Ethnoveterinary Practices of Medicinal Plants in Management of Worms and Ectoparasites in Livestock in Karatu District, Tanzania

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SUMMARY

Livestock production plays a critical role in supporting rural livelihoods across Tanzania. However, the sector faces constraints due to high disease prevalence and limited access to veterinary services, which are often costly. Thus, many smallholder farmers rely on ethnoveterinary practices. This study surveyed agropastoral households in Karatu District to explore their knowledge, attitudes, and use of medicinal plants for animal health management. A cross-sectional study was conducted, where 145 agropastoral households were purposively selected based on livestock population size. The households encompassed a diverse age range of 15 to 80 years, with male respondents predominating (69.7%), and were primarily engaged in cattle, small ruminants, pigs, and poultry production. Most respondents (81.4%) had over 11 years of experience in livestock farming, and over 90% of them had attained only primary education. Respondents identified symptoms indicative of several livestock diseases, including Infectious Bovine Keratoconjunctivitis (54.5%) in cattle, mange mites and worm infestations in pigs (35.2%) and worms in small ruminants (17.9%), and Newcastle disease (8.3%) in poultry. More than half of the respondents were aware of the presence of medicinal plants, which were mainly used when conventional drugs were unavailable (24.1%), costly (30.3%), or perceived as ineffective (19.3%). Most respondents (57.9%) perceived use of medicinal plants as effective and 64.1% viewed them as comparable to conventional treatments. The key plants used by the majority of respondents for parasite control was *Croton macrostachyus*. The study highlights that of ethnoveterinary knowledge remains a valuable alternative for livestock health management, while also emphasizing its vulnerability to erosion due to reliance on oral transmission.

Keywords: Agropastoralists, Animal health, Ethnoveterinary practices, Karatu District, Livestock ailments, Medicinal plants

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INTRODUCTION

Livestock production plays a vital role in supporting rural livelihoods across many developing countries in Africa, including Tanzania. It plays a crucial role in supporting food security, income generation, and social wellbeing, particularly among rural communities (Gidey *et al*., 2015; Eiki *et al*., 2021). However, despite its significance, the livestock sector in rural Tanzania

faces limited growth due to the high prevalence of animal diseases (Sudda *et al*., 2017). As a result, many farmers depend heavily on ethnoveterinary practices to manage livestock health. In rural areas of Tanzania, livestock keepers turn to medicinal plants because modern veterinary services are scarce, located far away, and often costly (Kacholi *et al*., 2024). A recent study in one major University in Tanzania have shown that 64% of the interviewed undergraduate students used herbal medicines, mostly for common ailments, immune support, and skincare (Mapunda and Mramba, 2025). Other studies from different parts of the country showed similar trend in use of medicinal plants in treating humans and animal diseases, including gastrointestinal disorders and opportunistic infections associated with HIV/AIDS (Kisangau *et al*., 2007; Kacholi *et al*., 2024; Mkenda *et al*., 2025). While global estimates of medicinal plant use range from 65–80%, national-level evidence from Tanzania similarly demonstrates a widespread reliance on medicinal plants for primary healthcare (Gidey *et al*., 2015; Mollel *et al*., 2022). This study aimed to explore how local communities in Tanzania utilize indigenous ethnoveterinary knowledge and the medicinal plants found in rural areas to treat and prevent livestock diseases. The findings aim to provide baseline information that can support future studies, and conservation of ethnoveterinary resources.

MATERIALS AND METHODS

Study Area and Duration

This study was conducted in three wards namely Buger, Kansay, and Mbulumbulu in Karatu District in northern Tanzania (Figure 1). The district is located between latitudes 3°10' to 4°S and longitude 34°47'E to 35°56’E (Ringo *et al*., 2007). Karatu district lies at an altitude approximately 900 - 1040 m above sea level and is predominantly inhabited by the Iraqw, along with several smaller ethnic groups. The Iraqw are primarily smallholder agropastoralists, engaging in crop cultivation such as maize, beans, pigeon peas, barley and wheat (Kiffner *et al*., 2019). Regarding livestock populations, most cattle and small ruminants are concentrated in five regions of Tanzania, including Arusha and Manyara, which were formally part of the Arusha Region before it was divided to two separate administrative regions (Chuwa, 2012). Karatu District, from which the study wards were selected, is one of the seven districts in the Arusha Region, where 56% of households are primarily engaged in cattle keeping (Abdallah, 2025). Its climate is characterized by wet and dry seasons, where the wet season runs from February to May and dry and hot season extends from June to September (Mwanga *et al*., 2025). This study was conducted between April and May 2025, a period during which most plant species were in their flowering stage.

Study Population and Sampling

A cross-sectional study was conducted in three wards in Karatu Districts. These wards were purposively selected based on livestock population size. Each selected ward was a frame for the random selection of five villages. Within the villages, any household keeping pigs, cattle, small ruminants, and poultry was eligible for the study. Thus, following the acquisition of verbal informed consent, respondents (n=145) were randomly selected, from whom data were collected on the utilization of medicinal plants in Karatu District.

Ethical Review and Research Clearance

Ethical approval for the study was obtained from the Ethical Review Board of the University (SUA), and research clearance (Ref. No. SUA/DRPTC/R/126/VET/3/2023/7) was secured prior to the commencement of the study. Verbal informed consent was obtained from all respondents before their involvement in the research.

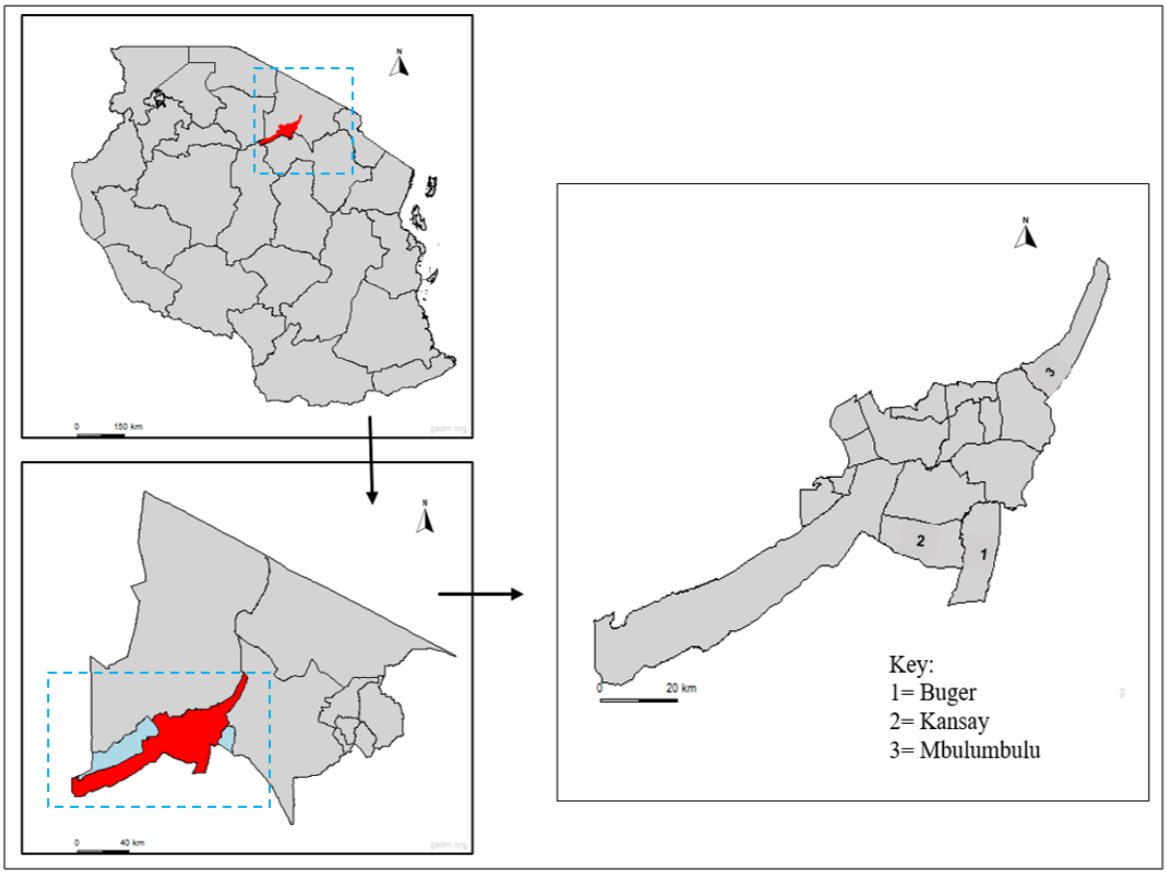

Figure 1. A map of Tanzania showing the study area. **Source**: https://gadm.org/maps/TZA.html

Data Collection and Identification of Plants

Field surveys were conducted using a well-structured questionnaire to collect and record information on the medicinal plants in the study area. Specifically, questionnaire was used to collect data on knowledge, attitudes and practices (KAP) regarding medicinal plants and livestock health issues. It covered respondents' knowledge of medicinal plants and their uses, attitudes towards their effectiveness and safety, and actual usage practices. Specimens of medicinal plants reported by respondents and identified by their local names were collected from the study area. These included whole plants as well as the vegetative parts such as leaves, seeds, flowers and fruits to facilitate accurate taxonomic identification. After respondents physically identified the plants in the field and provided their local names, preliminary identification, documentation and verification of the botanical names were conducted using the PlantNet application, following the procedures described by Jones (2020) and Pernat *et al*. (2023). Further identification and confirmation of the collected samples of medicinal plants was done by botany specialists in the Department of Botany at Sokoine University of Agriculture (SUA), Morogoro. In addition, face-to-face interviews were conducted to collect data on the respondents' socio-demographic characteristics in the study area.

Data Analysis

Data entry, cleaning, and coding were done in Microsoft Excel 2016. The data were entered into SPSS version 25 (IBM SPSS Statistics) and the descriptive statistics, such as frequencies and percentages were computed to summarize the socio-demographic characteristics of respondents and their awareness, attitudes, and practices regarding the use of medicinal plants.

RESULTS

Demographic Profile of Respondents

The study included 145 respondents, 101 (69.7%) of whom were male. The respondents' age ranged from 15 to 80 years, with their experience in livestock farming ranging from 5 to 40 years (Table 1). The majority of the respondents were between 25 and 54 years old (57.2%, n = 83/145) and 55 - 64 years (23.4%, n = 34/145). According to the educational status analysis, 133 (91.7%) of the respondents completed primary school education, while 6 (4.1%) did not attend any formal education, and 5 (3.4%) completed secondary school education. The remaining one (0.7%) respondent was a college graduate (Table 1). Only 11 (7.6%) respondents were unmarried while 134 (92.4%) were married, indicating that most of the families in the study area have more labour to engage in various farming and livestock keeping activities. The study indicated that all participating farmers (n = 145) were engaged in keeping cattle, sheep, goats, pigs, and poultry.

The majority of respondents (91.0%, n = 132/145) kept cattle alongside other livestock, while only a small proportion of households (9.0%, n = 13/145) did not keep cattle (Table 1). These livestock constituted their primary source of income and livelihood, as the majority of farmers (98.6%, n = 143/145) reported having no alternative sources of income. However, a small proportion of respondents (1.4%, n = 2/145) engaged in alternative income-generating activities, such as employment in public institutions (Table 1). The majority of respondents (81.4%, n = 118/145) had ≥ 11 years of experience in livestock keeping, followed by those with 6 -10 years (13.8%, n = 20/145) and ≤ 5 years (4.8%, n = 7/145) of experience, respectively (Table 1).

Livestock Health Issues Identified by Respondents Based on the Reported Symptoms

The vast majority of respondents (95.9%, n = 139/145) acknowledged that animals can become ill like humans, while a small number were either unaware (0.7%, n =1 /145) or unsure (3.4%, n = 5/145) [Table 2]. Based on the reported indicative symptoms of diseases in animals, the most frequently reported conditions in pigs were mange and worms (35.2%, n = 51/145), followed by African Swine Fever (ASF) alone (0.7%, n = 1/145) and a combination of ASF, mange, and worms (1.4%, n = 2/145). However, the majority of respondents (62.8%, n = 91/145) did not report any disease or condition in their pigs. Among cattle, Infectious Bovine Keratoconjunctivitis (IBK) was the most commonly reported condition (54.5%, n = 79/145), followed by other ailments such as tick-borne diseases (5.5%, n = 8/145), Foot-and-Mouth Disease (FMD) (4.8%, n = 7/145), respiratory diseases (3.4%, n = 5/145), reproductive problems (2.8%, n = 4/145), and worms and flukes (1.4%, n = 2/145) [Table 2].

In small ruminants, worms were the most commonly reported condition (17.9%, n = 26/145), followed by respiratory diseases (12.4%, n = 18/145), while the majority of respondents (61.4%, n = 89/145) did not report any disease. In poultry, Newcastle disease (NCD) was the most frequently reported ailment (8.3%, n = 12/145), with very few cases of infectious coryza (0.7%, n = 1/145). Most respondents (89.7%, n = 130/145) did not report any disease in their poultry (Table 2).

Table 1. Demographic Characteristics of the Respondents

Demographic parameter	Frequency (%)
Age (Years)	
Early working age (15-24)	6(4.1)
Prime working age (25-54)	83(57.2)
Mature working age (55-64)	34(32.4)
Elderly (≥ 65)	22(15.2)
Sex	
Male	101(68.7)
Female	44(30.3)
Education level	
No formal Education	6(4.1)
Primary School	133(91.7)
Secondary school	53.4)
College	1(0.7)
Marital status	
Unmarried	11(7.6)
Married	134(92.4)
Employments	
Public	2(1.4)
Unemployed	143(98.6)
Private	0(0)
Source of income	
Only employment	0(0)
Farming/ employment	145(145)
Livestock kept	
Cattle	8(5.5)
Cattle /small ruminants	20(13.8)
Cattle/ pigs	16(11.0)
Small ruminants/ pigs	7(4.8)
Pigs	1(0.7)
Cattle/small ruminants/pigs/ poultry	52(35.9)
Cattle/small ruminants/ poultry	34(23.4)
Pigs and poultry	1(0.7)
Small ruminants/ poultry	4(2.8)
Cattle/ poultry	2(1.4)
Experience (Years)	
≤ 5	7(4.8)
6-10	20(13.8)
≥ 11	118(81.4)

Table 2. Respondents' Responses on the Livestock Health Issues

Respondents' Knowledge on Herbal medicine	Frequency (%)
Are you aware that animals can also get sick like humans?	
Yes	139(95.9)
No	1(0.7)
I don't know	5(3.4)
List of diseases/ conditions in pigs	
African Swine Fever (ASF)	1(0.7)
Mange mites and worms	51(35.2)
ASF, Mange mites and worms	2(1.9)
No disease/ condition reported	91(62.8)
List of diseases/ conditions in cattle	
Respiratory diseases (RD)	5(3.4)
Worms and flukes	2(1.4)
Tick diseases	8(5.5)
Foot and Mouth Disease (FMD)	7(4.8)
Infectious Bovine Keratoconjuctivitis (IBK)	79(54.5)
Both RD, FMD, IBK, tick diseases, worms and flukes	7(4.8)
Retained placenta	4(2.8)
No disease/ condition reported	33(22.8)
List of diseases/ conditions in small ruminants	
Respiratory system diseases	18(12.4)
Worms	26(17.9)
Nervous system diseases	0(0)
Both RD, nervous system diseases and worms	12(8.3)
No disease/ condition reported	89(61.4)
List of diseases in poultry	
Newcastle disease	12(8.3)
Infectious coryza	1(0.7)
Both Newcastle disease and infectious coryza	1(0.7)
Others	1(0.7)
No disease reported	130(89.7)

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Respondents' Knowledge towards the Use of Medicinal Plants

Sixty percent (n = 87/145) of respondents were aware that plants can be used as medicines for treating animal diseases, and a similar proportion (59.3%, n = 86) acknowledged the presence of medicinal plants in their areas (Table 3). Respondents' knowledge of herbal medicine was primarily acquired through family sources (50.3%, n = 73), while neighbors, online sources, herbal practitioners, and livestock officers collectively contributed 12.4% (n=18) [Table 3]. Respondents reported that medicinal plants were mainly used when conventional drugs were unavailable (24.1%, n = 35), costly (30.3%, n = 44), or perceived as ineffective (19.3%, n = 28). Regarding respondents' perceptions of the effectiveness of herbal products for treating animal ailments, these products were rated as moderately effective (16.6%, n = 24), effective (15.9%, n = 23), and highly effective (7.6%, n = 11), while over 44% (n = 64) of respondents were unsure about their effectiveness (Table 3).

Respondents' Attitudes on Medicinal Plants Use in Animals

Nearly half of the respondents (48.3%, n = 70) reported that their interest in herbal medicine use in animals is growing, while 32.4% (n = 54) were unsure, and 19.3% (n = 28) were uncertain about whether community attitude towards the use of medicinal plants in animal disease management is increasing (Table 4). Over half of the respondents (57.9%, n = 84) agreed that the use of herbal medicines is effective in animal disease management. However, the majority of respondents (64.1%, n = 93) argued that herbal medicine can be equally effective as conventional medicine (Table 4). About treatment preference, nearly half of the respondents (48.3%, n = 70) indicated that they would choose herbal medicine if it were equally effective as conventional drugs, while 32.4% (n = 47) remained undecided, and 19.3% (n = 28) would continue using conventional drugs. The study showed that respondents' attitudes towards the use of medicinal plants in animal disease management were strongly influenced by perceived advantages such as fewer side effects (50.3%, n = 73), lower costs (60%, n = 87), and availability throughout the year (60.7%, n = 88). Regarding the low motivation to use medicinal plants, most respondents (66.2%, n= 96) reported that they were unaware of the reasons, while 32.1% (n= 48) chose not to disclose reasons for their choice (Table 4).

Plants Used to Manage Worms and Ectoparasites in Livestock in Karatu District

The study showed that the community in the study areas in Karatu District relied on traditional knowledge of medicinal plants for worm management. Approximately 15% (n=22/145) of the respondents interviewed reported using medicinal plants to treat worms and ectoparasites in their livestock (Table 5; Table 6), with men accounting for 77.3% (n = 17) of these respondents and women for 22.7% (n = 5). Among the respondents who used medicinal plants to treat worms (Table 5), *Croton macrostachyus* was the most commonly reported plants, accounting for 33.3% (n = 5/15) of the responses. Moderately used plants were *Ajuga integrifolia* (20%, n = 3/15) and *Euphorbia tirucalli* (20%, n = 3/15), while *Croton megalocarpus* and *Leonotis nepetifolia* were each reported by 13.3% (n = 2/15) of respondents (Table 5). The most commonly used plants parts were barks (80%, n= 12/15), while the roots, leaves and stems were each reported by 6.7% (n= 1/15) of respondents. The study highlighted the potential of *C. macrostachyus*, as multiple parts such as the barks, roots, and leaves were used to prepare aqueous extracts of the plants for oral administration to control worms in cattle, small ruminants, pigs, and chickens (Table 5).

In addition to their use in worm control in livestock, this study reports that *Tagetes minuta* (55.6%, n = 5/9), *Tithonia diversifolia* (22.2%, n = 2/9), *Ocimum sanctum* (11.1%, n = 1/9), and *Eucalyptus* spp. (11.1%, n = 1/9) were the main plant species used to control ectoparasites such as fleas, mites, and ticks (Table 6). *O. sanctum* and *T. minuta* were used in their whole form, either placed or hanged in animal houses or burned to produce repellent smoke. Leaves of *T. diversifolia and Eucalyptus spp.* are crushed and prepared as aqueous extracts for topical application. Regarding routes of administration, respondents reported that topical fumigation (smoke or hanging plants while fresh) was preferred to manage fleas and mites in poultry (Table 6).

Table 3. Respondents' Knowledge of Plants medicine use

Respondent Knowledge on Herbal medicine	Frequency (n)
Are you aware of plants use as medicines in animal disease treatment?	
Yes	87(60.0)
No	25(17.2)
No response	33(22.8)
Source of knowledge on herbal medicine	
Family	73(50.3)
Neighbours	7(4.8)
Herbal practitioners	1(0.7)
Livestock officers	1(0.7)
Online sources	9(6.2)
No response	54(37.2)
Are there any medicinal plants used for animal disease treatment in your area?	
Yes	86(59.3)
No	18(12.4)
I don't know	41(28.3)
In what situations are medicinal plants used as medicine in animals?	
Unavailability of conventional drugs	35(24.1)
High cost of conventional drugs	44(30.3)
Ineffectiveness of conversional drugs	28(19.3)
I don't know	36(24.8)
First aid	2(1.4)
How do you score the "effectiveness" of herbal products?	
Not effective	1(0.7)
Less effective	22(15.2)
Moderately effective	24(16.6)
Effective	23(15.9)
Highly effective	11(7.6)
I don't know	64(44.1)

Table 4. Respondents' Attitudes on Medicinal Plants Use in Animal Health Management

Parameters assessed	Frequency (n)
Is the interest in herbal medicine use in animals growing?	
Yes	70(48.3)
No	28(19.3)
I don't know	47(32.4)
Herbal medicine use can be effective in animals	
Yes	84(57.9)
No	7(4.8)
I don't know	54(37.3)
Herbal medicine can be equally effective as conventional medicine	
Yes	93(64.2)
No	6(4.1)
I don't know	46(31.7)
If herbal and conventional drugs are equally effective, I choose herbal medicine	
Yes	70(48.3)
No	28(19.3)
Not sure	47(32.4)
Choice to use herbal medicine is because of less side effects	
Yes	73(50.3)
No	10(6.9)
Not sure	62(42.8)
Choice to use herbal medicine is because of less costs	
Yes	87(60.0)
No	14(9.7)
Not sure	44(30.3)
Choice to use herbal medicine is because they are readily available	
Yes	88(60.7)
No	11(7.6)
Not sure	46(31.7)
What could be the reasons for the low motivation to use medicinal plants?	
Non hygienic	1(0.7)
Non-efficacy,	0(0)
Not evidence-based,	0(0)
Their adverse effects	0(0)
Others	48(32.1)
I don't know	96(66.2)

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Table 5. Plant Species Used for the Management of Worms in Livestock in Karatu District

Local name	Botanical name	Frequency (n)	Percent (%) N= 15	Part used	Drug form	Route	Vehicle	Method of preparation	Animals
Ayloi	*Croton megalocarpus*	2	13.3	Bark	Aqueous extract	Oral	water	Crushed, extracted in water	Cattle, small ruminants, pigs
Giro	*Leonotis nepetifolia*	2	13.3	Bark	Aqueous extract	Oral	water	Crushed, extracted in water	Cattle, small ruminants, pigs
Kwankwii	*Ajuga integrifolia*	3	20	Bark	Aqueous extract	Oral	water	Crushed, extracted in water	Cattle, small ruminants, pigs
Meali	*Croton macrostachyus*	5	33.3	Root, Bark, leaves	Aqueous extract	Oral	water	Crushed, extracted in water	Cattle, small ruminants, pigs
Mnyaa	*Euphorbia tirucalli*	3	20	bark, stem	Aqueous extract	Oral	water	Crushed, extracted in water	Cattle, small ruminants, pigs, poultry

Table 6. Medicinal plants used for Management of Ectoparasites in Livestock in Karatu District

Local name	Botanical name	Frequency (n)	Percent (%) N= 9	Part used	Drug form	Route	Vehicle	Method of preparation	Animals
Ayor njano (Mexican sunflower)	*Tithonia diversifolia*	2	22.2	Leaves, flowers	Aqueous extract	Topical (ointment)	Water (shampoo)	Crushed, extracted in water	Cattle, small ruminants, pigs, poultry
Akaliptus (Mkaratusi)	*Eucalyptus* spp.	1	11.1	Leaves	Aqueous extract	Topical (ointment)	Water (shampoo)	Crushed, extracted in water	Pigs
Burgas (Majani bangi)	*Tagetes minuta*	5	55.6	Leaves, Whole plant	Natural form (whole plant)	Topical (sweep, litter, smoke)	Natural form (whole plant/ repellant)	Whole plant (natural form)	Cattle, small ruminants, pigs, poultry
Soriyong (Holy Basil)	*Ocimum sanctum*	1	11.1	Leaves, Whole plant	Natural form (whole plant)	Topical (sweep, litter, hang in animal house)	Natural form (whole plant/ repellant)	Natural form (whole plant/ repellant)	Cattle, small ruminants, pigs, poultry

DISCUSSION

The use of medicinal plants in the study area varied by gender, with men (69.7%) comprising the majority of the respondents. Similarly, men (72.5%) reported higher use of medicinal plants than women (27.5%) This pattern is consistent with reports from agro-pastoral rural communities across sub-Saharan Africa, where men are the primary livestock owners and the main household decision-makers regarding animal health management (Howland 2021; Ramirez-Santos *et al*., 2023). In addition, the lower participation of females in the study was primarily attributed to their greater responsibilities in household activities, whereas males were more likely to engage in outdoor activities and to share indigenous knowledge with other men within the community (Howland 2021; Lulesa *et al*., 2025). The participation of the respondents across a wide age range, from early working age (15-24 years) to the elderly (≥ 65 years), is important for capturing the diverse roles that livestock play in livelihoods and the socio-economic development of rural communities (Nontu *et al*., 2025). However, most respondents (57.2%) fall within the prime working-age range (25-54 years), indicating that livestock farming continues to be economically important for household income generation among middle-aged adults (Herrero *et al*., 2013; Bwalya *et al*., 2024).

Additionally, participation across a wide range of age groups, combined with extensive livestock-keeping experience, suggests strong intergenerational continuity of livestock-related knowledge in the study area (Dovie *et al*., 2006; Herrero *et al*., 2013). Most respondents (92%) reported having only a primary education, which is proportionally high and consistent with national rural education profiles in Tanzania, and may influence reliance on indigenous knowledge systems such as ethnoveterinary practices in areas where access to veterinary extension services is inadequate (McGaw and Eloff, 2008; URT, 2019). The majority of respondents (92.4%) were married, reflecting stable household structures that likely contribute to the availability of family labour for livestock management activities (Ilboudo *et al*., 2025). Similar to this study, earlier studies have reported that livestock farming is the primary source of livelihood for nearly all respondents, with cattle being the most commonly kept animals (Swai *et al*., 2007; (Herrero *et al*., 2013; Bwalya *et al*., 2024).

Most respondents (60%) demonstrated a high level of awareness that animals can contract diseases, while a similar proportion (59.3%) reported the presence of medicinal plants in their areas [Table 2]. These findings suggest a foundational level of knowledge about livestock health which is important for early disease detection and management (Chitura *et al*., 2018). Among cattle, Infectious Bovine Keratoconjunctivitis (IBK) was the most commonly reported condition (54.5%), aligning with its known prevalence in tropical regions where factors such as dust, flies, and sunlight increase susceptibility to ocular infections (Radostits *et al*., 2007; Bartenslager *et al*., 2021).

Worm infestations in small ruminants and pigs were the most commonly reported conditions by respondents, supporting previous studies indicating worms as a significant health constraint on livestock productivity in smallholder systems (Sissay *et al*., 2007; Roesel *et al*., 2017; Armson *et al*., 2020). On the other hand, Newcastle disease in poultry was reported less frequently by respondents (8.3%), which is not consistent with its status as a major economic threat to backyard poultry in Africa due to high mortality in smallholder flocks (Mramba *et al*., 2025; Ouedraogo *et al*., 2025). Interestingly, although the vast majority of respondents (95.9%) acknowledged that animals can become ill like humans, a large proportion reported no disease occurrence in their livestock, including 89.7% in poultry, 62.8% in pigs, 61.4% in small ruminants, and 22.8% in cattle [Table 2]. This pattern may be attributed to underreporting, limited diagnostic capacity, or the tendency of farmers to perceive subclinical infections (Catley *et al*., 2012).

The findings from this study indicated that more than half of the respondents were aware of medicinal plants and their potential use in treating animal ailments. This highlights the continued relevance of ethnoveterinary medicine in rural communities in Tanzania (Mwatawala and Malinjanga, 2016). Since ethnoveterinary knowledge of medicinal plants is common yet

highly localized and specific to certain communities and family lineages, it is transmitted largely through oral traditions across generations, making it vulnerable to erosion if not properly documented (Wanzala *et al*., 2005; Oda *et al*., 2024). The study showed that respondents relied on medicinal plants not as a rejection of conventional veterinary medicine, but primarily when conventional treatments were unavailable (24.1%), costly (30.3%), or perceived as ineffective (19.3%) [Table 3]. Similar patterns have been observed across Africa, where farmers adopt a multicultural approach to animal healthcare, where these approaches combine indigenous and conventional therapies based on accessibility and perceived efficacy (McGaw *et al*., 2020).

A significant proportion of respondents (57.9%) agreed that herbal medicines are effective in managing animal diseases, with the majority (64.1%) asserting that they can be as effective as conventional treatments [Table 4]. Overall, this reflects a positive attitude towards medicinal plants and suggests their increasing role as an alternative strategy in animal healthcare. The study showed that respondents' attitudes towards the use of medicinal plants in animal disease management were strongly influenced by perceived advantages such as fewer side effects (50.3%), affordability (60%), and availability (60.7%) [Table 4]. These advantages have been widely cited as key drivers for the continued use of ethnoveterinary medicine in resource-limited settings (Lans *et al*., 2007; Mwale *et al*., 2005). However, some respondents expressed uncertainty and reluctance towards ethnoveterinary practices, highlighting the need for increased awareness, training, and scientific validation (Ndou *et al*., 2024; Melese *et al*., 2025). Doubts about the effectiveness of traditional remedies often arise from limited knowledge, lack of standardization, fear of treatment failure, and reluctance to disclose valuable information about medicinal plants (Eiki *et al*., 2021, Wanzala *et al*., 2025).

The use of *Croton macrostachyus* as the most frequently reported anthelmintic plant corroborates earlier ethnobotanical studies documenting its widespread use against gastrointestinal parasites in livestock across East Africa (Githiori *et al*., 2006; Gakuya *et al*., 2011). The preference for bark as the main plant part raises conservation concerns, as bark harvesting can be destructive and threaten plant survival if not sustainably managed (Yirga 2010; Oda *et al*., 2024). This study also reports that plants such as *Tagetes minuta* (Wanzala *et al*., 2014; Makwarela *et al*., 2025), *Tithonia diversifolia* (Wanzala *et al*., 2014; Makwarela *et al*., 2025), *Ocimum sanctum* (Asha *et al*., 2001; Alimi *et al*., 2022), and *Eucalyptus* spp. (Adenubi *et al*., 2021; Yang *et al*., 2025), which are used for endo- and ectoparasite control, have been previously documented to possess insecticidal and acaricidal properties. Hanging, smoking and topical applications of medicinal plants, particularly in poultry, reflects adaptive practices suited to small-scale systems where chemical acaricides may be inaccessible or unaffordable (Nwafor and Nwafor, 2022).

The study demonstrates that ethnoveterinary knowledge, particularly the use of medicinal plants, remains an important component of livestock health management strategies among rural communities in Tanzania. Overall, the findings of this study indicate that reliance on medicinal plants for parasite control highlights the potential role of ethnoveterinary knowledge in integrated parasite management strategies among agropastoralists.

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CONFLICT OF INTEREST

Authors have none to declare.

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