The paradox of awareness of bylaws in dealing with environmental consequences of urban livestock keeping in Tanzania

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Abstract: *This study examined the community awareness of urban bylaws on livestock keeping. It was conducted in two municipalities of Dodoma and Morogoro which had elaborate bylaws on urban livestock keeping. Primary data were collected at household level through interviews and focused group discussion. Secondary data on the other hand, were collected by reviewing various documents and bylaws on urban livestock keeping which were obtained from Municipal Offices (Agriculture and Livestock Department, Urban Planning and, Environment and Health Department) from libraries and from the Internet. Using a sample of 298 respondents whose majority were livestock keepers, it was found that 78.7% were not aware of the bylaws that guide urban livestock keeping. Awareness of bylaws by the respondents was closely associated with the number of extension staff and extension contacts. Other characteristics associated with the respondents such as level of education, occupation, gender and age were also highly associated with awareness of the bylaws. However, by-law enforcement mechanism had insignificant influence on awareness. Thus, the generally perceived notion that, urban dwellers are aware of bylaws that guide urban livestock keeping needs to be taken cautiously. In order for people to be aware of the bylaws and enforce them, they should participate in their formulation.*

Key words: Bylaw enforcement, urban livestock keeping, awareness

Introduction

Urban livestock keeping has historically been part and parcel of development of cities (Thys *et al,* 2006). In developing countries, urban livestock keeping is important in addressing food security, income and employment to urban livestock keepers (Schierre and Hoek, 2001). Despite its important role, urban livestock keeping is associated with environmental pollution; invasion and damage of gardens, fences, lawns and ornamental plants and, spread of diseases making it an undesirable activity (Mlozi *et al.*, 2012; Gaynor, 2007; Fuller, 2003). Due to its inherent environmental challenges, sustainable urban livestock keeping in developing countries can only

be achieved if there is an institutional framework for the management, control and development of strong institutions of urban livestock keeping (FAO, 2008: Wapwera, *et al.,* 2015; Silard, 2011). Urban livestock keeping has, however, gained more recognition in the Sustainable Development Goals 1, 2, 3, 12 and 13 that require countries to end poverty in all its forms everywhere; end hunger, achieve food security and improved nutrition, ensure healthy lives and well-being for all at all ages and, ensure sustainable consumption and production patterns – all calling for clear institutional framework to manage it.

Various studies have found that awareness on a given phenomenon is not directly related to its familiarity to people. Moreover, many studies have found that enforcement of bylaws under different circumstances has been ineffective due to limited awareness regardless of the likely people's exposure to the bylaws (Angello, *et al, 2016;* Katakweba *et al.,* 2012; Shetty *et al.,* 2017). In Tanzania, studies have also found that many municipal councils have bylaws, but are incomprehensive, and are rarely implemented (Mlozi 2003: Mwajombe, 2012). There is limited evidence on awareness of bylaws on urban livestock keeping in Tanzania although their preparation requires involvement of the local community. The aim of this study was to find out whether people were aware of urban bylaws on livestock keeping or not in a bid to ensure their effective implementation.

Methods and materials

This study was conducted between September 2017 and March, 2018 in two municipalities namely; Dodoma and Morogoro. The population for this study was all municipal households. The study involved one urban division from Dodoma Municipality where eight (8) wards were selected; and Morogoro Urban Division which also constitute the Morogoro Urban District

where seven (7) wards were selected based on livestock population densities; making a total of 15 wards.

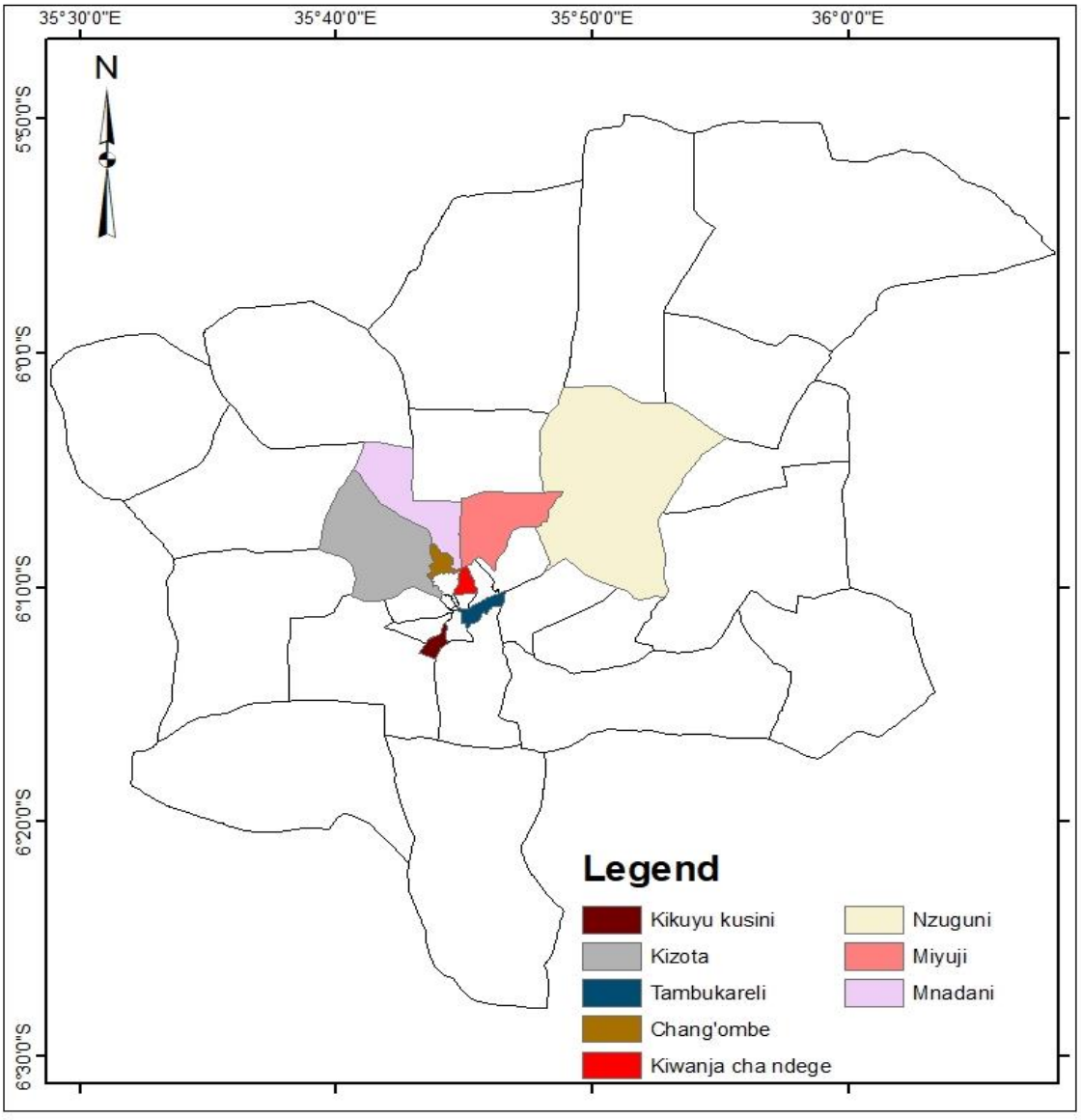

Figure 1: A Map showing Location of Wards Covered by the Study in Dodoma Municipality

Source: NBS (2012)

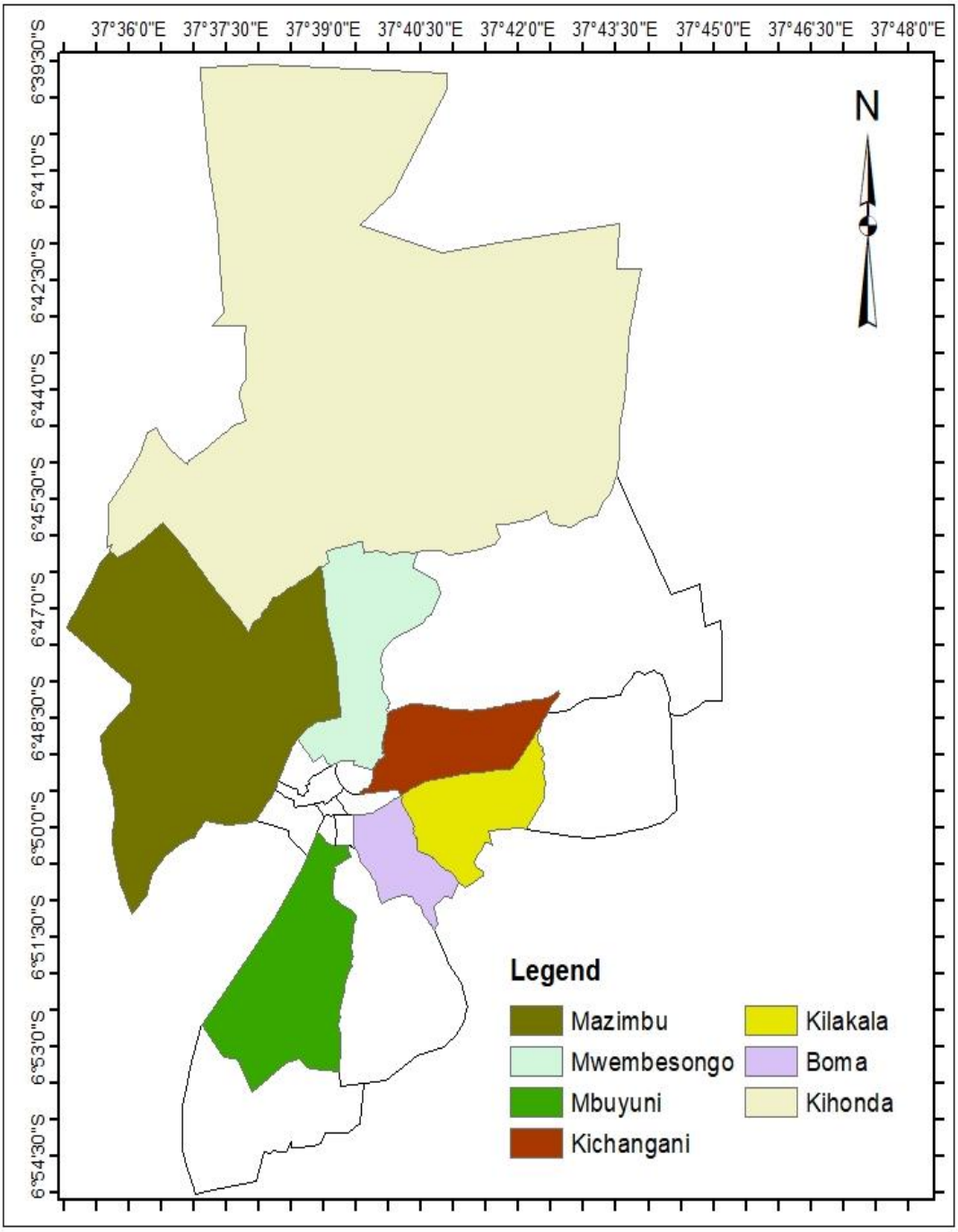

Figure 2: A Map Showing Location of Wards Covered by the Study in Morogoro Municipality

Source: NBS (2012)

Table 1: Study Wards and Livestock Status in Dodoma and Morogoro Municipalities

Municipality	Ward	Total Households	Total Livestock	*ULK HH
Dodoma	Mnadani	14,373	30,702	140
	Miyuji	14,965	16,304	161
	Nzuguni	15,466	11,365	262
	K/Ndege	10,129	7,964	165
	Chang'ombe	25,415	3,237	87
	T/Reli	6,584	3,115	23
	Kizota	34,453	3,058	68
	Kikuyu Kusini	5,974	695	54
Sub Total	**8**	**127,359**	**76,440**	**960**
Morogoro	Kihonda	44,424	22,620	605
	Boma	8,706	16,575	15
	Kilakala	18,345	15,012	30
	Mbuyuni	11,786	13,864	823
	Kichangani	19,166	12,653	75
	Mwembesongo	43,571	11,070	53
	Mazimbu	72,527	10,204	120
Sub Total	**7**	**218,525**	**101,998**	**1,721**
Total	**15**	**345,884**	**178,438**	**2,681**

Source: Extracted from Annual Reports (DMLD, 2015; MMLD (2017)

* ULK HH = Urban Livestock keeping Households

A cross-sectional survey involving 298 households was conducted. The determination of this sample was based on the formula by Cochran (1977) as follows:

$$n = \frac{Z^2 (1-p)\, p}{(ME)^2}$$

Where,

n, is a sample size,

Z, is critical value (1.96 for 95% confidence interval);
p, is proportion of the livestock keeping households in the population; (2,681/345,884)
ME, is marginal error (4%)

Out of the 298 respondents, 158 were drawn from Dodoma Municipal Council and 140 were from Morogoro Municipal Council.

Data collection

Data collection involved interviews to household heads using a semi-structured questionnaire, discussion with key informants using an interview guide, and observation. Individual interviews of selected households' heads involved both livestock keepers and those without livestock. Both closed and open-ended questions were included in the questionnaires. The information sought included respondent's characteristics (age, gender, education, marital status and type of occupation), number of livestock, types of livestock (cattle, pigs, goat, sheep and poultry), grazing systems), bylaws coverage, awareness of bylaws, number of extension staff, environmental pollution (odour, animal waste heaps, dust, noise plants' destruction), waste disposal, and occurrences of conflict.

Data Analysis

Data collected through the administration of the questionnaire were coded and entered into the Statistical Package for Social Sciences (SPSS) for windows versions 20. Both descriptive and quantitative techniques were used to analyse data. These statistics were used to assess respondents' socio-economic characteristics, livestock keeping systems practiced, effectiveness of extension staff, use of bylaws in resolving conflicts, people's awareness of bylaws and effects of livestock on the environment.

Results

Socioeconomic and demographic characteristics of Respondents

Table 2 summarizes the socio economic and demographic characteristics of the population sample of the study area. Five important characteristics were considered in view of their influence on livestock keeping namely gender, age, marital status, education level, and occupation.

Table 2: Socioeconomic and Demographic Characteristics of Respondents

Characteristic	Dodoma	Morogoro	Total
Gender			
Male	**65.8** (104)	**80.7** (113)	**72.8** (217)
Female	**34.2** (54)	**19.3 (27)**	**27,2 (81)**
Total	**100.0** (158)	**100.0** (140)	**100.0 (298)**
Age			
Between 18 – 40	**25.3** (40)	**15.7** (22)	**20.8** (62)
Between 40 – 45	**29.1** (46)	**40.7** (57)	**34.6** (103)
Between 46 - 60	**29.7** (47)	**30.0** (42)	**29. 9** (89)
Above 60	**15.8** (25)	**13.6** (19)	**14.8** (44)
Total	**100 (158)**	**100.0 (140)**	**100.0 (298**
Level of Education			
No Formal Education	**0.6** (1)	**0.0** (0)	**0.3** (10
Standard Seven	**10.1** (16)	**2.1** (3)	**6.4** (19)
Form Four	**50.6** (80)	**45.0** (63)	**48.0** (143)
Form Six	**20.3** (32)	**30.7** (43)	**25.2** (75)
Certificate	**3.8** (6)	**2.1** (3)	**3.0** (9)
Diploma	**8.2** (13)	**8.6** (12)	**8.4** (25)
Degree	**6.3** (10)	**11.4** (16)	**8.7** (26)
Total	**100.0 (158)**	**100.0 (140)**	**100.0 (298)**
Marital Status			
Single	**23.4** (37)	**24.3** (34)	**23.8** (71)
Married	**58.2** (92)	**65.7** (92)	**61.7** (184)
Widowed	**13.3** (21)	**7.9** (11)	**10.7** (32)
Separated	**5.1** (8)	**2.1** (3)	**3.7** (11)
Total	**100.0 (158)**	**100.0 (140**	**100.0 (298)**
Occupation			
Self employed	**71.5** (113)	**67.9** (95)	**69.8** (208)
Private Entity	**12.1** (19)	**11.4** (16)	**11.7** (35)
Government Employee	**8.2** (13)	**16.4** (23)	**12.1** (36)
Others	**8.2** (13)	**4.3** (6)	**6.4** (19)
Total	**100.0 (158)**	**100.0 (140)**	**100.0 (298)**

Bolded figures are the percentage and those in brackets are the number of respondents involved

In this study, 72.8% of the households were male headed, while female headed households were 27.2%. Majority of the respondents (34.6%) were aged 40-45 years. Majority of respondents

(73.2%) had completed secondary education (Form IV and Form VI). Majority of the respondents were also married (61.7%) followed by singles (23.8%). In terms of occupational status, more than two-thirds of the respondents (69.8 %) were employed in the informal sector.

Awareness of Bylaws on Urban Livestock Keeping

The objective of this study was to examine the respondents' awareness on by-laws that help to control environmental pollution arising from urban livestock keeping. People are not expected to implement bylaws which they are not aware of. Respondents were asked to indicate if they were aware or not, of any by-laws on environmental pollution caused by urban livestock keeping in their area. The results of their responses were as presented in Table 3.

Table 3: Respondent's Awareness of By-laws on ULK (N=298)

Awareness on bylaws	Dodoma	Morogoro	Total
Yes	31(10.4)	32(10.7)	63(21.3)
No	127(42.6)	108(36.2)	233(78.7)
Total	**158(53.0)**	**140(46.9)**	**298(100)**

Figures in brackets are percentages

Results in Table 3 show that, more than three quarters of the respondents (78.7%) were not aware of by-laws on urban livestock keeping.

Seven (7) factors namely; number of extension staff, extension contacts (visits), law enforcement age, gender, education and occupation were considered to have an influence on the awareness of urban livestock keeping. In order to establish whether these factors were truly responsible for low awareness of the community in the study areas or not, a chi-square test was conducted. The results from the statistical test on their association with awareness of the by-laws are summarized in Table 4.

Table 4: Association between extension and /or socioeconomic characteristics and awareness of bylaws

Variables	Pearson chi2	P-value
Number of extension Staff	120.61	0.000
Extension Visit	195.36	0.002
Law enforcement	3.833	0.050
Level of Education	187.434	0.000
Age group	187.430	0.000
Gender	158.26	0.000
Occupation	5.434	0.246

Discussion

Socioeconomic and demographic characteristics

Gender distribution of the respondents was in line with the typical Tanzanian cultural system in which males are dominant household heads (72.8%) with decision making powers, and majority of the respondents (34.6%) were adults (aged 40 – 45). This implies that urban livestock keeping is a male's domain. More than 70% of all respondents had finished secondary education, with 48% and 25.2% having form IV and form VI respectively. The fact that majority of respondents had this level of education is in line with our expectation. Majority of urban dwellers send their children to secondary schools. The government education policy also places high priority to secondary education. Further analysis of the results indicates that, people from all levels of education background are involved in urban livestock keeping. As far as the marital status is concerned, most of the respondents were married (61.7%). This is in line with our expectation since the study aimed to solicit information from household heads of marriage age (18 years and above). One striking feature of the respondents in this study is the growing number of single headed households. This is also an expected phenomenon under urbanized conditions where many young men and women workers and business dealers stay single for a reasonable time before they marry. The fact that self employed respondents were majority is an indication that the informal sector is dominant in the study area. However, livestock keeping is practised by people from all occupational backgrounds to serve different purposes ranging from income generation, employment, food security, insurance and social needs (Guendel, 2002).

Awareness of bylaws

Awareness of the bylaws was considered a necessary condition for livestock keepers to abide by them. There was an alarming rate of unawareness of 78.7%. Following a Chi-square test of independence, the null hypothesis was rejected, implying that there was a relationship between socioeconomic characteristics of the respondents and their awareness on bylaws; with exception of law enforcement and occupation ($p \leq 0.050$; $p \leq 0.246$ respectively). Low awareness of bylaws was attributed to inadequate provision of extension services due to shortage of extension staff, limited number of extension visits (livestock keeper's contacts) by extension staff, inadequate enforcement of by-laws by the relevant agents and socio-economic and demographic characteristics of the respondents such as education level, occupation, gender and age as explained below:

Number of Livestock Officers

The Chi- square test results in Table 4 show that number of extension staff has significance influence on awareness of bylaws **(**$p \leq 0.050$). Shortage of livestock officers who could disseminate knowledge, not only on livestock husbandry practices but also the guiding bylaws, can reduce the general public awareness of the bylaws. The results are in agreement with previous studies that poor extension services to farmers in Tanzania have largely been attributed to inadequate number of extension staff (Angello et al., 2016; Semwenda, 2016; Mcharo 2013).

Extension visits to Livestock Keepers

Effectiveness in the delivery of extension services is not only determined by number of staff, but also the frequency of their contacts with the livestock keepers. According to Table 4, there is association between extension visits and awareness of bylaws ($p<0.050$). This result is supported by a study by Hussain et al., (1994) on impacts of the training and visit extension system on farmers' knowledge and adoption of technology in Pakistan who found that increased extension contact led to rapid diffusion of knowledge in the area served relative to the adjoining non-visited area. The existence of extension staff is, therefore, more meaningful if they frequently visit the people for whom the bylaws are intended.

Enforcement of b*ylaws*

The Chi-square test in Table 4 shows that by-law enforcement mechanisms had insignificant influence on the awareness of the by-laws ($p \geq 0.050$). The test statistic failed to reject the null hypothesis suggesting that the awareness of bylaws is independent of bylaw enforcement**.** This implies that enforcement of bylaws does not directly lead to awareness based on the provided data.

Occupation

The Chi-square test in Table 4 also failed to reject the null hypothesis of independence of bylaws awareness and occupation ($p \geq 0.05$). Regardless of their occupation type, the respondents in the study area were not aware of any by-laws that guide urban livestock keeping. The implication of this result is that people are more interested in their personal accomplishments than in the ruling bylaws that are not effectively enforced. Any proposed awareness programme can be relevant to all urban dwellers from different occupation background.

Level of education, gender and age

The respondent's characteristics such as the level of education, gender and age were also closely associated with awareness of the bylaws on urban livestock keeping. The test statistic ($p<0.050$) rejected the null hypothesis of their independence of bylaws, suggesting that awareness of bylaws is related to level of education, gender and age.

Based on statistical test of association between variables of interest and awareness of bylaws, awareness was found to be associated with the number of extension staff, number of extension visits made by extension officers and other characteristics associated with the respondents such as the level of education, type of occupation, gender and age. The statistical tests, however, failed to reject the null hypothesis of independence of bylaws awareness with respect to enforcement and occupation; suggesting that awareness of bylaws is independent of bylaw enforcement as well as occupation type. The results are in agreement with Bozoglu *et al* (2016), who found that the students' socio-demographic and economic variables such as gender, age, mother education, father education, residence and family income were statistically significant in the formation and growth of environmental awareness.

Conclusions and recommendations

Awareness is a complex phenomenon in that, it is not only based on the knowledge of existence of something or the understanding of a situation or subject based on available information or experience with the general community. Rather, an extensive personal involvement in the phenomenon, experience or situation is important in awareness creation. The dynamic nature of the society makes it difficult for one person to get exposed to all relevant awareness factors ever experienced. In terms of bylaws for urban livestock keeping, peoples' awareness would demand genuine participation in their preparation, constant interactions with extension officers, constant reminders in public meetings and full involvement of leaders at all levels.

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