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RESEARCH ARTICLE

Comparing use of ethno veterinary products among rural and periurban chicken farmers in Katulani District, Kenya

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Abstract

A survey was carried out to determine use of ethno veterinary products among chicken farmers in Katulani District, Kenya. Data was collected through observations, photography and structured questionnaires administered to 110 chicken farmers in rural and peri urban sites to allow for comparison. Data on household demographics, diseases occurrence, whether medicines were administered, choice & type of medicinal products used and factors influencing the choice were captured. There was a significant positive correlation p=0.01, r=0.524 between household size and mean flock size. There were more female headed households rearing chicken, however male headed households reared larger flock sizes in both sites. Those in formal employment kept larger flock sizes than the unemployed. It was found that use of medicines in management of chicken diseases was common where about 98.6% and 90% of chicken farmers in rural and periurban areas respectively used medication on their flocks. Majority (80%) of rural farmers used traditional products while 57.5% peri urban farmers used conventional medicines. The main traditional medicinal products used were *Aloe vera*, neem tree, pepper and goat milk. Healing ability, availability of drugs, cultural practices and cost of drugs were the main factors guiding choice of drugs used. It was concluded that ethno veterinary medicine and practice is common in the study area, openly practiced, and was reported to successfully manage diseases. More research needs to be conducted on chemical composition, efficacy, dosage and side effects on key medicinal products used in the area.

Introduction:-

In Kenya agriculture contributes about 26% to the Gross Domestic Product (GDP) with poultry playing a major role representing 30% of the agricultural contribution to GDP (FAO, 2008). The poultry sector employs people either directly in production and marketing or indirectly through linkages with suppliers of such inputs as day old chicks, feeds and veterinary services (Omiti and Okuthe, 2008).

The poultry sector also contributes to food security throughout the developing countries by diversifying and improving incomes, food quality, energy and fertilizer in over 80% of rural households (Sonaiya and Swan, 2004). Poultry also play an important social and cultural role amongst poultry keepers (Anders, 2008).

However, growth of the poultry industry has continuously been affected by various production constraints like use of feed rations of poor quality, diseases, predators, harsh environment, limited production skills and high costs of feeds (Ochieng *et al*., 2013). Any improvements in these constraints may lead to sustainable increase in chicken productivity.

The presence of diseases in chicken leads to inferior performance. It is therefore essential that flocks are kept in good health by prevention of diseases, early recognition of diseases and/or early treatment (Anders, 2008). This can be done either through proper antimicrobial use, proper parasite control, increasing resistance by vaccination and decreasing exposure to pathogens such as bacteria, viruses, and coccidia (Andrews, 2000).

There are various antimicrobials that can be used; Turkson (2008) found in Accra, Ghana that most of drugs used by farmers were dewormers, coccidicidals and antibacterials excluding vitamin and mineral supplements. However, some poor rural chicken farmers consider these antimicrobials expensive and unaffordable (Marizvikuru *et al*., 2005), hence prompting them to use ethno veterinary medicines which they consider easily accessible, affordable and apparently effective (Gueye, 1999; Moreki, 2012). This study was therefore aimed to establish the proportion of chicken farmers using ethno veterinary medicines, the most common products used, factors influencing the practice while making comparisons and recommendations between rural and periurban farmers in the study area.

Methodology:-

A cross-sectional survey research design was used. The study area had 14 sub locations, of which 4 were in peri urban while 10 were in a rural setup. Out of the total 9593 households in the area, 3465 and 6128 households were located in peri urban and rural areas respectively; this represented 36% and 64% of the households. A sample of 110 respondents was obtained according to Israel (1992). The sampling design was multi stage, two sub locations were randomly selected in both rural and peri urban areas. Then two villages were randomly selected from each sub location. The final stage was a simple random sampling from each village to proportionately select the respondents according to population distribution in the villages which were the final sampling units. Overall, 40 and 70 questionnaires were administered to peri urban and rural areas respectively. Data was collected through observations, photography and using structured questionnaires. These were then analyzed accordingly using Statistical Package for Social Sciences (SPSS). Simple descriptive statistics mainly means and percentages were used to present data.

Results and Discussion:-

Size of households:-

In the survey, households were classified into two; small household which refers to households with between $1 \leq 5$ persons and large households for those with more than 5 persons. On the other hand, flock sizes were grouped into three classes namely; small flock size for households with less than 10 chicken, medium for those owning between$11 \leq 50$ chicken and lastly large for those households that had more than 50 chicken. The distribution of household size in relation to number of chicken owned is presented in Table 1.

Table 1: Distribution of flock size in relation to household size in rural and peri urban sites

Study site	**House hold size**	**Mean flock size**	**Flock size distribution**		
	Category	**(In numbers)**	**1≤10**	**11≤50**	**>50**
Rural (n=70)	1 to ≤5	17.64	3(4.3)	11(15.7)	0(0.0)*
	>5	59.73	4(5.7)	26(37.1)	26(37.1)
Peri urban (n=40)	1 to ≤5	20.35	5(12.5)	16(40.0)	5(12.5)
	>5	25.5	2(5.0)	11(27.5)	1(2.5)

***Figures in brackets are percentages, source: survey data, Katulani, 2015**

Rural households had larger household sizes compared to peri urban households. In terms of chicken flock size, large households had higher mean flock sizes compared to small households. For example, in rural areas large households had a mean flock size of 59 chicken compared to smaller households who had an average of 17 chicken. In both sites, large household sizes had the highest number of chicken; this was because they provided adequate labour during chicken management. Besides, each member of the family was expected to own at least a chicken. This finding is similar to those reported by (Nduthu, 2015), where large household size were found to be directly linked to flock sizes. Overall for the study area, there was a significant positive correlation p=0.01, r=0.524 between

household size and total chicken flock size. This implies that the larger the household size, the bigger the flock size. However this may be applicable when environmental and socio economic factors are not limiting.

Gender of the respondent:-
There were more female headed households rearing chicken in both study sites. More females kept chicken in the study area as they were easily disposable for subsistence purposes. Furthermore, for women who run daily household affairs, chicken can bring quick cash to buy basic household food requirements. This outcome is similar to the findings by Kingori *et al.,* (2010) who reviewed the indigenous chicken production in Kenya; Kyule *et al*., (2014) in Nakuru County and Getu and Malede, (2014) in Ethiopia who reported that indigenous chicken rearing is usually associated with women as it is considered a venture of the poor. However, though fewer male headed households were rearing chicken, they kept larger flock sizes than females in both areas. For example in rural areas males kept a mean flock size of 53 chicken compared to 49 chicken by females. In peri urban areas males kept a mean flock size of 28 chicken compared to 19 chicken by females.

Level of education and flock sizes:-
Majority had attended school up to primary level in both study sites. This follows the national trend where the national literacy levels for those with no formal education stands at 5%, 50% for those with primary education and 46% for those with secondary education and above (KNBS, 2014). Literacy levels in Kitui County were low due to the high secondary school dropout rates, inadequate education facilities, inadequate staff, low enrolment and low transition rates (GOK, 2014). Peri urban areas had higher education levels, this is mainly due to better equipped schools, more staff and short distances to school.

In rural areas the mean flock size was 18 chicken by those with no formal education, 45 chicken by those with up to primary level of education, 84 chicken by those with secondary level of education and 57 chicken by those with tertially education. This generally shows that the higher education levels, the bigger the flock size kept. With high education levels, farmers' intellectual capacity is expected to be high. This would in return enhance application of proper chicken rearing practices hence improve household income derived from chicken (Kyule *et al.,* 2014). Also in peri urban areas the higher the education level the bigger the flock size kept. Majority in both study sites preferred rearing medium sized flocks.

Marital status of the respondents:-
From the survey, the separated/divorced had the lowest flock sizes. In rural areas, single households were rearing larger flock sizes (average 68 chicken) than the married (average 53 chicken) so as to supplement their household income. However, in peri urban areas, the married had larger flock sizes (average 24 chicken) to provide additional source of food for their families. Among married households like in the study area, women are considered to have limited control over decision making on agricultural resource allocation (FAO, 2011; African Development Bank, 2015).

Employment status:-
Only 1.4% of rural respondents were in formal employment compared to 42.5% in peri urban. The study area had unemployment rate of 79.5%; this is compared to 65% unemployment rate for the whole of Kitui County. The high unemployment in Kitui County is attributed to lack of/or limited vocational skills demanded by the economy and the employers (GOK, 2014).

The unemployment rates for the study area and Kitui County as a whole were higher than the national average of 40% (Biko, 2012). The survey found those in formal employment had an average flock size of 140 and 24 chicken in rural and peri urban sites respectively, this was higher than flock sizes of the unemployed who had average flock sizes of 50 and 20 chicken in rural and peri urban sites respectively. This is because the employed had stable income, hence access to capital that enables them to purchase more chicken which was found to be the main method of initial stock acquisition

Poultry dynamics:-
Majority of households (99%) in the study area reared chicken only, 1% reared a combination of chicken and ducks. All the respondents reared chicken of indigenous type. The explanation was because of the minimal costs involved as indigenous chicken can scavenge the whole day with limited labour and feed costs. A similar finding was reported by Danda *et al*., (2010) in the costal lowlands of Kenya; Mailu *et al*., (2012) in Eastern Kenya and Bwalya

and Kalinda (2014) in Lusaka, Zambia. From these studies, indigenous chicken were favoured because they had several advantages like resistance to diseases than exotic breeds, cheaper to buy, taste preferences for their meat and eggs in the market, free ranging ability, ability to tolerate harsh environment, easy to dispose/sell and need for less labour. In addition, Bwalya and Kalinda (2014) indicated that indigenous chicken were favoured since they cause minimal destruction to the environment and require very little feed supplementation.

About 96% of respondents reared chicken under free range as shown in Figure 1 and 2.


Figure 1

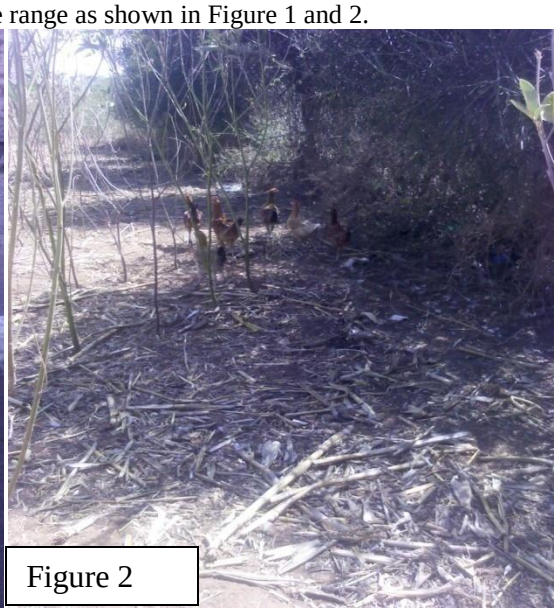
Figure 2

Fig 1 and 2: Indigenous chicken under free range in the study area

Disease occurrence and management:-

Various diseases/signs especially Newcastle disease, respiratory disturbances, digestive disturbances and conditions affecting mobility of chicken were reported. In rural areas all the respondents experienced disease incidences as compared to 52.5% in peri urban site. On disease management, 98% and 90% of rural and peri urban farmers respectively used medication on their flocks. Majority (80%) of rural chicken farmers used traditional medicinal products while in peri urban areas majority (57.5%) favoured use of conventional medicines.

Guéye (1999) describes traditional animal health care practice also known as ethno veterinary medicine (EVM), as the application of traditional products; it is defined as local or indigenous knowledge and methods for caring, healing, and managing livestock. EVM are mainly used as broad spectrum drugs to manage various diseases and conditions. Majority of respondents could tell when their chicken were sick by observing clinical signs. The most common signs observed were; diarrhoea, sneezing/coughing, dropping wings, nasal discharges, inappetance, immobility and sudden death.

Medicinal products used:-

Medicinal products applied ranged from medicinal plants, chemicals, animal by products, house hold goods to a commonly available waste product like soot. Some of the medicinal products used were; *Aloe* species, allium species, tobacco powder, African night shade, neem tree, pepper, mushroom, cough grass, wandering jew and euphorbia species. One of the chemicals used was battery cell powder. Goat milk and sugar were also used. The finding that majority of the products were of plant origin agrees with studies by Gueye (1999) who indicates that medicinal plants are the common ingredients of EVM and all plant parts can be used. Toyang *et al*., (2007) also indicates that parts and products of animals such as bones, milk, butter, urine and dung are used as ingredients of EVM in addition to other common ingredients like honey, sugar, vegetable oils, butters and salt

The study revealed a wide usage (80%) of EVM in rural areas, they had gained recognition at the expense of conventional drugs, this is mainly because they were readily accessible, available, inexpensive, and apparently effective. Rural areas had 21 types of medicinal products compared to 4 types in peri urban areas. The main products used were *Aloe vera*, neem tree, pepper and goat milk.

Figure 3 shows one of the methods used by free range chicken farmers to administer clean drinking or medicated water.

Fig 3. Receptacle for administering drinking water to free range chickens, the container was anchored to the ground at one point in the compound so that birds can access it throughout. Medication was added to the water for treatment or prophylactic purposes.

The method of preparation involved using some parts of the plant like leaves alone or a combination of parts of the same plant like leaves and bark. A combination of parts of different plants was also administered to sick birds. Routes of administration were mainly oral where plant parts were mixed in drinking water. Most products were prepared by chopping and pounding the mixture of bark and/or leaves and then administering in drinking water. Charcoal powder and sugar were administered as solutions. These products were mainly used to manage a broad spectrum of diseases and conditions (Table 2).

Table 2. Various medicinal products, preparation and diseases and/or conditions they managed		
Medicinal product English/scientific/local name	**Preparation**	**Condition managed**
Battery cell powder	Powder in water	Diarrhea
Vernonia lasiopus/muvatha	Smashed leaves in water	Newcastle disease
Aloe species/Burn plant/*kiluma*	Juice mixed in water or slice leaves put into drinking water	NCD and other diseases
Red bitter berry/*strychnos henningsii/muteta*	Roots and back in boiled drinking water	Various diseases
Goat milk	Milk	Diarrhea
Allium species/ onions	Slices in water	Various diseases
Nicotinia tubacum/ Tobacco powder	Powder	Drowsiness
African night shade/*kitulu Sollanum villosum*	Leaves fed to chicken	Diarrhea
Azandirachta indica/mwarobaine/ neem tree	Smashed leaves and back in water	Newcastle disease Worms ,coccidiosis Fowl typhoid &cholera
Pepper (ndulu) +euphorbia+aloe species	Chopped pepper mixed with Aloe juice and euphorbia	Newcastle and Fowl typhoid
Melia volkensii guerke/mukau	Smashed back and leaves in water	Worms ,Newcastle disease ,coccidiosis
*Launaea cornuta/*wild lettuce/*Uthunga*	Chopped in drinking water	Various diseases
Soot/*muwae*	In drinking water, usually mixed with other products	Newcastle disease and others
Maerua decumbens(kinatha)	Roots	Various diseases
Albizia amara (mwoa)	Various parts	Many diseases
Charcoal powder	In drinking water	Diarrhoea and poisonings
Pepper /*ndulu* and mushroom/*ikunu*	In drinking water	Improving immunity and quick recovery in various diseases
Elymus repens /Cough grass	In drinking water	Newcastle disease +fowl typhoid
Sugar	Solution in water	Weakness
Marabou thorn/*muselesele* leaves	Smashed leaves in water	Antihelmiths and gut problems
Wandering jew juice	Leaves smashed in drinking water	Typhoid and coccidiosis

Source: survey data, Katulani, 2015

The most widely used medicinal plant was *Aloe vera* (Aloe species), it was used to manage several diseases including Newcastle disease. *Aloe vera* leaves were harvested, cleaned with water and crushed or sliced into pieces before mixing with drinking water. The medicated water was offered to sick birds until they showed signs of recovery. *Aloe vera* has been documented to have several pharmacological properties. These include; antibacterial, antifungal, antivenin, immunological, anti-allergy and anti inflammatory properties. It is a perennial herb that originates in the tropics and therefore is readily accessible and inexpensive (Marisvikuru *et al*., 2005). Aloe species have a wide usage even by other communities in Kenya (Shivairo *et al*., 2013). Some chicken farmers in the study area used it for prophylactic purposes by mixing it in drinking water and strategically placing it in the compound so that birds could drink it while on free range.

Another medicinal plant used was neem tree (*Azandirachta indica*); commonly known as *mwarobaini* in Kenya. It was used as a preparation of smashed leaves and bark in water to treat various conditions. Gueye (1999) reported that it had been used to treat various endoparasites. Pepper (capsicum species), Onions (Allium species), *Melia volkensii guerke*, *Vernonia lasiopus* and *Strychnos henningsii* were also used to manage several diseases. Gueye (1999) also reported that onions (Allium species) chopped and soaked in drinking water has been used to treat fever.

Melia volkensii guerke, locally known as *Mukau* tree has been reported to increase appetite when administered in boiled drinking water while *Vernonia lasiopus* locally known as *Muvatha* has been administered in drinking water to treat digestive disturbances (Kwesi and Philip, 2004). Battery cell powder was used to treat diarrhoea. *Strychnos henningsii* locally known as *Muteta* was also widely used, it has been reported to treat various diseases when the bark, roots and fruits are administered in boiled drinking water (Kuria *et al*., 2012). Soot and pepper have been used to treat coccidiosis (Marizvikuru *et al*., 2005). Farmers discontinued administration of these medications once signs of good health were observed. No adverse effects were reported during administration.

Factors influencing farmers' choice of chicken health management strategies (traditional and conventional) in the study area:-

Respondents also indicated factors they consider before using either traditional, conventional medicinal products or both. The results highly ranked ability of a product to heal a disease(s) until signs of recovery were observed by 90% and 94% of rural and peri urban respondents respectively. About 91% of rural respondents and 36% of periurban respondents said availability of a medicinal product near their locality influenced their choice of medication. This explains why rural respondents favoured use of traditional products due to long distances to agro vets shops while peri urban respondents mainly used conventional medicines. Overall in the study area 72% of respondents considered local availability of a drug as a key factor

About 71% of rural respondents said cultural practices influenced their choice of medication as compared to 5.6% of peri urban respondents. Cultural practices in the rural areas where knowledge and skills on use of ethno veterinary medicine were wide spread and passed from older to younger generations favoured use of EVM over conventional medicine. Overall 48.6% of the respondents ranked culture as the third main factor influencing their choice of medicinal product

Other factors that influenced choice of medicinal products were cost of drugs (48%), accessibility (45%), ease of administration (36%), indigenous knowledge (29%), risk of overdose (8%) and religion type (2%) as shown in Table 3.

Table 3. Factors influencing choice of medication used on chicken

Factors	**Location**		
	Rural (%) n=70	**Peri urban (%) n=40**	**Overall (%) n=110**
Cost	59.4	25.0	47.6
Availability	91.3	36.1	72.4
Accessibility	56.5	22.2	44.8
Healing ability	89.9	94.4	91.4
Ease of administration	44.9	19.4	36.2
Risk of overdose	2.9	16.7	7.6
Indigenous knowledge	34.8	16.7	28.6
Religion	1.4	2.8	1.9
Culture	71.0	5.6	48.6

Source: survey data, Katulani, 2015

Conclusion and recommendations:-

Household demographics like household size, education levels, employment and marital status had influence on total chicken flock size per household. Farmers preferred medium sized flock and reared indigenous chicken breeds mostly under free range production system. Ethno veterinary medicine and practice is widespread in this community, openly practiced, and was reported to successfully manage chicken diseases. In addition, healing ability, availability, cultural practices and cost influenced the use of a particular health management product. The recommendations of the study include upgrading of local chicken breeds through improved indigenous or exotic breeds and promoting of chicken disease control programmes. More research needs to be conducted on chemical composition, efficacy, dosage and side effects on key medicinal products used in the study area.

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