

Species Diversity and Conservation of Domesticated Fauna in the Upper West Region-Ghana

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Abstract

The study settled on 13 communities in Upper West region by means of systematic sampling taking into consideration, natural resources endowments such as diverse species of poultry and livestock. 160 domesticated animal rearers were selected for interaction by means of simple random sampling. Data collection methods were questionnaire administration, direct observation, and photography. The study identifies diverse domesticated fauna species in Upper West region with their importance ranging from income, food, and raw materials to pleasure. It was also obvious in the study that modern scientific and traditional methods are used in conserving domesticated animals. The study concludes that, a blend of modern scientific methods and indigenous knowledge is instrumental in promoting sustainable development.

Keywords: Species Diversity, Conservation, Domesticated Fauna, Natural Resources Management, Sustainable Development.

I. INTRODUCTION

It is worth noting that 40 animal species consisting of nearly 4500 breeds are relied on by the world for food supply [1]. In the light of Food and Agriculture Organization (FAO), there has been an erosion of about 800 genetic resources of farm animals and about 30% of all those remaining are associated with some magnitude of risk [2].

Poultry and its products are a major source of employment, income, food as well as socio-cultural values [3]. Records indicate that in the past decade poultry meat production increased by 43% in developing countries as against 28.4% in developed countries [4]. Jordan and Pattison (1996) cited in John (2016) [5] are of the opinion that meat, eggs,

income and foreign exchange is the economic significance of poultry. The demand for red meat from livestock which is expensive has fallen as a result of poultry products which are cheaper and at the same time considered as a more acceptable source of animal protein [6].

The livestock sector on the other hand employs 1.3 billion people globally and provides livelihood support to 600 million poor small holder farmers [7]. Livestock production which is seen as a risk reduction strategy for vulnerable communities is also an avenue for the provision of nutrients as well as traction for crop cultivation in smallholder systems. The contribution of livestock products in terms of global calorie consumption is 17% as against 33% in terms of global protein provision [8].

There are positive and negative effects of livestock systems on natural resource base, public equity, economic growth and public health [9]. One of the fastest agricultural subsectors in developing countries is the livestock sector with a contribution of 33% to agricultural GDP. By implication, the growth of the livestock sector is influenced by population growth, urbanization, and increasing income in developing countries [10].

There was a tripling of total meat production in the developing world from 45 to 135 million tons between 1980 and 2002 [9].

The Upper West region is one of ten regions in Ghana where diverse domesticated animal species ranging from poultry to livestock are reared on subsistence and commercial basis. It is however noted that researches in contemporary times tend to focus on some other aspects of domesticated fauna to the neglect of species diversity and conservation. For instance, “Turner (2010) [11]” looked at recent trends and future

prospects of livestock production in Kenya. “Attuahene et al (2010) [12]” concentrated on poultry production in Ghana with emphasis on prospects and challenges. Also, “John (2016) [5]” focused on prospects and challenges of poultry farming in the Wa Municipality of the Upper West region of Ghana. More so, “Diane and Olivier (2011) [13]” touched on domesticating animals in Africa with emphasis on implications of genetic and archaeological findings. These suggest that there is a knowledge gap on species diversity and conservation of domesticated fauna with specific reference to Upper West region. As such, the article in questing aims at filling the identified knowledge gap by focusing on species diversity and conservation of domesticated fauna in the Upper West region of Ghana, cognizance of diverse domesticated fauna species, their conservation status, importance, as well as modern scientific and indigenous methods of conservation.

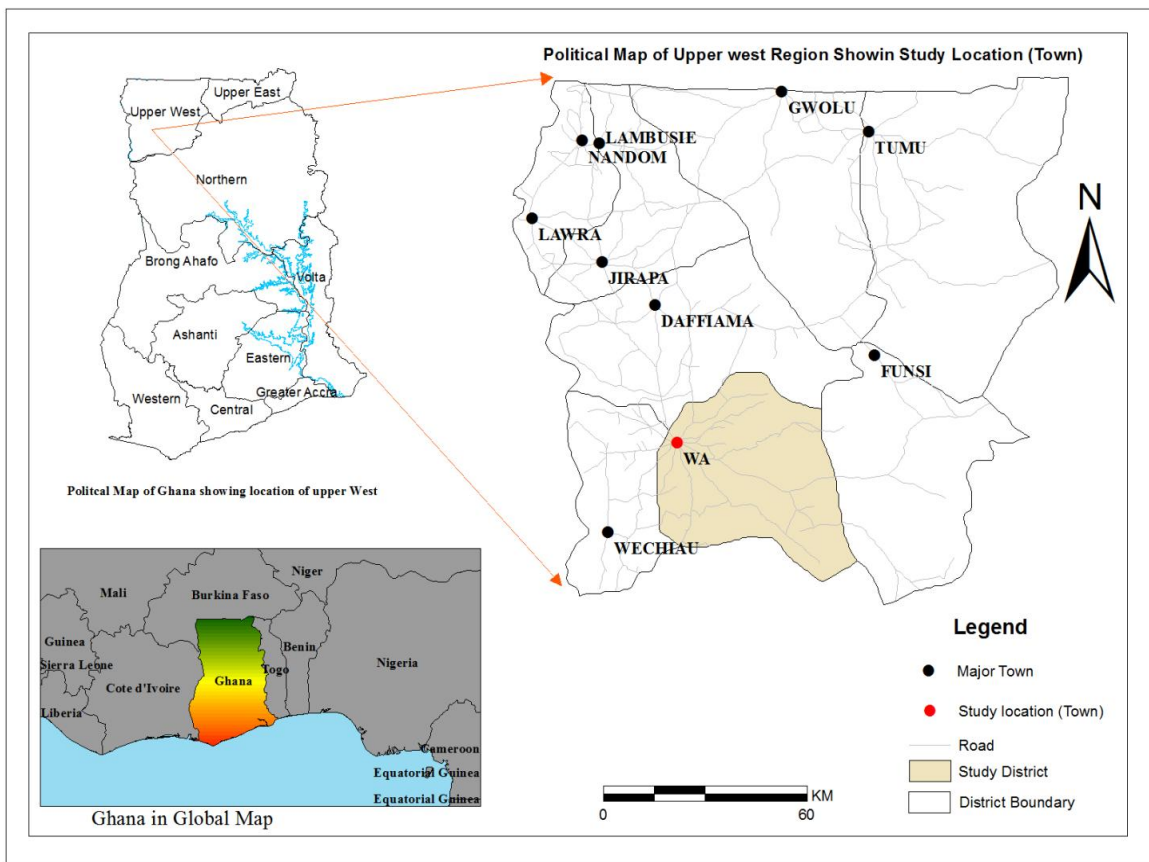
II. MATERIALS AND METHODS

Location, landmass and population size of the study area as well as methodology of the study are presented as follows:

A. Location, Landmass and Population Size

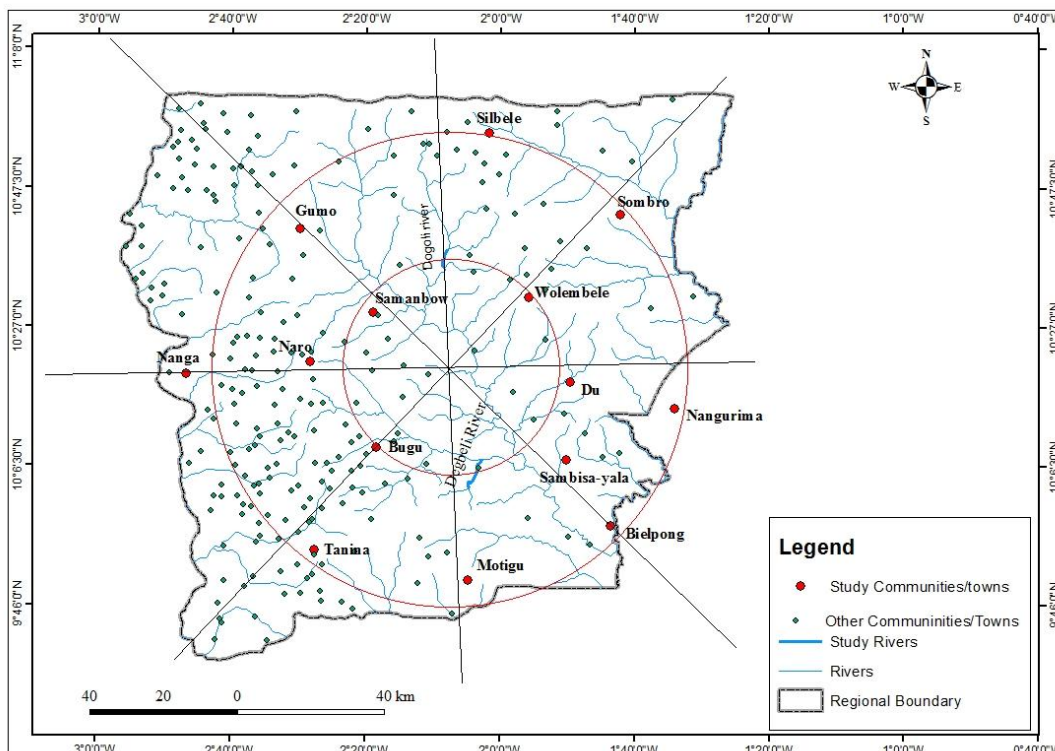
The Upper West Region is one of the ten regions in Ghana. It is located in the North-Western corner of Ghana with latitude of 9.80-11.00 North and longitude of 1.60 to 3.00 West. It shares a boundary with Burkina Faso to the North and republic of cote d Ivoire to the west. It has a landmass of 18,476 square kilometers which represent 12.7% of the total land area of Ghana. It also shares a border with the Upper East and Northern Region to the East and Northern Region to the south. It is the seventh largest region in the country with 11 districts. It has a potential for international and inter-regional trade by virtue of its position. The Upper West region has a population of 702,110 with a population density of 38 per square kilometers[14]. Figure 2.1 and 2.2 are maps of Ghana indicating Upper West region and study communities.

Figure 2.1: Map of Ghana Indicating Upper West Region



(Source: Constructed from Arc GIS)

Figure 2.2: Map of Upper West Region Indicating How the Study Communities were Systematically Selected



(Source: Constructed from Arc GIS)

B. Methodology

The study is organized into research design, sources of data, sampling techniques, data collection methods, as well as techniques of data analysis and presentation. The study relied on survey research design. The survey research design was appropriate in this direction as the research objectives took into consideration the views, opinions, characteristics and expectations of the respondents. Neuman (2007) contents that survey is appropriate for research objectives and questions that are about self-reported beliefs or behaviors and could even be stronger when answers sought by these research objectives and questions measure variables. The research undertaken confirmed this notion. Also, the study relied on primary and secondary sources of data. In other words, apart a review of relevant literature, the study generated first-hand information from the field. The study communities namely Samanbaw, Sambisi, Wollembelle, Silbele, Naro, Nanga, Somboro, Gumo, Bielepong, Tanina, Motigu, Bugu, and Nanguri were

systematically sampled taking into consideration endowment of natural resources such as poultry and livestock. The study sampled 160 domesticated animal rearers by means of simple random sampling. Data collection methods were questionnaire administration, photography and direct observation. Data analysis was done by means of descriptive statistics as a component of Statistical Package of Social Sciences. Data presentation was done by means of tables, photographs, and charts.

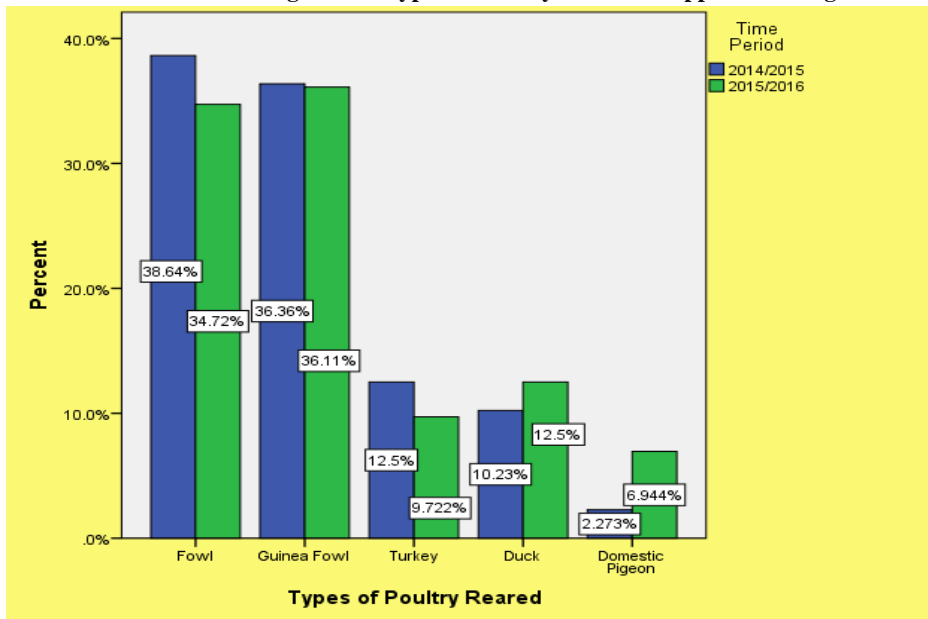
III. RESULTS AND DISCUSSION

Findings in line with the objectives of the study are discussed as follows:

A. Types of Domesticated Animals Reared in Upper West Region.

Domesticated animals reared in Upper West region are classified into poultry and livestock. Figure 3.1 is an illustration of types of poultry reared in Upper West region.

Figure 3.1: Types of Poultry Reared in Upper West Region

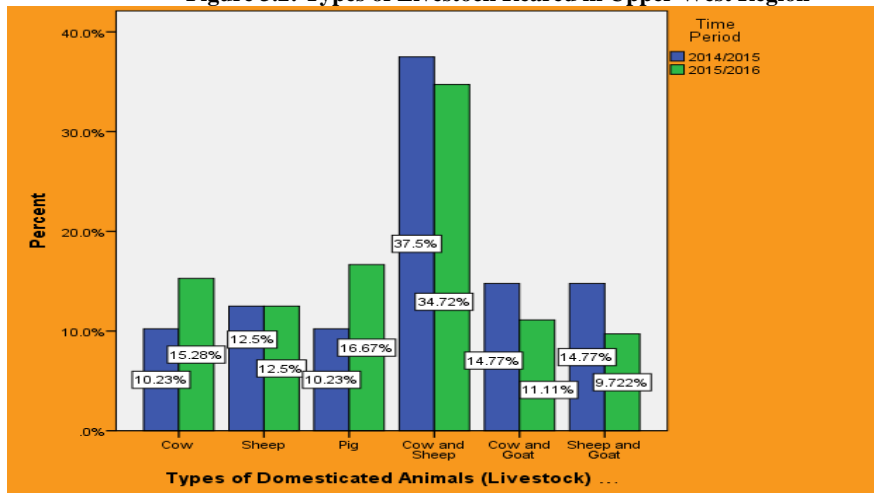


(Source: Field Survey, 2014/2015 and 2015/2016)

It is obvious from figure 3.1 that during the period 2014/2015, 38.64% of respondents indicated fowl as a poultry reared in Upper West region, 36.36% of respondents mentioned guinea fowl as a type of poultry reared in Upper West region, 12.5% of respondents indicated turkey as a type of poultry reared in Upper West region, 10.23% of respondents mentioned duck as a poultry reared in Upper West region, whereas the remaining 2.27% of respondents indicated domestic pigeon as a poultry reared in Upper West region. On the other hand, during the period 2015/2016, 34.72% of respondents indicated fowl as a

poultry reared in Upper West region, 36.11% of respondents mentioned guinea fowl as a type of poultry reared in Upper West region, 9.72% of respondents indicated turkey as a type of poultry reared in Upper West region, 12.5% of respondents mentioned duck as a poultry reared in Upper West region, whereas the remaining 6.94% of respondents indicated domestic pigeon as a poultry reared in Upper West region. Conclusively, poultry reared in Upper West region are fowl, guinea fowl, turkey, duck, and domestic pigeon. Figure 3.2 is an illustration of types of livestock reared in Upper West region

Figure 3.2: Types of Livestock Reared in Upper West Region



(Source : Field Survey, 2014/2015 and 2015/2016)

From figure 3.2, it is obvious that during the period 2014/2015, 10.23% of respondents indicated cow as a type of livestock reared in Upper West region, 12.50% of respondents mentioned sheep as a livestock reared in Upper West region, 10.23% of respondents indicated pig as a livestock reared in Upper West Region, 37.50% of respondents mentioned cow and sheep as livestock animals in Upper West region, 14.77% of respondents indicated cow and goat as livestock reared in Upper West region, whereas the remaining 14.77% of respondents mentioned sheep and goat. On the other hand during the period 2015/2016, 15.28% of respondents indicated cow as a type of livestock reared in Upper West region, 12.50% of respondents mentioned sheep as a livestock reared in Upper West region, 16.67% of respondents indicated pig as a livestock reared in Upper West Region, 34.72% of respondents mentioned cow and sheep as livestock animals in Upper West region,

11.11% of respondents indicated cow and goat as livestock reared in Upper West region, whereas the remaining 9.72% of respondents mentioned sheep and goat. Conclusively, livestock animals reared in Upper West region are cow, sheep, pig, and goat. Notre (1999) [16] is of the opinion that, farm animal genetic diversity is instrumental in the provision of current production needs and enhancement of sustained genetic improvement. Also, Lalit (2010) [17] argue that, there is a progressive erosion of rich biological diversity of farm animals. Especially in the case of cattle, poultry, sheep, and pigs because a large percentage is either being replaced by exotic or crosses of the exotic and native breeds. Table 3.1 is a classification of domesticated animals (poultry and livestock) reared in Upper West region with their conservation status based on IUCN evaluation in 2016 (version 3.1).

Table 3.1: Classification of Domesticated Animals (Poultry And Livestock)

Scientific name of Species	Common name of Species	Kingdom	Phyllum	Class	Order	Genus	Conservation Status (Based on IUCN Evaluation in 2016 (Version 3.1))
<i>Gallus gallus</i>	Chicken	Animalia	Chordata	Aves	Galliformes	Gallus	Least Concern
<i>AnasPlatyrhynchos</i>	Duck	Animalia	Chordata	Aves	Anseriformes	Anas	Least Concern
<i>Meleagrisgallopavo</i>	Turkey	Animalia	Chordata	Aves	Galliformes	Meleagris	Least Concern
<i>Columba livia</i>	Domestic Pigeon	Animalia	Chordata	Aves	Columbiformes	Columba	Least Concern
<i>Numida meleagris</i>	Domesticated Guinefowl	Animalia	Chordata	Aves	Galliformes	Numida	Least Concern
<i>Capra aegagrus</i>	Goat	Animalia	Chordata	Mammalia	Artiodactyla	Capra	Vulnerable
<i>Bostaurus</i>	Cow	Animalia	Chordata	Mammalia	Artiodactyla	Bos	Not Yet Assessed
<i>Ovisaries</i>	Sheep	Animalia	Chordata	Mammalia	Artiodactyla	Ovis	Not Yet Assessed
<i>Susscrofa</i>	Pig	Animalia	Chordata	Mammalia	Artiodactyla	Sus	Least Concern

From table 3.2, *Capra aegagrus* is vulnerable, whereas *Gallus gallus*, *AnasPlatyrhynchos*, *Meleagrisgallopavo*, *Columba livia*, *Numidameleagris*, *Susscrofa* are least concern. However, *Bostaurus* and *Ovisaries* are yet to be assessed by the International Union for the Conservation of Nature (I.U.C.N). A

species is considered as least concern when it is abundant or not threatened. In a similar vain, a species is considered as vulnerable when it has a high risk of extinction. However, plate A, B, C, D, E, F, G, H, and I are photographs of domesticated animals reared in Upper West region.

Plate A: Gallus Gallus (Domesticated Fowl)



Plate B: Anas platyrhynchos (Duck)



Plate C: Numidamaleagris (Guinea Fowl)



Plate D: Maleagrisgallopavo (Turkey)



Plate E: Columba Livia (Domestic Pigeon)



Plate F: Oviesaries (Sheep)



Plate G: Susscrofa (Pigs)



Plate H: :Bostaurus (Cattle)



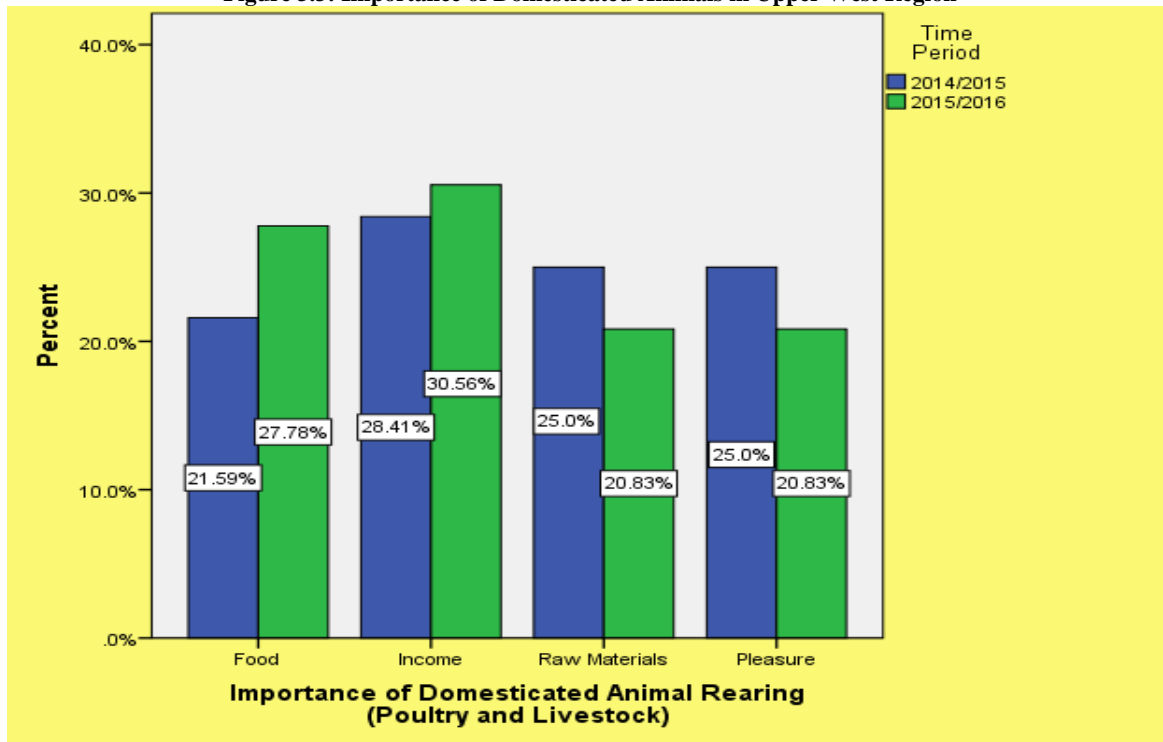
Plate I: Capra Aegagrus (Goats)



B. Importance of Domesticated Animal Rearing

According to the survey, the importance of domesticated animal rearing ranges from food, income, raw material to pleasure. Figure 3.3 is an illustration of the importance of domesticated animal rearing in Upper West region.

Figure 3.3: Importance of Domesticated Animals in Upper West Region



(Source: Field Survey, 2014/2015 and 2015/2016)

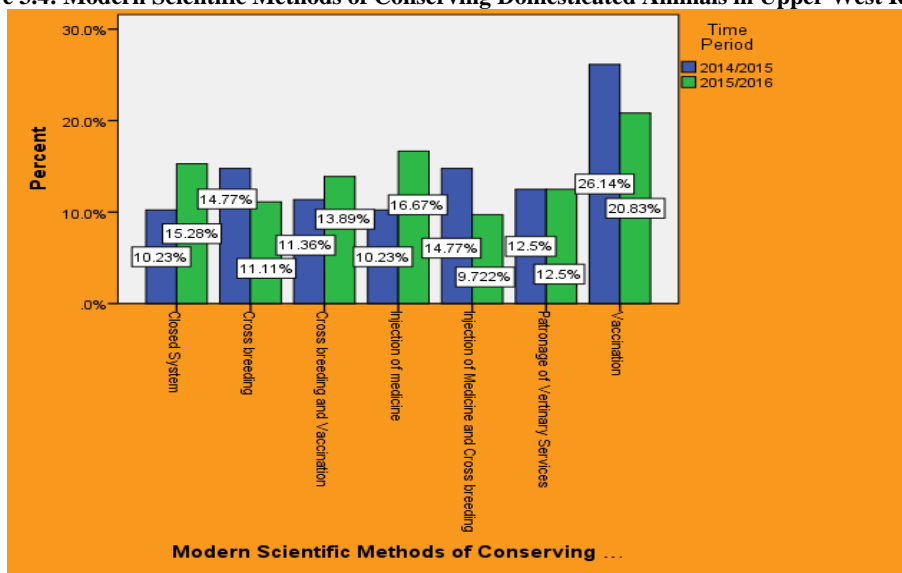
It is clear from figure 3.3 that during the period 2014/2015, 21.59% of respondents indicated food (meat, eggs and milk) as an importance of domesticated animal rearing, 28.41% of respondents mentioned income as an importance of domesticated animal rearing. Also, 25.00% of respondents mentioned raw materials provision as an importance of domesticated animal rearing, whereas the remaining 25.00% of respondents indicated pleasure as an importance of domesticated animal rearing. On the other hand, during the period 2015/2016, 27.78% of respondents indicated food (meat, eggs and milk) as an importance of domesticated animal rearing, 30.56% of respondents mentioned income as an importance of domesticated animal rearing. Also, 20.83% of respondents mentioned raw materials provision as an importance of domesticated animal rearing, whereas the remaining 20.83% of respondents indicated pleasure as

an importance of domesticated animal rearing. Fafchamps et al (1998) [18] argue that a variety of non food products such as leather, wool and pharmaceutical as well food products such as meat and milk are provided by livestock. Also, Swanepoel et al (2010) [19] are of the opinion that, apart from the fact that income is generated from livestock production, there is also a provision of economic values for rural families often serving as a major contributor to food security by means of livestock production.

C. Methods of Conserving Domesticated Animals

The survey reveals two broad methods of conserving domesticated animals. They are indigenous methods and modern scientific methods. Figure 3.4 is an illustration of modern scientific methods of conserving domesticated animal species in Upper West region.

Figure 3.4: Modern Scientific Methods of Conserving Domesticated Animals in Upper West Region

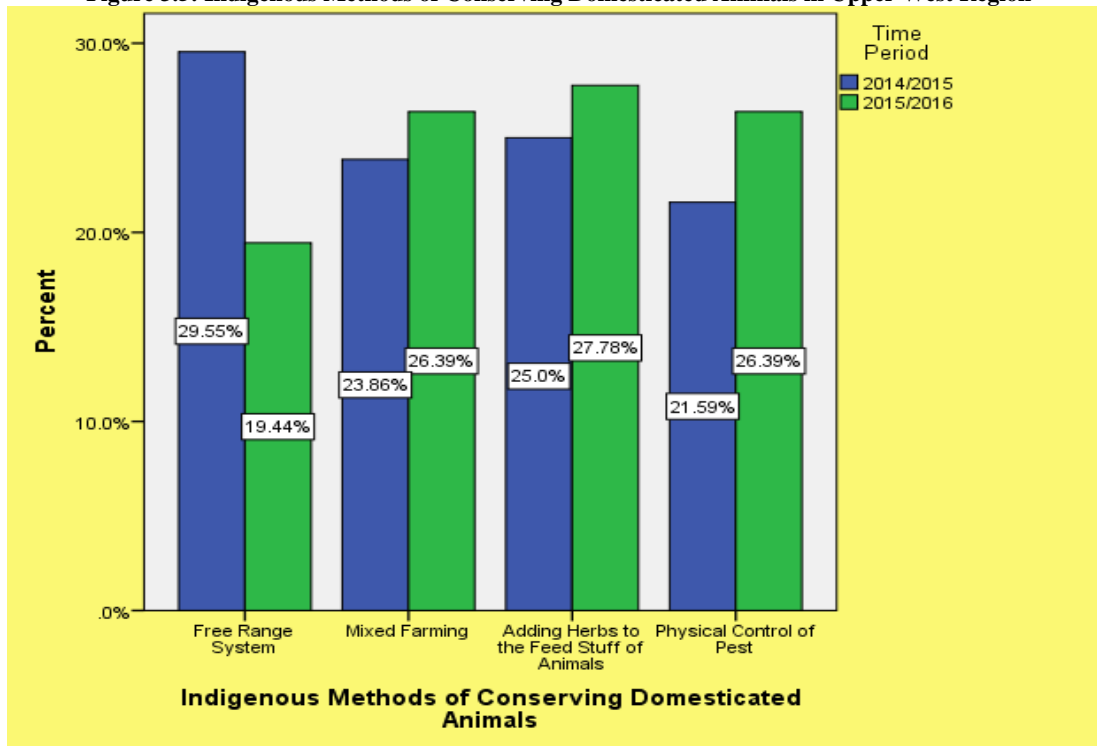


(Source: Field Survey, 2015/2016)

It is clear from Figure 3.4 that during the period 2014/2015, 10.23% of respondents mentioned closed system as a modern scientific method of conserving domesticated animals, 14.77% of respondents indicated cross breeding as a modern scientific method of conserving domesticated animals, 11.36% of respondents mentioned cross breeding and vaccination as modern scientific methods of conserving domesticated animals, 10.23% of respondents indicated injection of medicine as a modern scientific method of conserving domesticated animals, 14.77% of respondents mentioned injection of medicine and cross breeding as modern scientific methods of conserving domesticated animals, 12.50% of respondents indicated patronage of veterinary services as a modern scientific method of conserving domesticated animals, whereas the remaining 26.14% of respondents representing the majority mentioned vaccination as a modern scientific method of conserving domesticated animals. On the other hand, during the period 2015/2016, 15.28% of respondents mentioned closed system as a modern scientific method of conserving domesticated animals, 11.11% of respondents indicated cross breeding as a modern scientific method of conserving domesticated animals, 13.89% of respondents mentioned cross breeding and vaccination as modern scientific methods of conserving domesticated animals, 16.67% of respondents indicated injection of medicine as a modern scientific method of conserving domesticated animals, 9.72% of respondents mentioned injection of medicine and cross breeding as modern scientific methods of conserving domesticated animals, 12.50% of respondents indicated patronage of veterinary services

as a modern scientific method of conserving domesticated animals, whereas the remaining 20.83% of respondents representing the majority mentioned vaccination as a modern scientific method of conserving domesticated animals. By implication, modern scientific methods of conserving domesticated animals in the Upper West region are closed system, cross breeding, vaccination, injection of medicine, and patronage of veterinary services. Els et al (2007) [20] are of the view that veterinary vaccines constitute 23% of animal health products in the global market, the sector has grown consistently due to technological advancement in vaccine development. Also, Danielle (2005) [21] opines that closed system of rearing animals also known as concentrated animal feeding operations or intensive livestock operations has the ability to hold large number of cattle, hog, turkeys or chicken often indoors with the aim of maximizing output at the lowest possible cost whilst ensuring the greatest level of food security. On the issue of cross breeding, The Oklahoma Cooperative Extension Service (2017) [22], argue that in breeding animals, valuable traits in pure bred animals may be considered. Alternatively, individuals may also intend to use some type of cross breeding in order to produce a new type of stock with presumably superior ability in a new area of endeavor. Also, on the issue of injection of medicine, Jacky (2011) [23] opines that, there has been an increase on the use of antibiotics by means of injection over the last decade in some of the most intensive sectors such as pigs and chicken (broiler) production. Figure 3.5 is an illustration of indigenous methods of conserving domesticated animals in the Upper West region.

Figure 3.5: Indigenous Methods of Conserving Domesticated Animals in Upper West Region



(Source: Field Survey: 2014/2015 and 2015/2016)

It is obvious from figure 3.5 that during the period 2014/2015, 23.86% of respondents indicated free range system as an indigenous method of conserving domesticated animals, 23.86% of respondents indicated mixed farming as an indigenous method of conserving domesticated animals in Upper West region, 25.00% of respondents indicated adding herbs to feed stuff of animals as an indigenous method of conserving domesticated animals, whereas the remaining 21.59% of respondents mentioned physical control of pest as an indigenous method of conserving domesticated animals in Upper West region. On the other hand during the period 2015/2016, 19.44% of respondents indicated free range system as an indigenous method of conserving domesticated animals, 26.39% of respondents indicated mixed farming as an indigenous method of conserving domesticated animals in Upper West region, 27.78% of respondents indicated adding herbs to feed stuff of animals as an indigenous method of conserving domesticated animals, whereas the remaining 26.39% of respondents mentioned physical control of pest as an indigenous method of conserving domesticated animals in Upper West region. Conclusively, indigenous methods of conserving domesticated animals are free range system, mixed farming, adding herbs to animal feed stuff, and physical control of pest. In the light of Heuser (2003) [24], until the discovery of vitamin A and D in the 1920's which allowed for a

successful practice of confinement, the free range system among poultry was the dominant system. In the free range system, animals are allowed to roam freely in open space for at least part of the day rather than being confined in an enclosure. On the issue of mixed farming, Mishra (2010) [25], argue that, mixed farming which is the large category of the world's livestock system is an avenue for maintaining soil fertility and soil biodiversity. It also minimizes soil erosion and helps in water conservation. Also, Walter and Dietrich (1992) [26] reported that in the physical control of pest, ticks can be controlled by collecting them from infested animal and throwing them into a burning fire near the entrance to the enclosure. Also, in the eradication of ticks, the infested pasture can be burnt. On the issue of adding herbs to animal feed stuff, Cheryl and Nancy (2011) [27] argue that extracts and essential oils from epazote, lambsquarters, mugwort, burdock and comfrey can be added to the feed stuff of poultry for prevention or control of intestinal parasites as well as treatment of black head disease (*Histomonas meleagridis*) of turkey.

IV. CONCLUSION

The study concludes that domesticated animal species in Upper West region of Ghana are diverse with their importance ranging from food, income, and raw materials to pleasure. However, a blend of modern scientific methods and indigenous

knowledge in the conservation of domesticated fauna in the Upper West region of Ghana is instrumental in promoting sustainable development.

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