Socio-economic, technical characteristics and challenges in indigenous (taurine-type cattle) beef production in Cameroon

E.T. Ojong[#1], P.M. Oben[1], T.B.A. Hako[2], K.A. Etchu[3], J.S. Motsa'a[2], N.N. Wozerou[1] & T.C. Keambou[4]

[1]Department of Animal Science, Faculty of Agriculture and Veterinary Medicine, University of Buea, Buea, Cameroon
[2]Department of Animal Production, Faculty of Agronomy and Agricultural Sciences, University of Dschang, Dschang, Cameroon
[3]Institute of Agricultural Research for Development, Directorate Nkolbisson, Yaounde, Cameroon
[4]Center for Tropical Livestock Genetics and Health (CTLGH), International Livestock Research Institute (ILRI), Nairobi, Kenya

Abstract

The study evaluated the socio-economic, production parameters and challenges facing Cameroon taurine cattle farmers in ten regions of Cameroon. A single-visit using the multiple-subject survey method was carried out by face-to-face interviews using structured questionnaires. A total of 175 farmers were interviewed in the presence of their animals for breed-type verification. Taurine-type breed cattle in this study were the Namchi, Kapsiki, Bakossi and Bamenda. A majority of the indigenous cattle farmers in this study had no formal education and 51.1% inherited their cattle herds from parents. Many farmers kraaled their animals at night, and let them roam-free to graze during the day. More than 50% of farmers supplementary fed their animals; 81.5% allowed cattle to freely mate; 95.6% faced cattle production challenges, and despite challenges, 95.7% made a profit from indigenous taurine-type cattle production. It was concluded that indigenous taurine cattle farming is profitable and beneficial to the rural population in Cameroon as it is a source of income for the rural families. There is a need to provide farmers in modern production and financial management as well as to open a cattle-breeding centre to study the breed further was identified.

Keywords: Bakosi, Bamenda, Farmers, Kapsiki, Namchi,
#Corresponding Author: emmanuelojong91@gmail.com

Introduction

Cameroon is a lower-middle-income country typified by lagging social indicators and persistently high levels of poverty. According to a report of the Livestock Development Project (2016), the country has shown relatively strong macroeconomic performance in recent years with economic growth reaching 4.6% in 2012, and was estimated to be 5.6 to 5.9% between 2013 and 2015, and has a Gross Domestic Product (GDP) of US$1,429 per capita in 2014. The country's human population is expected to grow by more than 50% by between 2004 and 2030 (Aliou, 2004). This increase in human population, and rise in disposable incomes will improve the quality of elevate demand for livestock products.

Beef is a source of income, nutrition, food security, and enhances the social standing of households in rural communities. According to 2014 statistics from MINISTERE DE L'ELEVAGE, DES PECHES ET DES INDUSTRIES ANIMALES (MINEPIA), there are 5,805,297 million heads of cattle in Cameroon. Beef is a significant part of the main diet for more than 60% of the population (Ngalim, 2015). Some products like milk, hides and skin are also in high demand in some parts of the country, especially in the North West and Northern Regions (Aliou, 2004).

The larger proportions of cattle in Cameroon are Zebus (*Bos indicus*) which are trypano-susceptible. However, indigenous *Bos Taurus* cattle are trypano-tolerant and are considered to be highly endangered (Donelson, 2003). Despite the rich genetic diversity of local cattle, their productivity is low. Genetic, husbandry, health and reproductive problems have previously been identified as factors contributing to their low cattle productivity (Ebangui *et al*., 2011). The indigenous cattle of Cameroon are bred naturally under traditional management systems with little or no breeding programs. The Doayo (Namchi) and Kapsiki (Kirdi) cattle are the major taurine (shorthorn) breeds of Cameroon with origin as complex as for most African cattle populations (Rege *et al.*, 1994 as cited by Ebangui *et al*., 2011). Rege *et al*. (1994) estimated the population of Namchi cattle to range between 1060 and 7000 head, which represented 0.02 to 0.14% of the 4.9 million head

of African Shorthorns. While, Sauveroche & Thys, (1994), also estimated the population of Kapsiki to range between 3000 and 4098 head representing 0.06 to 0.08% of the African Shorthorns. These estimates fall within levels of threat for extinction (1000 to 5000 breeding females) defined by various conservation groups (FAO, 1992) and they are therefore considered to be endangered. This study is aimed at studying the socioeconomic and technical parameters of the Cameroon indigenous (Taurine) cattle breeds. This will help in the planning of strategies to improve the production of taurine cattle that are trypano-tolerant.

Material and Methods

This study was undertaken during the dry season (November 2019 to March 2020) in all the 10 regions of Cameroon. Namchi cattle were found on the Sudanian side within the Poli Mountains in the Faro Division of the North Region. Kapsiki was found in the Sahelian side within the Mandara Mountains located on an altitude of 600 m between Mokolo and Bourrah in the Tsanaga Division of the Far North Region of Cameroon. Bakosi cattle were found in Bamougoum in the Mifi Division of the West Region and the Bamenda breed were found in Chup in the Momo division of the North West Region and around lake Manengoumba in the Kupe-Maunengoumba division of the South West Regions.

Figure 1 A map showing the distribution of indigenous taurine breed of Cameroon

A single-visit, multiple-subject survey was carried out by face-to-face interviews using a structured questionnaire. One hundred and seventy-five (175) taurine keeping farmers were identified from information

at the Ministry of Livestock in Cameroon. There were 3 enumerators to conduct the survey. The survey was done in the official language preferred by the respondents, or in Pidgin English. In all cases, survey respondents were members of the household knowledgeable on cattle production. The survey primarily collected basic information on the households and on cattle management practices. These included household livelihood activities, importance of indigenous cattle keeping/production; indigenous cattle feeding, health-care, housing practices; cattle ownership, decision making; labour responsibilities; and reasons for keeping indigenous cattle breeds/types. All farmers were interviewed in the presence of their livestock.

Descriptive statistics were used for data analysis, using Microsoft Excel 2016 and Statistical Package for Social Sciences (SPSS) software, Version 20.1.

Results

As seen in Table 1, most household heads were male, who also did most cattle rearing (96.0%). Of the 96%, 34.0% were in the 40-49 years age group. A majority had family sizes of 11 to 20 members. The greater proportion of 38.3% taurine cattle farmers had no formal education, and no farmer had university education. Local farmers made up 53.2% of taurine farmers while 27.7% were civil servants and 19.1% of them were traders. Most (87.2%) of the respondents were owners of the indigenous cattle breeds and 44.7% of them had cattle rearing experience of 1-20 years while 31.1% had 21-40 years and 23.4% had 41-60 years' experience.

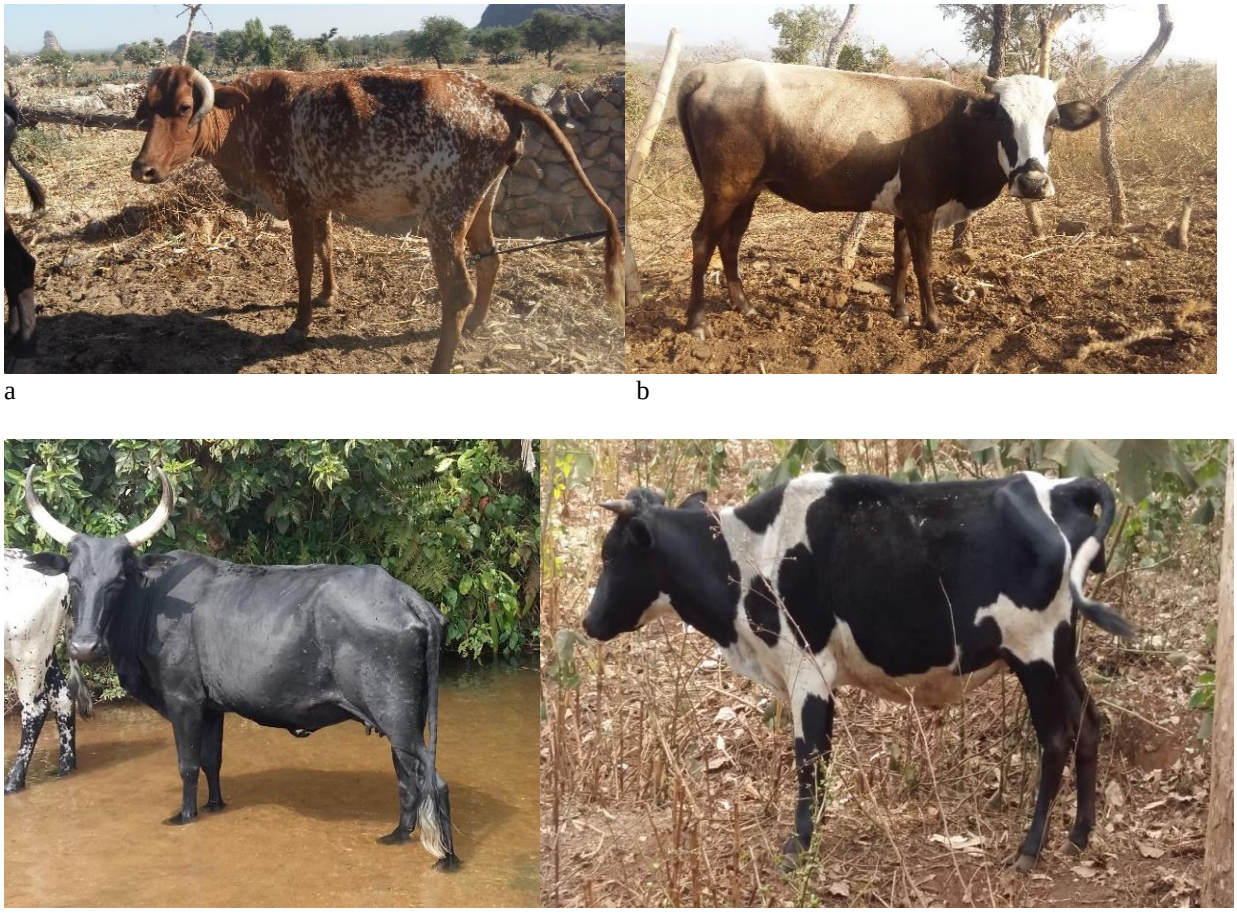
Table 1 Social Characteristics of the indigenous taurine cattle farmers

	Parameters (n=175)	**Percentage (%)**
Household head	Male	100
	Female	00.0
Gender of respondent	Male	96.0
	Female	4.0
Household size	≤10	34.3
	11-20	45.7
	≥21	20.0
Age group	‹20	14.9
	30-39	27.7
	40-49	34.0
	50+	23.4
Level of education	No formal education	38.3
	Secondary education	23.4
	Basic education	21.3
	High school	17.0
Main Occupation	Farmer	53.2
	Civil servant	27.7
	Trader	19.1
Marital status	Married	95.7
	Single	4.3
Religion Status	Christianity	53.2
	Islamic	27.7
	Traditional	19.1
Category of respondent	Owner	87.2
	Caretaker	12.8
Years of experience	1-20	44.7
	21-40	31.9
	41-60	23.4

n = total number of farmers

As shown in Table 2, Namchi and Kapsiki were dominant breeds kept (32.0% and 29.8%), respectively. A total of 29.5% had less than five indigenous taurine cattle, while 25.5% had more than 25 indigenous cattle. Over 59.3% of farmers kept less than five crossbreeds and 51.1% inherited their parent stock.

Table 3 shows that 76.6% of the farmers kraaled/housed their animals at night and let them free-roam during the day. About 94.4% of cattle kraals have no roof; kraals are built of wooden fence. Over 55.3% practiced tethering and 77.0% of those who tethered were during the rainy season. The majority, 77.0% of farmers were transhuman during the dry season (Table 4). A majority of 89.3% practiced extensive cattle production, and only 10.7% did semi-intensive cattle farming. Figure (2) shows different indigenous taurine-type cattle breeds in Cameroon, and Figure (3a and b) shows the type of fencing used by the farmers.



a b c d

Figure 2 The Cameroon Indigenous taurine breeds (a= Kapsiki, b=Namchi, c=Bamenda and d=Bakosi)

Table 2 Distribution of farmers according to indigenous taurine cattle breed

	Parameter	Frequency	Percentage (%)
Breeds kept by farmers	Bamenda	15	8.5
	Bamenda and cross	15	8.5

	Cross	22	12.7
	Bakosi	15	8.5
	Namchi	56	32.0
	Kapsiki	52	29.8
	Total	**175**	**100**
Total local breeds kept by farmers	‹5	52	29.8
	5-15	37	21.3
	15-25	41	23.4
	25+	45	25.5
	Total	**175**	**100**
Total crossbreed kept by farmers	‹5	60	59.3
	5-15	22	22.2
	15-25	19	18.5
	Total	**101**	**100**
Origin of parent stock	Government breeding station	26	14.9
	Neighbours	26	14.9
	Inheritance	90	51.1
	Local market	33	19.1
	Total	**175**	**100**

Table 3 Distribution of farmers according to kraaling system

	Parameter	**Frequency**	**Percentage (%)**
House	Yes	134	76.6
	No	41	23.4
	Total	**175**	**100**
Reason for housing	Proper management	34	25.0
	Avoid destructions and problems	48	36.1
	Avoid thieves	52	38.9
	Total	**134**	**100**
Period of housing	Only at night	93	69.4
	At night and cropping season	22	16.7
	Cropping season	19	13.9
	Total	**134**	**100**
Roof of the house	Thatch	4	2.8
	Galvanized roofing sheets	4	2.8
	Left open	126	94.4
	Total	**134**	**100**
Walls of the house	Wooden fence	126	94.4
	Mud bricks	8	5.6
	Total	**134**	**100**
Floor of the house	Left as it is	134	100
	Gravel	00	00
	Concrete	00	00
	Total	**134**	**100**

Figure 3a Type of kraals with galvanized roofing

Figure 3b Type of fencing used to kraal indigenous cattle at night

Table 4 Distribution of farmers based on tethering and transhumance practices

	Parameter	**Frequency**	**Percentage (%)**
Cattle herder	Family member	170	97.1
	Herdsmen	5	2.9
	Total	**175**	**100**
Tether	Yes	97	55.3
	No	78	44.7
	Total	**175**	**100**
Period of tethering	All year round	22	23.0
	Rainy season	75	77.0
	Dry season	0	00
	Total	**97**	**100**
Transhumance	No	52	29.8
	Yes	123	70.2
	Total	**175**	**100**
Period of transhumance	Dry season	123	100
	Total	**123**	**100**

	Extensive	156	89.3
Production system	Semi-intensive	19	10.7
	Total	**175**	**100**

Table 5 shows that 76.6% of farmers provided supplementary feed, of which 88.9% was Bracharia as the main supplement. Majority, 91.7% of farmers left feed on the ground for feeding. Half of farmers made supplementary feed available throughout the day; and all farmers provided water to their animals with 63.7% of the water coming from rivers. More than half of farmers provided water twice per day to their cattle.

Table 5 Distribution of farmers based on Feeding practices

	Parameter	**Frequency**	**Percentage (%)**
	Yes	134	76.6
Supplementary feeding	No	41	23.4
	Total	**175**	**100**
	Compounded feed	0	00
Type of feed	Kitchen waste and grass	15	11.1
	Bracharia	119	88.9
	Total	**134**	**100**
	Use of feeders	8	5.6
Means of feeding	Left on the floor	122	91.7
	Others	4	2.7
	Total	134	100
	Once daily	44	33.3
	Twice daily	15	11.1
Frequency of serving feed per day	Thrice daily	8	5.6
	Feed always available	67	50.0
	Total	134	100
	Yes	175	100
Water	No	0	00
	Total	175	100
	Rivers	111	63.7
	Rivers, wells and boreholes	11	6.4
	Rivers, wells and rainwaters	11	6.4
Water source	Rivers and rainwater	11	6.4
	Rivers and boreholes	15	8.5
	Wells and boreholes	8	4.3
	Rain water	8	4.3
	Total	175	100
	Once	30	17.0
Frequency of water given to the animal per day	Twice	97	55.3
	Thrice	22	12.8
	Always available	26	14.9
	Total	**175**	**100**

Table 6 shows that 63.8% of farmer's cows' calf inside the kraals. Many (89.4%) of the farmers allow the cattle to practice free mating and all the indigenous cattle farmers owned the males which were used for mating. Most (63.8%) of the farmers had 0-10 parturition in their farms over the last five years. In addition, 78.7% of the farmers have 0-10 offspring born alive while 14.9% have 10-20 offspring born alive during the last five years. 87.2% of the farmers had 0-5 stillbirth in their farm during the last five years and 78.7% of the farmers have stillbirth during the dry season.

Table 6 Distribution of farmers according to cattle reproduction management

	Parameter	Frequency	Percentage (%)
Place of delivery	Inside the kraals	112	63.8
	In and out of the kraals	63	36.2
	Total	**175**	**100**
Type of mating	Free mating	156	89.4
	controlled mating	19	10.6
	Total	**175**	**100**
Source of bull	Own	175	100
	Total	**175**	**100**
Number of parturitions over the last 5years	0-10	149	85.1
	10-20	18	10.6
	20-30	8	4.3
	Total	**175**	**100**
Number of offspring born alive over the last 5years	0-10	138	78.7
	10-20	26	14.9
	20-30	11	6.4
	Total	**175**	**100**
Number of stillbirths over the last 5years	0-5	153	87.2
	5-10	22	12.8
	Total	**175**	**100**
Season of mortality over the last 5years	Rainy	30	17.0
	Both seasons	7	4.3
	Dry	138	78.7
	Total	**175**	**100**

Table 7 reveals that 83.0% of farmers' experienced animal health problems; 83.0% deworm their animals annually and 74.4% deworm 2-5 times per year. Most (74.5%) farmers give animals medications. The highest prevention method used by the farmers is vaccinations with 42.6% of them using vaccination as a preventive measure against foot and mouth disease. Table 8 shows that 96.6% of animals die due to starvation and it was mostly in the dry season (89.4% of farmers reported that). Majority, 95.7% of farmers reported 0-10 sudden death during the last 5years while 83.0% of the farmers complained of death caused by diseases ranging from 0-10 cattle during the last 5years and 66.0% of the death occurs during the dry season.

Table 7 Distribution of farmers according to health care and prevention

	Parameter	Frequency	Percentage (%)
Health problems	Yes	145	83.0
	No	30	17.0
	Total	**175**	**100**
Deworming	Yes	145	83.0
	No	30	17.0
	Total	**175**	**100**
Frequency of deworming/year	1-5 times	108	74.4
	6-10 times	37	25.6
	Total	**145**	**100**
Medication	Yes	130	74.5
	No	45	25.5
	Total	**175**	**100**
Prevention method	Vaccination	75	42.6
	Administration drugs	37	21.4
	Use of traditional methods	33	19.0

	No preventive methods used	30	17.0
	Total	**175**	**100**

Table 8 Distribution of farmers according to death occurrence during the last 5 years

	Parameter(n=175)	**Percentage (%)**
Number of Death caused by starvation	0-10	93.6
	10-20	6.4
Season	Rainy	10.6
	Dry	89.4
Number of Sudden deaths	0-10	95.7
	10-20	4.3
Season of sudden death	Rainy	53.2
	Dry	46.8
Number of deaths caused by disease	0-10	83.0
	10-20	17.0
Season of disease death	Rainy	34.0
	Dry	66.0

n = total number of farmers interview

Table 9 shows that 95.7% experienced difficulties in cattle production; 42.6% complained of conflicts around pastures; 21.3% reported animal health problems; 19.1% had financial challenges and 17.0% reported water scarcity

Table 9 Constraints to indigenous cattle production in the 10 study zones

	Parameter	**Frequency**	**Percentage (%)**
Challenges in taurine cattle production	Yes	167	95.7
	No	8	4.3
	Total	**175**	**100**
Type of challenges	Conflict of pastures	71	42.6
	Animal health	36	21.3
	Financial	32	19.1
	Water scarcity	28	17.0
	Total	**167**	**100**
Reason of cattle leaving the farm	Gift	15	8.5
	Dowry	15	8.5
	Theft	15	8.5
	Natural death, gift, dowry and theft	22	12.8
	Natural death and dowry	11	6.4
	Natural death, dowry and theft	45	25.5
	Gift and dowry	22	12.8
	Gift and theft	19	10.6
	Dowry and theft	11	6.4
	Total	**175**	**100**

Table 10 shows that 85.1% of farmers sell their cattle of which 77.5% sold for cash to address family issues, and 22.5% to get liquid cash. Most (91.5%) farmers say there is a ready market for their product and 95.7% make profit from the indigenous taurine cattle farming. Sixty-two percent (62.5%) sell adult animals to buggers, of which 95.0% sell mature stock for between 100,000–500,000 FCFA. 85.0% sell 0–10 cattle

annually; 92.5% sell live animals while 7.5% of the farmers sell their animal in the slaughtered form. Seventy-four percent (74.1%) of farmers produce 0–10 L of milk and 25.9% produce 10 -20 L of milk per cow per week. Most of the farmers' exit cattle production through gifting, natural death, dowry and/or theft.

Table 10 Sales of indigenous cattle

	Parameter	Frequency	Percentage (%)
	Yes	149	85.1
Sales	No	26	14.9
	Total	**175**	**100**
	To make a profit	34	22.5
Reason for selling	Solve family and personal problems	115	77.5
	Total	**149**	**100**
	Yes	160	91.5
Ready market	No	15	8.5
	Total	175	100
	Yes	167	95.7
Profitability of cattle production	No	8	4.3
	Total	175	100
	Any person that is in need	19	12.5
	Buggers	93	62.5
Buyers	Cattle Market	22	15.0
	Other farmers	15	10.0
	Total	**149**	**100**
	100,000-500000	142	95.0
Cost of a mature cattle	600,000-1000000	7	5.0
	Total	**149**	**100**
	10,000-50,000	142	95.5
Cost of a calf	60,000-100,000	7	5.0
	Total	**149**	**100**
	0-10	127	85.0
Number of cattle sold per year	10-20	22	15.0
	Total	**149**	**100**
	Live	**138**	92.5
Form of sale	Slaughtered	11	7.5
	Total	**149**	**100**
	0-10	20	74.1
Milk production per cow/week (L)	10-20	7	25.9
	Total	**27**	**100**

Discussion

The low number of farmers keeping indigenous taurine cattle may indicate to several causes including that indigenous cattle numbers in Cameroon going down. Males are majority household heads and main keepers of indigenous cattle. These results are in agreement with Keambou *et al.* (2016) who reported, that men are responsible for cattle and small ruminants in the western highlands of Cameroon. Taurine breeders were mostly men in the 40-49 years age group, which may point to more experience in taurine cattle production in this cohort of farmers. The majority of farmers had no formal education, and depended solely on cattle farming for their livelihoods. This finding contradicts that of Mingoas *et al.* (2014), who reported the highest number of cattle breeder having primary education, this difference may be due to the fact that their study was limited to one division in the Adamawa region of Cameroon while these study was carried out in all the regions of Cameroon were taurine cattle are located. All the indigenous cattle farmers were the owners of their cattle and have long experience in indigenous cattle keeping; this makes them have a special love for the animals and prefer to keep them for their tolerance to trypanosomiasis, which is one of the main issues in the tropical zones of Cameroon.

Most farmers kept Namchi in the North, Kapsiki in the Far North region and Bakosi and Bamenda cattle breeds in the West and North West regions, respectively. In this study, only a few farmers kept Bakosi cattle

and Bamenda cattle, which may suggest dwindling numbers of these breeds. The majority indigenous taurine cattle farmers inherited their parents' stock because it is relatively difficult to find the breeds at cattle markets in Cameroon and because they are no more taurine cattle breeding centres in Cameroon.

The study shows that most farmers housed cattle in opened kraals mostly at night and during the cropping seasons to avoid animals getting onto crop in the fields. In general, cattle are herded by a family member knowledgeable on cattle production, and those with larger herd allow them to roam freely. Most farmers tether especially in the crop-growing season prevents animal grazing on crops. Small herd sizes make tethering easy which explains why farmers with larger herd do not tether. Farmers also practice transhumance during the dry season, due to scarcity of water and feed during the dry season in the mountains where they have been kept, so animals are moved down the mountains in search for water and feed. The majority of farmers operate extensive and semi-intensive production systems, which is in line with Kouamo & Pa-ana (2017) who discussed cattle breeding systems in the northern regions of Cameroon.

Most indigenous taurine cattle farmers supplementary fed their cattle in the morning and then allowed to roam freely grazing. This is in agreement with Kouamo & Pa-ana (2017), who reported the same, and they also reported the source of water for cattle to be were the rivers in the northern region of Cameroon. Not all indigenous taurine cattle farmers provide supplementary feed for their animals leaving the available natural pasture as the only source as also reported by Blama *et al.* (2016) in the Far North Region of Cameroon.

The practice of leaving the cow to calf out of the kraal is because the farmers practice an extensive farming system where proper control is not possible. It is also because they practice free-range mating and the farmers may not know when the cows are about to calf, since they could not determine when they mated. There is uncontrolled mating which makes it difficult to know when cows are due to calve. Most farmers had animal health problems in their herds, which could be due to the improper livestock management. Farmers' complained of Foot and Mouth Disease as earlier reported by Kouamo & Pa-ana (2017). Little care about animal and environmental hygiene may compromise biosecurity measures. This exposes livestock to various health challenges such as sunburn during the dry season and Foot and Mouth Disease.

Farmers believe that most animals die due to starvation especially in the dry season because natural pasture not having sufficient feed. This is in accordance with what Ebangui *et al.* (2011) who reported that inadequate nutrition for local cattle in Gudali and Wakwa beef breeds of Adamawa, Cameroon. The sudden death reported in this study; can be attributed to the poor management practice of the animal herd, as animals can be infected without the knowledge of the farmer.

Most of the difficulties faced by taurine cattle farmers in Cameroon are lack of pasture, health problems, financial problems and water scarcity. As reported by Kouamo & Pa-ana (2017) "the restriction of grazing areas, the degradation of pastures and inadequate feeding are factors of failure of any reproductive technology" and this can explain why cattle farmers in Cameroon are turning from extensive farming to semi-intensive farming by feeding their animals with supplementary feed. This type of farming system requires financial assistance, thus, local farmers in the villages do not have enough money to provide supplementary feed to their animals, this allow their animals to die of starvation and diseases. Since most of the cattle production is done in the Northern part of the country where water supply is a serious issue, there is a scramble for water between the cattle and humans, hence, encouraging the transhumance practice in the search for water.

The milk production reported by Kouamo & Pa-ana (2017) also falls within the range of that reported in this study. Milking is mostly done by women and is mostly for home consumption. This is in accordance with what was reported by Dieng *et al.* (2014) that women are involved in the milking processing of cattle.

Conclusions

The study indicates that indigenous taurine cattle farming in Cameroon is beneficial to the rural population as it is profitable and serves as a source of income. Indigenous taurine cattle production in Cameroon is mostly by the extensive system of production. Despite it being beneficial, it has some challenges such as inappropriate production techniques, lack of funds, lack of adequate pasture, animal health issues and water security problems. It is therefore recommended that training on cattle production and financial assistance should be provided to farmers. Taurine cattle breeding centres should be opened to study the breed further. Multiplication centres should be created to assist in multiplying the endangered trypano-tolerant breeds. To improve the livelihoods of indigenous cattle farmers and the production of indigenous cattle in Cameroon, their production should receive more attention by both the governmental and non-governmental organizations.

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Authors' contributions

Emmanuel Takor Ojong (Conceived the research, data collection, data analysis and manuscript writing). Pius Mbu Oben (Research supervisor), Kingsley Agbor Etchu (Supervised the Research work and Manuscript writing). Hako, A, (Data collection, data analysis and Manuscript writing), Joseline Motsa'a Sob (Data analysis and manuscript writing), Ndaleh Wozerou Nghonjuyi (Data analysis and manuscript writing). Christian Keambou Tiambo (Conceived the research, data collection, further data analysis and Manuscript writing)

Ethical statement

This research does not contain clinical studies or patient data. The purpose of the study was stated to the farmers and their participation was voluntary and anonymous. Verbal consent of each participant was obtained and documented in the questionnaire.

Conflicts of Interest

They were no conflict of interest amongst the authors

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