



## **Plant Remedies Used for Livestock by Farmers in Southern Senatorial Zone, Plateau State, Nigeria**

**Bata Shalangwa Ishaku<sup>1\*</sup>, Dawurung Christiana Joshua<sup>2</sup>, Garba John<sup>3</sup>,  
Bot Christopher<sup>1</sup>, Abraham Kabans<sup>1</sup>, Abdulateef Habiba<sup>1</sup>, Agwu Eunice<sup>1</sup>,  
Kujul Nimzhi Boukur<sup>1</sup>, Akinyera Adebukola<sup>4</sup>  
and Udokainyang Akaninyene, Dickson<sup>5</sup>**

<sup>1</sup>Department of Animal Health, Federal College of Animal Health and Production Technology, NVRI Vom, Nigeria.

<sup>2</sup>Department of Physiology and Pharmacology, University of Jos, Nigeria.

<sup>3</sup>Veterinary Council of Nigeria, North Central Office, Nigeria.

<sup>4</sup>Department of Fisheries, Federal College of Animal Health and Production Technology, NVRI Vom, Nigeria.

<sup>5</sup>Department of Animal Production, Federal College of Animal Health and Production Technology, NVRI Vom, Nigeria.

### **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors BSI and DCJ conceived and designed the research. Author AK developed questionnaire while author AK administered the questionnaire. Authors BC and AH managed the data and produced the tables. Authors AE, KNB and AA reviewed the materials and wrote the discussion. Authors GJ and UAD proof read/edit the article and author GJ provided guide on highlighting the study area on the map. All the authors have read and approved the final manuscript.*

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### **ABSTRACT**

Survey of the plant remedies used by livestock farmers in Southern Senatorial Zone of Plateau State was carried out using structured questionnaire. A total of 150 structured questionnaires were distributed to livestock farmers in three selected Local Government Areas of Southern Senatorial

zone Plateau State. Of the 150 questionnaires distributed 142 were completed and retrieved. Information obtained from the respondents showed that livestock farmers in the study area are aware of ethno-veterinary remedies and also use them for the management of common livestock diseases. A total of 49 plant species from 11 families used to treat the 23 livestock diseases in the study area were identified. The study revealed that the plants identified are used either singly or in combination with parts of different plants. Based on the plant parts used, the result showed that barks are most frequently used (50.7%), followed by the leaf (40.8%), the seed (35.2%) and root (18.3%). About 85.9% of the plants used in the study area are sourced from the bush. More so, 76.1% are available all year round while 14.1% are used in preserved form and 9.9% are cultivated during the wet season. The plants identified are either used as processed, wet or in dry form. The result showed that greater percentage of the farmers keep small ruminants (43.0%), followed by poultry (26.1%) dogs (16.0%), and pigs (4.7%). About 41.0% of the livestock farmers keep animals for income, 26.0% for meat and income, 14.0% for security, 10.0% for meat and 0.1% for income and security.

*Keywords: Medicinal; diseases; management; ethno-veterinary; remedies.*

## 1. INTRODUCTION

In developing countries, livestock have been shown to play an important role in supporting the livelihood of poor farmers, consumers, traders and laborers [1]. Therefore, enhancement of livestock production system is the greatest impact of livestock on sustainable development designed to help the poor. According to FAO [1], animal diseases are crucial constraints in enhancing livestock productivity and production. The high cost of animal health coupled with absence or unsuitability of production inputs, particularly predisposes the animals to disease. Most livestock farmers are located in the rural areas and lack information on improved veterinary and management services. Livestock farmers therefore resort to using indigenous methods to curb animal disease. The use of herbs to manage animal disease is among the various indigenous methods adopted by farmers. The knowledge base of these herbs differs not only from region to region but also within communities [2]. Some studies carried out in Africa, Asia, Europe, Latin America and North America show that plants are routinely used as remedies for animal disease [3,4]. It has been documented that humans sometimes use the same herbal preparations that they use to treat their sick animals [5]. In Nigeria, farmers are known to treat animal disease with herbs and had utilized other traditional medical practices before the advent of orthodox medicine [6]. Ethno-veterinary medical practice is widespread among herdsmen and native livestock producers in northern Nigeria. Traditional remedies in this area include extracts from different plant parts [7].

Drugs are supposed to be safe (with no side effects), cheap/less-expensive and readily available. No drug is said to be completely safe as most have one or more side effects. Natural remedies (herbs/plants) have been shown to have fewer side effects, be less expensive and readily available [8]. Cost, inaccessibility and other problems like side effects of modern animal health care system have encouraged the local people to rely on traditional rural wisdom. The knowledge base of these herbs, however, differs not only from region to region but also within communities. In addition, it has been developed through trial and error and deliberate experimentation. In many countries, there has been little documentation of this traditional knowledge, but it has been transmitted across generations by oral tradition and therefore is in danger of extinction [9].

The study was aimed at providing useful information on common ailments, medicinal plants, and traditional remedies available and used by livestock farmers in Southern Senatorial Zone of Plateau State. This will help veterinarians and other scientists in harnessing the information towards solving livestock health problems in the area [10]. More so, the information obtained in this study will be useful in documentation of this invaluable traditional knowledge.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The survey was carried out in three (3) Local Government Areas in the Southern Senatorial

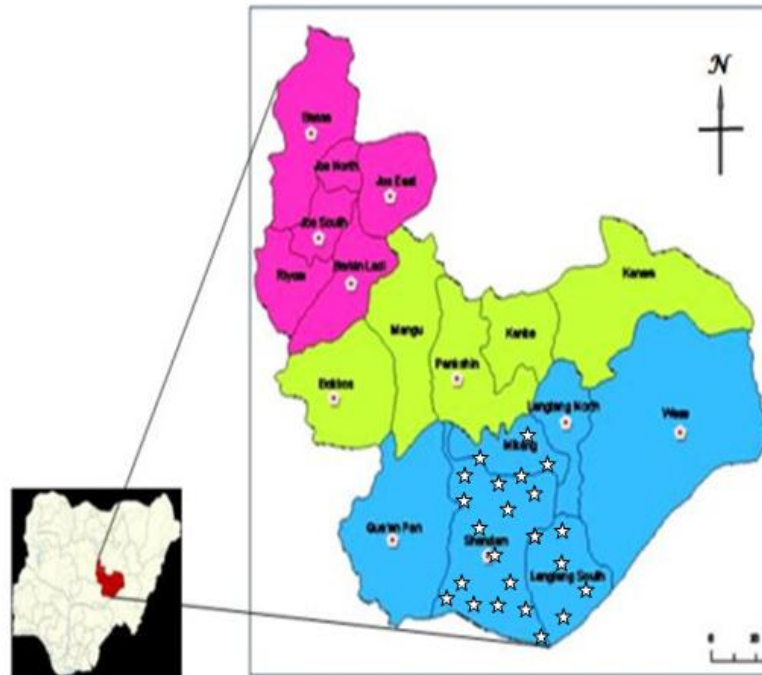
Zone of Plateau State which are: Langtang North, Mikang and Shendam. Langtang north occupies a total area of 1,188 km<sup>2</sup>, the headquarters is in the main town at 9°08'00"N 9°47'00"E, having a population of 140,643 as of 2006 census [11]. Mikang occupies total area of 739 km<sup>2</sup>, with the headquarters in Tunkus. It has a population of 97,411 as of 2006 census [11]. Shendam lies almost 254 kilometers to the south-east and on the foothills of the Jos highlands. It is uniquely recognized as lowland because of its geographical low altitude. Its weather can be equated to that of Abuja, the Federal Capital Territory. The area has a total land mass of 2,437 square kilometers and population of 208,017 people [12]. The area is divided into four administrative districts of Shendam, Dorok, Derteng and Dokan Tofa with the Goemai being the dominant group. The major occupation of the people is farming. However, trading, pottery, weaving, woodcarving, blacksmithing are also popular just as are hunting and fishing [11].

## 2.2 Study Design

The study was a questionnaire survey. Livestock farmers in three Local Government Areas in the Southern Senatorial Zone of Plateau State were selected by simple random sampling techniques by balloting.

## 2.3 Questionnaire Administration

One hundred and fifty structured questionnaires were randomly administered to the livestock farmers through home and market visit in each of the three Local Government Areas. The survey was carried out between the months of March and July. Letter of introduction was presented to each livestock farmer to introduce the surveyor seeking their assistance in providing information. After filling the questionnaire, the local (common) name of the plants, disease condition and sample of the plants was collected and sent to the Herbarium of the Department of Biological Sciences Federal College of Forestry Jos Plateau State for identification and authentication.



Map 1.

Key:  
 ☆ ☆  
 ☆ ☆ = Study area (Shendam, Mikang and Langtang North LGA)  
 ☆

## 2.4 Data Analysis

Descriptive statistics (frequency, percentage) were used to analyze categorical data and results presented in tables.

## 3. RESULTS

Out of a total of 150 questionnaires distributed to livestock farmers in the three selected Local Government Areas of Southern Senatorial zone of Plateau State, one hundred and forty two were retrieved comprising 48 in Mikang, 47 in Shendam and 47 in Langtang North Local Government Areas respectively. The result showed that livestock farmers are aware of ethno-veterinary remedies and use them for the management of common livestock diseases in the study area. Table 1 shows the list of the common diseases identified in the three Local Government Areas. The result revealed a total of 23 commonly encountered livestock diseases in

the study area. More so, a total of 49 plants species were identified from 11 families which are used to treat the 23 livestock diseases (Table 2). The plants identified are used either singly or in combination with other parts of different plants. Based on the plant parts used, the result showed that bark of the plants are most frequently used (50.7%), followed by the leaf (40.8%), the seed (35.2%) and root (18.3%). Greater proportions (85.9%) of the herbs are obtained from the bush (Table 3). The result also showed that the herbs are mostly used in combination with parts of other plants (Table 4). Fig. 1 shows the types of animals reared by the farmers. The result showed that greater percentage of the farmers keep small ruminants (43.0%), followed by poultry (26.1%), dogs (16.0%), and pigs (4.7%). Only one of the respondents in Lantang reared all animals in the three selected LGAs. Fig. 2 shows the farmers' purpose of keeping animals. About 41.0% of the livestock farmers keep for income, 26.0% for meat and income, 14.0% for

**Table 1. Common diseases identified in the study area**

Disease	Mikang LGA Frequency	%	Langtan North LGA Frequency	%	Shendam LGA Frequency	%
Diarrhea	9	18.0	10	20.0	14	28.0
Fowl typhoid	2	4.0	-	0.0	1	2.0
Bloat	3	6.0	4	8.0	1	2.0
Newcastle	4	8.0	10	20.0	4	8.0
Poison	2	4.0	-	0.0	2	4.0
Foot rot	0	0.0	1	2.0	3	6.0
Fowl pox	1	2.0	-	0.0	2	4.0
CRD	3	6.0	2	4.0	3	6.0
Worms	3	6.0	5	10.0	4	8.0
Coccidiosis	0	0.0	3	6.0	2	4.0
PPR	3	3.0	-	0.0	8	16.0
Yar-wuya	0	0.0	1	2.0	2	4.0
Cough	3	6.0	-	0.0	1	2.0
Samore	0	0.0	-	0.0	1	2.0
(Trypanosomiasis)						
Hanta(Liver fluke)	0	0.0		0.0	1	2.0
Harbin daji (Black quarter)	0	0.0		0.0	1	2.0
Mite infestation	0	0.0		0.0	1	2.0
Ectoparasites	1	2.0		0.0	1	2.0
Snake bite	1	2.0	1	2.0		
Kirchi	1	2.0	2	4.0	0	0.0
(Dermatophilosis)						
Mange	0	0.0	1	1.0	0	0.0
Traumatic injury	0	0.0	1	2.0	0	0.0
Eye infection	0	0.0	2	4.0	0	0.0

security, 10.0% for meat and 0.1% for income and security. About 85.9% of the plants used in the study area were sourced from the bush. More so, 76.1% are available all year round while, 14.1% are preserved and 9.9% are cultivated during the wet season. These plants are either

used in processed, wet or dry form with 1.41%, 60.56%, 33.80% respectively. Table 5 shows that greater proportion (59.9%) of the respondents use traditional remedies for their livestock diseases.

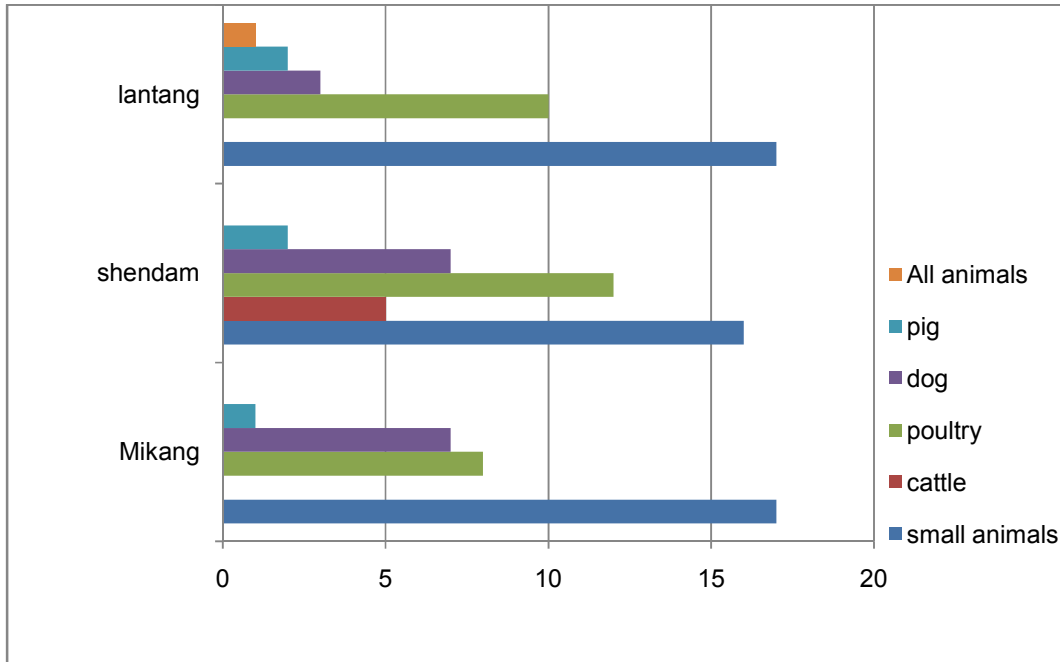


Fig. 1. Showing the type of animals kept by the farmers

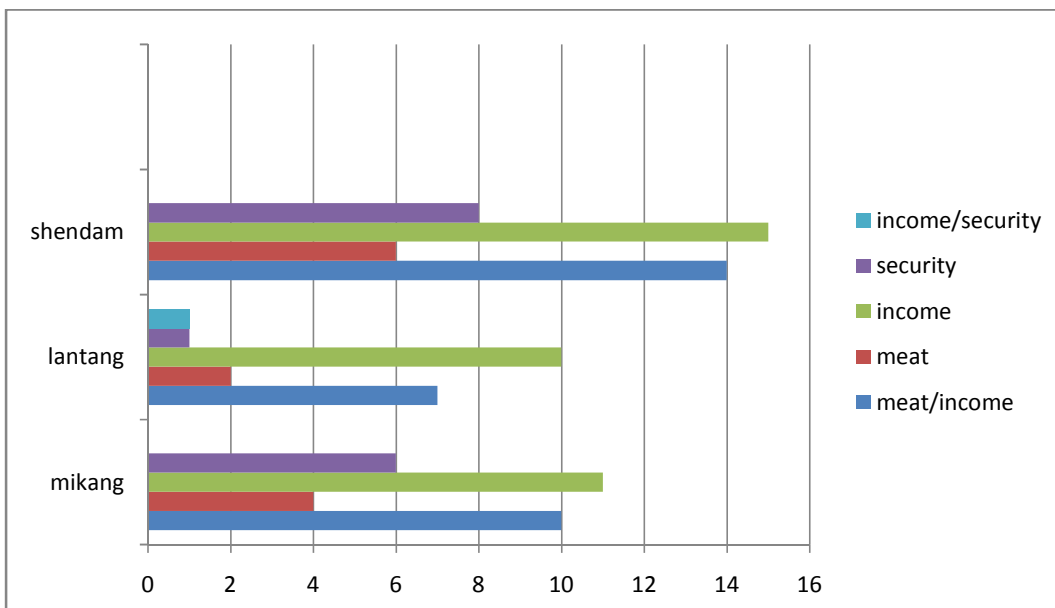


Fig. 2. Showing purpose of keeping livestock by farmers in the study area

**Table 2a. Medicinal plants used by livestock farmers in Southern senatorial zone of Plateau State based on the selected Local Government Areas**  
**Mikang Local Government Area**

Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
Diarrhea	1	Wee wee +Dogon yaro	<i>Canabis sativum</i> + <i>Azadirachta indica</i>	1 (16.7)	Leaf/stem/seed	Water+ Gin	Oral
	2	Gwaska +Yakuwa	<i>Luffer cylindrica</i>	1 (16.7)	Seed + seed	Soaked (Water and potash)	Oral
	3	Gwaska (igiyan soso)	<i>Luffer cylindrica</i>	1 (16.7)	Seed	Pounded to powdered form	Oral
	4	Ararrabi	<i>Boswellia dalzeilii</i>	1(16.7)	Bark	Boiled	Oral
	5	Baure+ Shiwaka	<i>Ficus sycomorus</i> + <i>Vernonia amygdalina</i>	1(16.7)	Root + leaf	Soaked	Oral
	6	Acasia+ Dogon yaro	<i>Cassia sieberiana</i> + <i>Azadirachta indica</i>	1(16.7)	Leaf/stem bark + stem bark/leaf	Boiled	Oral
Fowl typhoid	1	Melena+ Dogon yaro	<i>Gmelina arborea</i> + <i>Azadirachta indica</i>	1(100.0)	Stem bark + stem bark	Boiled or soaked	Oral in drinking water
Bloat	1	Baure+ Shiwaka	<i>Ficus sycomorus</i> + <i>Vernonia amygdalina</i>	1(100.0)	Root +leaf	Soaked	Oral
Newcastle	1	Gautan Kaji + Zakami	<i>Solanum toivum</i> + <i>Datura metel</i>	1(33.3)	Egg plant + seed	Soaked	Oral
	2	Gwandar daji + Shiwaka	<i>Annona senegalensis</i> + <i>Vernonia amygdalina</i>	1(33.3)	Stem bark + leaf	Boiled	Oral
	3	Melena + dogon yaro	<i>Gmelina arborea</i> + <i>Azadirachta indica</i>	1(33.3)	Stem bark + stem bark	Boiled/soaked	Oral
Poison	1	Hakorin yawo	<i>Acanthospermum hispidum</i>	1(100.0)	Leaf	Pounded or juice squeezed out	Oral
Snake bite	1	Aduwa+ Hakorin yawo	<i>Balanites</i>	1(100.0)	Stem bark + leaf	Boiled or soaked	Oral

Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
Kirchi (Dermatophilosis) Worms	1	Baushe+ Dogon yaro	<i>aegyptiaca+</i> <i>Acanthospermum hispidum</i> <i>Terminalia spp+</i>	1(100.0)	Root + bark	Soaked with potash	Oral
	1	Gwaska +Yakuwa	<i>Azadirachta indica</i> <i>Luffer cylindrica+</i>	2(50.0)	Seed +seed	Soaked with potash	Oral
	2	Ararrabi	<i>Hibiscus sabdariffa</i> <i>Boswellia dalzeilii</i>	1(25.0)	Bark	Boiled	Oral
	3	Yakuwa	<i>Hibiscus sabdariffa</i>	1(25.0)	Seed	Fried and pounded to powder	Oral or in feed
PPR	1	Dinya+ Dorowa	<i>Vitex doniana +</i> <i>Parkia biglobosa</i>	1(33.3)	Bark + leaf	Soaked or boiled	Oral
	2	Shediya+ Dinya + Rimi	<i>Ficus thornningii+</i> <i>Vitex doniana +</i> <i>Ceiba pentandra</i>	1(33.3)	Bark + bark + bark	Soaked with potash	Oral
	3	Wee wee + Dogon yaro	<i>Canabis sativum+</i> <i>Azadirachta indica</i>	1(33.3)	Leaf/stem/seed+ stem	Soaked with Gin	Oral
CRD/Cough	1	Giginya+ Zakami	<i>Borassus aethiopum +</i> <i>Datura metel</i>	1(25.0)	Root + seed	Soaked with gin	Oral/ in drinking water
	2	Dinya+ Dorowa	<i>Vitex doniana +</i> <i>Parkia biglobosa</i>	1(25.0)	Bark + leaf	Soaked or boiled	Oral
	3	Zakami+ Dinya	<i>Datura metel +</i> <i>Vitex doniana</i>	1(25.0)	Seed + bark	Soaked with gin	Oral
	4	Gautan kaji + Zakami	<i>Solanum tovum+</i> <i>Datura metel</i>	1(25.0)	Plant egg + seed	Soaked	Oral in drinking water
Ecto-paraside(Mange) Open wound	1	Tumpapiya	<i>Calotropis procera</i>	1(100.0)	Sap	Sap	Topical
	1	Kimba/Kashin kuda	<i>Lantana camera</i>	1(50.0)	Leaf/root/seed	Pounded to powder	Topical
	2	Ararrabi	<i>Boswellia dalzeilii</i>	1(50.0)	Stem bark	Pounded to powder	Topical

Table 2b. Lantang North Local Government Area

Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
Diarrhea	1	Baushe + Namijin sada	<i>Terminalia spp + Mayterus senegalensis</i>	1(20.0)	Root/leaf+ root	Soaked with potash	Oral
	2	Kargo + Dogon yaro	<i>Piliostigma spp + Azadirachta indica</i>	1(20.0)	Bark + bark	Soaked with potash	Oral
	3	Gwandar daji +Dogon yaro	<i>Annona senegalensis + Azadirachta indica</i>	1(20.0)	Root +stem bark	Boiled	Oral
	4	Wee wee + Dogon yaro	<i>Canabis sativum + Azadirachta indica</i>	1(20.0)	Seed/stem/leaf + stem bark	Soaked	Oral
	5	Wee wee + dewormer	<i>Canabis sativum + dewormer</i>	1(20.0)	Seed + dewormer	Pounded to powder	Oral/in feed
Skin infection	1	Aloe vera	<i>Aloe vera</i>	1(100.0)	Whole plant	Pounded to powder	Topical
CRD	1	Shediya+ Zakami + Shiwaka	<i>Ficus thornningii + Datura metel + Vernonia amygdalina</i>	1(100.0)	Bark+ seed + stem bark	Soaked	Oral
Newcastle	1	Shediya + zakami + Shiwaka	<i>Ficus thornningii + Datura metel + Vernonia amygdalina</i>	1(12.5)	Bark + seed + stem bark	Soaked	Oral
	2	Maje + Baushe	<i>Daniellia oliveri + Terminalia spp</i>	1(12.5)	Bark + root	Boiled	Oral
	3	Wee wee	<i>Canabis sativum</i>	1(12.5)	Seed/leaf	Soaked	Oral
	4	Shiwaka + Dogon yaro + Zakami	<i>Vernonia amygdalina + Azadirachta indica+ Datura metel</i>	1(12.5)	Whole plan + stem bark + seed	Soaked	Oral
	5	Wee wee + wuyan damo	<i>Canabis sativum +Combretum spp</i>	1(12.5)	Seed/leaf +stem	Soaked with gin	Oral in drinking water
	6	Wee wee +dogon yaro	<i>Canabis sativum + Azadirachta indica</i>	1(12.5)	Seed/leaf + stem	Soaked with potash	Oral/in drinking water
	7	Wee wee + sisal	<i>Canabis sativum + Agave sisilana</i>	1(12.5)	Seed/leaf + leaf	Soaked with gin	Oral
	8	Rimi + Zakami + Gautan kaji	<i>Ceiba pentandra + Datura metel + Solanum toivum</i>	1(12.5)	Bark +seed + plant egg	Soaked	Oral



Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
Worm	1	Shiwaka + Yakuwa	<i>Vernonia amygdalina</i> + <i>Hibiscus sabdariffa</i>	1(50.0)	Bark + seed	Soaked and pounded	Oral in feed
	2	Wee wee + dewormer	<i>Canabis sativum</i> + <i>dewormer</i>	1(50.0)	Seed/leaf + dewormer	Pounded to powder	Oral or in feed
Snake bite	1	Aduwa	<i>Balanites aegyptiaca</i>	1(100.0)	Root bark	Boiled	Oral
Traumatic injury	1	Aduwa	<i>Balanites aegyptiaca</i>	1(100.0)	Young shoot	Pounded or juice squeezed out	Topical
Bloat	1	Karkashi		1(100.0)	Leaf	Pounded + water	Oral
Kirchi(Dermatophilosis)	1	Shiwaka + Dogon yaro + Zakami	<i>Vernonia amygdalina</i> + <i>Azadirachta indica</i> + <i>Datura metel</i>	1(100.0)	Whole plant + stem bark + seed	Soaked	Oral
Eye infection	1	Zogale	<i>Moringa oliefera</i>	1(100.0)	Leaf	Juice squeezed out	Intra-ocular
Coccidiosis	1	Maje + Baushe	<i>Daniellia oliveri</i> + <i>Terminalia spp</i>	1(50.0)	Bark + root	Boiled	Oral
	2	Wee wee + sisal	<i>Canabis sativum</i> + <i>Agave sisilana</i>	1(50.0)	Seed/leaf + leaf	Soaked with gin	Oral
PPR	1	Shiwaka +Dogon yaro + Zakami	<i>Vernonia amygdalina</i> + <i>Azadirachta indica</i> + <i>Datura metel</i>	1(50.0)	Whole plant + stem bark + seed	Soaked	Oral
	2	Wee wee + Dogon yaro	<i>Canabis sativum</i> + <i>Azadirachta indica</i>	1(50.0)	Leaf/stem/seed + stem bark	Soaked	Oral

Table 2c. Shendam Local Government Area

Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
Diarrhoea	1	Gwandan daji + Baushe	<i>Annona senegalensis</i> + <i>Terminalia spp</i>	1(12.5)	Root bark + root	Boiled	Oral
	2	Rimi + Zakami + Dogon yaro	<i>Ceiba pentandra</i> + <i>Datura metel</i> + <i>Azadirachta indica</i>	1(12.5)	Bark + seed + bark	Soaked or boiled	Oral
	3	Mongoro + dogon yaro	<i>Mangifera indica</i> + <i>Azadirachta indica</i>	1(12.5)	Leaf + stem bark	Boiled	Oral
	4	Kadanya + Baushe	<i>Vitellaria paradoxa</i> + <i>Terminalia spp</i>	1(12.5)	Bark + fresh leaf	Boiled	Oral
	5	Rimi	<i>Ceiba pentandra</i>	1(12.5)	Bark	Soaked with potash	Oral
	6	Maje + Baushe	<i>Daniellia oliveri</i> + <i>Terminalia spp</i>	1(12.5)	Leaf + root	Boiled	Oral
	7	Maje	<i>Daniellia oliveri</i>	1(12.5)	Stem bark	Soaked	Oral
	8	Audua	<i>Gossipium spp</i>	1(12.5)	Leaf	Soaked with potash	Oral
Fowl typhoid Newcastle	1	Hakorin yawo	<i>Acanthospermum hispidum</i>	1(100.0)	Stem and leaf	Boiled	Oral
	1	Gautan kaji + Zakami	<i>Solanum toivum</i> + <i>Datura metel</i>	1(50.0)	Plant egg + seed	Soaked	Oral
	2	Gautan kaji + Agushun jeji	<i>Solanum toivum</i> + <i>Cucumis metiliferus</i>	1 (50.0)	Plant egg + fruit	Soaked	Oral
Poison	1	Hakorin yawo	<i>Acanthospermum hispidum</i>	1(50.0)	Leaf	Soaked or boiled	Oral
	2	Ararrabi	<i>Boswellia dalzielii</i>	1(50.0)	Stem bark	Boiled	Oral
Foot rot	1	Rimi + Kargo + Marke	<i>Ceiba pentandra</i> + <i>Plliostigma spp</i> + <i>Anogiessus leicarpa</i>	1(100.0)	Bark + bark + bark	Soaked or boiled	Oral
Fowl pox	1	Samiyan biri	<i>Nelsonia canescens</i>	1(100.0)	Erect spike	Juice squeezed out	Topical
CRD/Cough	1	Shediya + Dinya	<i>Ficus thorningii</i> + <i>Vitex doniana</i>	1(25.0)	Bark + bark	Soaked	Oral
	2	Giginya + Zakami	<i>Borassus aethiopum</i> + <i>Datura metel</i>	1(25.0)	Root + seed	Soaked	Oral

Diseases	S/N	Medicinal common name	Plant botanical name	Percentage (%)	Parts used	Methods of preparation	Route of administration
	3	Yakuwa + wee wee	<i>Hibiscus sabdariffa</i> + <i>Canabis sativum</i>	1(25.0)	Leaf + seed	Soaked	Oral
	4	Dorowa + wee wee	<i>Parkia biglobosa</i> + <i>Canabis sativum</i>	1(25.0)	Leaf + seed/leaf	Soaked	Oral
Worms	1	Baska (igiyan soso)	<i>Luffa cylindrica</i>	1(33.3)	Seed	Pounded	Oral
	2	Gwandan daji + Baushe	<i>Annona senegalensis</i> + <i>Terminalia spp</i>	1(33.3)	Root bark + root	Boiled	Oral
	3	Marke	<i>Anogiessus leicarpa</i>	1(33.3)	Root	Boiled	Oral
Coccidiosis	1	Zakami + Gautan kaji	<i>Datura metel</i> + <i>Solanum tovonum</i>	1(100.0)	Seed + plant egg	Soaked	Oral
PPR	1	Zogale + Dogon yaro	<i>Moringa oleifera</i> + <i>Azadirachta indica</i>	1(20.0)	Leaf + leaf	Soaked	Oral
	2	Dorowa + wee wee	<i>Parkia biglobosa</i> + <i>Canabis sativum</i>	1(20.0)	Leaf + leaf/seed	Soaked	Oral
	3	Giginya + Zakami	<i>Borassus aethiopum</i> + <i>Datura metel</i>	1(20.0)	Root + seed	Soaked	Oral
	4	Shediya + Dinya	<i>Ficus thorningii</i> + <i>Vitex doniana</i>	1(20.0)	Bark + bark	Soaked	Oral
	5	Rimi + zakami + Dogon yaro	<i>Ceiba pentandra</i> + <i>Datura metel</i> + <i>Azadirachta indica</i>	1(20.0)	Bark + seed + bark	Soaked or boiled	Oral
Samore	1	Madachi	<i>Khaya senegalensis</i>	1(100.0)	Stem bark	Pounded to powder + water	Oral
Hanta (Fasciolosis)	1	Madachi	<i>Khaya senegalensis</i>	1(100.0)	Stem barrk	Pounded to powder + water	Oral
Harbin daji	1	Ararrabi + Madachi	<i>Boswellia dalzielii</i> + <i>Khaya senegalensis</i>	1(100.0)	Stem bark + stem bark	Boiled	Oral
Mite infestation	1	Kayar kadangare	<i>Asparagus africanus</i>	1(100.0)	Whole plant (ash)	Burnt to ash	Topical
Bloat	1	Maje	<i>Daniellia oliveri</i>	1(50.0)	Stem bark	Soaked	Oral

**Table 3. Percentage of herb based on source, method of preparation and livestock management system**

Source of plant	Freq. (%)	Management system	Freq. (%)	Methods of preparation	Freq. (%)	Seasonal availability	Freq. (%)
Bush	122(85.9)	Intensive	3(2.8)	Boiled	28(19.7)	Wet season	14(9.8)
Forest	6(4.2)	Semi-intensive	95(87.9)	Soaked	60(42.3)	Dry season	0
Cultivated	14(9.9)	Extensive	10(9.3)	Pounded	26(18.3)	All year round	108(76.1)
Herbal vendors	0			Boiled/soaked	14(9.9)	Preserved or stored	20(14.1)
<b>Total=142</b>				Burnt to ash	2(1.4)		<b>Total=142</b>
				Juice squeezed out	10(7.0)		
				Fried & pounded	2(1.4)		
					<b>Total=142</b>		

#### 4. DISCUSSION

The survey revealed that the farmers in the three selected Local Government Areas rely more on traditional remedies than orthodox veterinary drugs. This may suggest limited access or unavailability of veterinary services in the area. More so, farmers may resolve to using traditional remedies because they are more readily available and are cheaper [13]. The survey showed that the plants used as remedies for the common diseases in the area are available all year round either in the fresh or preserved form. This therefore suggests their accessibility by farmers when the need arises.

**Table 4. Shows the combination in the herbal preparation identified in the Southern Senatorial Zone of Plateau State**

Combination in the herbal preparation	Freq. (%)
Whole plant	18(12.7)
Bark of plant	18(12.7)
Flowers	0
Parts of different plants	90(63.4)
Combination with orthodox	4(2.8)
Seeds	4(2.8)
Leaf	6(4.2)
Root	2(1.4)
<b>Total=142</b>	

**Table 5. Approach to treatment of animal diseases by livestock farmers in southern senatorial zone of Plateau State**

Service	Frequency	Percentage (%)
Veterinary drugs	37	26.1
Traditional remedies	85	59.9
Both	20	14.0
<b>Total</b>	<b>142</b>	<b>100.0</b>

It was observed that the stem bark (50.7%) constitute the most plant part used, followed by the leaves (40.8%) and the least used are the seeds (35.2%) and roots (18.3%). Some authors [14] reported that seeds, fruits and the roots are the least plant parts used. They indicated the leaves as the most commonly used part in contrast with our findings. Other indigenous populations have also indicated preference for the use of leaves in the preparations of herbal medicines [15] because it is more convenient collecting leaves than root parts, flowers and fruits etc [16]. Leaves are sometimes used in

combination with other plant parts as reported by Ayyanar and Ignacimuthu [15]. From the conservation point of view, collection of leaves for herbal preparations as well as the use of barks could be regarded as sustainable so long as some leaves and the barks are left on the parent plant [17]. This is opposed to the collection of roots which could be a severe threat for rare and slowly growing plants. Scientifically, leaves are actively involved in photosynthesis and the production of metabolites [18]. Thus, the numerous constituents found in leaves could explain their efficacy in the treatment of various ailments in both humans and animals.

In this study, none of the respondents indicated the use of fruits as medicament. This is in agreement with the findings of other authors [14, 15]. In a related study Cheikhoussef and Embashu [19] however reported the use of fruits as medicaments in Northern Namibia.

Some studies revealed that some herbs have multiple medicinal uses while others have been shown to be effective as mixtures [20]. This according to Giday et al. [16] is mostly aimed at achieving synergistic effect or to improve the likelihood of an interaction with a relevant molecular target. Different herbal treatments were often cited for the same disease, with varying dosages. This study has also revealed that most of the plants are used in combination with different parts of other plants as remedies. The most common method of preparation of the herbs surveyed was by soaking inside water (42.3%) followed by boiling (19.7%).

The livestock most frequently kept by farmers in the study area are the small ruminants (goats and sheep). This agrees with the findings of Taiwo et al. [21] who reported in a study that 80.0% of the sample farmers keep goats while about 51.0% keep sheep and only 16.0% rear cattle. This may be explained by the fact that it is easier and cheaper to rear small ruminants especially considering the need for large space in keeping cattle.

#### 5. CONCLUSION

Livestock farmers in the three selected Local Government Areas use plant parts as remedies for most livestock diseases. These plant parts are either used solely or in combination with different parts of other plants. Twenty three livestock diseases were identified in the area with forty-nine plants used as remedies by the

farmers. The most used plant part as remedies was the bark followed by the leaves.

## 6. RECOMMENDATIONS

The farmers used these traditional remedies with no knowledge of their dosage and toxicological effects on the animals. Some of these plants mentioned in this study may contain chemicals that will explain their uses in ethno-veterinary practice. Therefore, more study is needed in this field to ascertain their active ingredient, dose and their toxicological effect on animals. We also recommend that further studies be carried out on all the above listed plants to validate their efficacy. In addition, we also recommend conservation measures to ensure the continued availability of effective medicinal plants through the establishment of herbal gardens.

## CONSENT

There was no written consent form; however, verbal consent of each respondent was obtained before the administration of the questionnaire. To ensure confidentiality, no information that will identify the respondent personally was included.

## ETHICAL APPROVAL

The research did not involve administration of drugs (drug trial), collection of specimen from human subject. The project was examined and approved by the College project committee.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Food and Agriculture Organization of the United Nation. Improve animal health for poverty reduction and sustainable livelihood. *FAO Ani Prod Healt Pap.* 2002; 153:52.
2. El Hadji FG. Disease in village chickens: Control through ethno-veterinary medicine. *ILELA Newsletter.* 1997; 13(2):20.
3. Ali ZA. Folk veterinary medicine in Moradabad District (Uttar Pradish) India. *Fitolerpia.* 1999;70:340-34.
4. Passalacqua NG, Define G, Guarrera PM. Contribution to the knowledge of the veterinary science and of the ethno-veterinary in Calabria region (southern Italy). *J E-Bio Ethno-Med.* 2006;2:55.
5. Eisenberg D, Davis R, Ettner S. Trend in the United States 1990-1997; result of a follow-up survey. *J Am Med Assoc.* 1998; 280:1569-1575.
6. Nwude N, Ibrahim MA. Plants used in traditional veterinary medical practice in Nigeria. *J Vet Pharm Ther.* 1986;3:261-273.
7. Alawa JP, Jokthan GE, Akut K. Ethno-veterinary medicinal practice for ruminants in the sub-humid zone of Northern Nigeria. *Prev Vet Med.* 2002;54(1):79-90.
8. Sanhokwe M, Mupangwa J, Masika PJ, Maphosa V, Muchenje V. Medicinal plants used to control internal and external parasites in goats. *On J Vet Res.* 2016; 83(1).
9. Matekaire T Bwakura TM. Ethnoveterinary medicine: A potential alternative to orthodox animal health delivery in Zimbabwe. *Int J App Res in Vet Med.* 2004;2(4):269-273.
10. Adekunle OA, Oladele OI, Olukaiyeja TD. Indigenous control methods for pest and disease of cattle in Northern Nigeria. *Liv Res R Dev.* 2002;14(2).
11. Wikipedia. 2004-to-Date Galleria Media Limited; 2014. Available:<http://www.plateaustategov.org>
12. National Population Commission. The National Population Census Results; National Population Commission (NPC), Nigeria; 2006.
13. Chah JM, Igbokwe EM, Chah KF. Ethnoveterinary medicine used in small ruminant health in the Eastern Guinea Savanna, Nigeria. *Liv Res R Dev.* 2009; 21(12):1-45.
14. Nkechi VO, Sunday M, Ishaku LE, Micah SM, Jurbe GG, Christiana JD, Olusola OO, Ann SL, David S. Ethnobotanical survey of medicinal plants used in the treatment of animal diarrhea in Plateau State, Nigeria. *J Med PI Res.* 2011;6:4625-4632.
15. Ayannar M, Igraciimuthu S. Ethnobotanical survey of medicinal plant commonly used by Kani tribal in Tirunelveli hills of Western Ghats, India. *J Ethnopharma.* 2011;134: 851-864
16. Giday M, Asfaw Z, Woldu Z. Medicinal plant of the Meinit ethnic group of Ethiopia: An ethnobotanical study. *J Ethnopharma.* 2009;124:513-521.
17. Yinegar H, Kelbessa E, Bekele T, Lulekal E. Ethnoveterinary medicinal plant in Bale

- Mountains National Park. J Ethnopharma. 2007;112:55-70.
18. Ghorbani A. Studies on pharmaceutical ethnobotany in the region of Turkmen Sahra, North of Iran (part 1): General result. J Ethnopharma. 2005;102:58–68.
  19. Cheikhyoussef A, Embashu W. Ethnobotanical knowledge on indigenous fruits in Ohangwena and Oshikoto regions in Northern Namibia. J Ethnobiol and Ethnomed. 2013;9:34.
  20. Matekaire Tafara MS, Taona M, Bwakura MS. Ethno-veterinary medicine: A potential Alternative to Orthodox Animal Health Delivery Zimbabwe. Int J App Res Vet Med. 2004;2:4.
  21. Taiwo EM, Adegboyega E, Oguntade A, Fajemisin N, Olaiya AP. Local knowledge and socio-economic determinants of traditional medicine utilization in livestock health management in southwest Nigeria. J Ethnobiolo Ethnomed. 2012;8:2.

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