rural areas for both males and females because of their benefits and the faster way to generate income by converting the input resources within a short time. Findings from Nepal revealed that chickens, particularly indigenous breeds, are good in terms of income generation, controlling pests, less labor force required, resistance to diseases, higher price value, and source of vitamin A and minerals such as iron and zinc (Kattel, 2016). We observed that chicken production contributes socio-economically to local communities through the provision of meat, manure, offerings, source of income, aesthetic value (beauty), provision of school fees, and source of employment. This is in agreement with the study carried out in Mauritius, which showed that local communities kept chicken for income generation, home consumption, culture, and leisure reasons (Jugessur et al., 2006). In addition to that, the study by Alem and Akilu showed that the local communities were keeping chicken for home consumption, ceremonies, internal guest, and perpetuating more chicken (Alem et al., 2013).
Response of Chicken Keepers on the Importance of Chicken in Socio-Economic Life

Chicken keeping is mostly done by individuals with primary education, who rely on them as sources of income and protein and the variations of the same between districts. In this study, it was observed that, small-scale chicken keepers from Kongwa district keep more local chickens as a source of protein and income, while in Dodoma municipal, people keep chicken particularly layers and broilers as source of school fees, income, and employment. Similar findings have been observed in other areas. For instance, in Tanzania, chicken production has been reported to contribute to food security, through improving food and nutrition while generating income at household level specifically for the disadvantaged women in rural areas (Saleque et al., 2016). Similarly, a study in Senegal showed that, chicken production was the source of income and employment to women (Gueye, 2002).

Markets for Chicken Products and By-products

In this study, it is was clear that the main market for chicken products and by-products particularly in Kongwa district was retail and within their premises. They rarely need to travel fetching for markets. In Dodoma municipal, chicken products were sold in nearby shops (mostly the eggs and culls). Therefore, market and marketing varied between urban and rural areas. Other potential markets in the study area were nearby shops, retailers (individuals), strategic animal market places (Mnadani/Sokoni), travelers, urban areas (Dodoma city), areas outside Dodoma region, for occasions such as wedding, and for restaurants. The variation in market between the two studies sites was possibly influenced by various factors such consumers’ preference and demand, products’ price, breed of chickens kept, colors, and sex of chicken. A study in Senegal showed that indigenous chickens are more preferred than other breeds (Gueye, 2002). Other factors reported to influence markets of products are distance to the market, quality and quantity of products, body weight (or, indirectly, age), diseases outbreak, socio-cultural events, and season of the year (e.g., more demand in festival days such as Christmas) (Gueye, 2002).

Income Generated From Chicken Production

In both Kongwa district and Dodoma municipal, the number of eggs sold in each quarter of the year was higher than that of live chicken, although the overall income from the live chicken was higher than that from eggs sold. For instance, in the time interval between January and March, the number of eggs and live chicken sold was 618 and 120, respectively. However, the income from sold eggs and the live chicken was Tsh. 125,520 (equivalent to 58 USD) and Tsh 1510, 000 (equivalent to 690 USD), respectively. The variation in income from the sold eggs and chicken was due to difference in prices between the two products. In this study, it was observed that the price per egg was between Tsh 350 (equivalent to 0.16 USD) and Tsh 500 (equivalent to 0.23 USD), while the price for the live chicken was observed to be between Tsh 10, 000 (equivalent to 4.55 USD) and Tsh 13, 000 (equivalent to 5.6 USD). The discrepancies and fluctuation in income and price could be due to variation in market places for the products. It is noted that selling chicken to retailers/individuals fetched a higher price than selling to others. This probably made retailers to be the main potential market for the chicken products. This is in agreement with the study in Bengal which showed that chicken production is an important source of income to small livestock holders (Ahuja et al., 2008).

CONCLUSION

Chicken production in local communities in Dodoma municipal and Kongwa district contributes socio-economically to both males and females. Income from chicken production varied between those accrued from eggs and live chicken sales because of differences in market places/categories and the price for each type of chicken product.
Recommendations are as follows: The local communities need to be empowered on the best way for chicken production to generate income and other benefits which are anticipated to come from chicken production such as manure, protein sources, aesthetic value, and employment. More studies need to be carried out to evaluate net income from chicken production after considering the inputs used in production.

**ACKNOWLEDGMENTS**

The authors would like to thank the University of Dodoma for providing a conducive environment for the project and the grants through the Junior Academician fund for supporting this study through the project titled Programmed Chicken Disease Control A Tool for Improved Productivity, Health and Reduced Drug Residues in Chicken Products and By-products in Dodoma Municipality. The authors acknowledge the support from Tanzania Veterinary Laboratory Agency (TVLA)—Tanzania Vaccine Institute.

Informed Consent: Informed consent was obtained from all participants included in the study.

**DISCLOSURES**

The authors declare that they have no conflict of interest.

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