

## Spatial Distribution and Management of Muturu Cattle in Southwest Nigeria: Implications for genetic conservation

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### Abstract

*This study aimed to identify the production locations of the Muturu breed of cattle which is an indigenous breed in Nigeria. The breed is endangered as the population has been reducing with time. To reverse this trend and enhance its conservation and renew production, its distribution and production constraints need to be documented. A survey was conducted in sixteen communities in Southwest Nigeria where sixty-eight Muturu cattle farmers were interviewed using structured questionnaire. Data obtained were analyzed using simple statistics. Results revealed that the age range of the rearers was between 31 and 60 years and majority of them are males (88.2%) with over 20 years experience. Many of the farmers had no formal training in cattle rearing and management while 4.4% had training in cattle production. The primary occupation of the rearers (63.9%) is farming while 36.1% had other vocations apart from Muturu cattle farming. The farmers (55.8%) flock-mate their cattle while 27.9% of the farmers tether-mated their cattle. Average herd size was four, a low figure in relation to the few farmers rearing the Muturu breed in Southwest Nigeria. In order for this endangered cattle breed not to go extinct, efforts must be made towards its genetic conservation.*

**Keywords:** Conservation, extinction, indigenous, Production traits, Muturu cattle

## Distribution spatiale et gestion des bovins Muturu dans le sud-ouest du Nigeria: implications pour la conservation génétique



### Résumé

*Cette étude visait à identifier les lieux de production de la race bovine Muturu qui est une race indigène au Nigeria. La race est en voie de disparition car la population a diminué avec le temps. Pour inverser cette tendance et améliorer sa conservation et renouveler sa production, ses contraintes de distribution et de production doivent être documentées. Une enquête a été menée dans seize communautés du sud-ouest du Nigeria où soixante-huit éleveurs de bétail Muturu ont été interrogés à l'aide d'un questionnaire structuré. Les données obtenues ont été analysées à l'aide de statistiques simples. Les résultats ont révélé que la tranche d'âge des éleveurs se situait entre 31 et 60 ans et que la majorité d'entre eux étaient des hommes (88,2 %) ayant plus de 20 ans d'expérience. Beaucoup d'agriculteurs n'avaient aucune formation formelle en élevage et gestion de bétail tandis que 4,4% avaient une formation en production bovine. L'occupation principale des éleveurs (63,9%) est l'agriculture tandis que 36,1% ont d'autres vocations en dehors de l'élevage bovin Muturu. Les agriculteurs (55,8 %) s'accouplent avec leur bétail tandis que 27,9 % des agriculteurs s'accouplent avec leur bétail. La taille moyenne des troupeaux était de quatre, un chiffre faible par rapport aux quelques agriculteurs élevant la race Muturu dans le sud-ouest du Nigeria. Pour que cette race bovine menacée ne disparaisse pas, des efforts doivent être faits pour sa conservation génétique.*

**Mots-clés :** Conservation, extinction, indigène, caractéristiques de production, bovins Muturu

## **Introduction**

The growing demand for animal protein intake by the ever increasing human populations in developing countries requires the growth and sustainability of livestock sector to continuously supply livestock products. In the tropics, cattle contribute largely to supply of beef and milk. However, cattle populations have continuously been influenced by selective breeding in response to the needs of the owners and through natural selection to adapt to the prevailing local agro-environment (Mwai *et al* 2015). The indigenous cattle breeds are known for their unique morphological and adaptive features which distinguishes them from other breeds (Terefe *et al* 2015), but many of the local breeds have small population size which categorizes them at risk of extinction (FAO 2013). Nigeria is highly endowed with myriads of African indigenous cattle breeds but extensive uncontrolled crossbreeding of indigenous with the exotic breeds has resulted in dilution of genetic traits or loss of some indigenous breeds (Adebambo, 1992). Among the indigenous cattle breeds of Nigeria, the Muturu is a trypanotolerant short-horn cattle adapted to humid agro-ecologies of Nigeria. Over the years, natural selection have also provided them with a high degree of heat tolerance, resistance to tropical diseases and the ability to survive long periods of feed and water shortage (Syratad, 1991). The muturu breed is superior in reproductive efficiency (Adeniji, 1985; Ezekwe and Kamalu, 2000) compared to larger tropical Zebu cattle breed and very fertile with a capacity to produce one viable calf per annum (ILCA 1979; Adeniji 1985). They are hardy and are reared mainly as beef cattle. They mature earlier than the Zebu and the intervals between consecutive calvings are shorter (Adebambo 2001). However, they are an endangered species of

indigenous cattle (Gwaza and Momoh 2016) which are gradually going into extinction as their population continues to dwindle due to discontinuation of its rearing from majority of its traditional production systems where they were popularly reared.

The population of Muturu breed of cattle in Nigeria has continued to decline drastically for several reasons as documented (RIM 1992; Adebambo 2001; Gwaza *et al.* 2018). To reverse this trend and enhance its conservation and renewed production, there is need to document its distribution, production systems analysis and on-station evaluation of its growth and reproductive potentials. Also, in the face of global climatic change, conservation of valuable genes in locally adapted breeds is of great priority in planning genetic improvement of livestock breeds for immediate use and future food security. In view of the above potentials and the urgent need to address the decline in population size of Muturu cattle, this study was designed to geo-reference the production locations of Muturu cattle in Southwestern parts of Nigeria and to analyze its production systems, demography of the farmers, constraints and opportunities of the breed within the locations identified.

## **Methodology**

The study was carried out in Ogun, Ondo and Lagos states which were purposively selected in southwest Nigeria based on the information that Muturu cattle are reared in those states. From each state, the Local Government Areas (LGAs) where the cattle were reported to be dominant were also purposively selected. Yewa South, Ado Odo and Ipokia Local Government Areas (LGAs) were selected in Ogun state, Badagry LGA was selected in Lagos State and Ilaje LGA in Ondo State. A total of sixteen communities were selected as locations where Muturu cattle were reared

in the region. From these sixteen communities, a total of sixty-eight cattle farmers were interviewed for the study. Information and data were obtained from the cattle farmers using structured questionnaire which were administered

through personal interview schedules. The spatial dataset of identifiable communities where Muturu cattle are reared were also collected with the use of Global Positioning System (GPS) for the identification of positions of the communities in the study areas (Fig. 1).



**Figure 1: Map showing surveyed Muturu cattle locations in Southwest Nigeria**

## **Results and Discussion**

### ***Socioeconomic characteristics***

Table 1 shows the socioeconomic characteristics of the cattle farmers in the study areas. Average age of the cattle farmers was 47.6 years (51.2 years in Ogun state, 44.6 years in Ondo state and 43.6 years in Lagos state). However, the percentage of cattle farmers (69.1%) within the age bracket of 31-60 years in this study was higher than 62% reported by Taiwo *et al.* (2007) of cattle farmers in Ibadan which is also located in Southwest Nigeria. The age range further shows that the cattle

farmers are within their active age and economical productive group. Majority (88.2%) of the respondents were male. This is an indication that rearing of Muturu cattle is predominantly a male-business. The low percentage (11.7%) of female is expected because traditional method of cattle management demands much energy and money to survive the stress required in cattle rearing. This shows that rearing of cattle is gender based and it is similar to findings of Taiwo *et al.* (2007) and Aruwayo *et al.* (2015) that ruminant production is male dominated.

**Table 1: Socioeconomic characteristics of respondents**

<b>Variables</b>	<b>Frequency (N=68)</b>	<b>% of farmers</b>
<b>Sex</b>		
Female	8	11.7
Male	60	88.2
<b>Age (years)</b>		
30 and below	6	8.82
31-40	16	23.5
41-50	16	23.5
51-60	15	22.1
Above 60	15	22.1
<b>Formal Education</b>		
None	20	29.4
Primary	22	32.4
Secondary	23	33.8
Tertiary	3	4.41
<b>Marital status</b>		
Single	3	4.41
Married	65	95.6
<b>Household size</b>		
1-5	12	17.7
6-10	44	64.7
Above 10	12	17.7
<b>Cattle rearing experience (years)</b>		
Below 5	9	13.2
5-10	18	26.5
11-20	14	20.6
Above 20	27	39.7

Source: Field survey, 2020

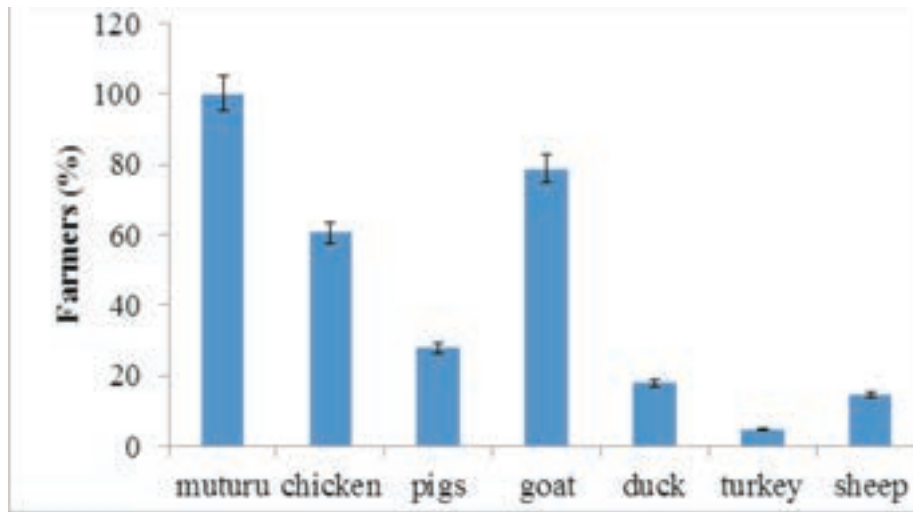
About twenty-nine and half per cent (29.4%) of the farmers had no formal education. However, majority (70.6%) had some level of formal education with thirty-eight per cent (38.21%) having a minimum of secondary education. This could contribute positively to the adoption of new innovations for improvement of Muturu cattle. The relatively fair formal educational level in the study areas might be attributed to the high priority and values placed on formal education in Southwest Nigeria. Average household size for more than half (64.7%) of the farmers in the three states was eight persons. With regards to having any formal training in cattle rearing and management, only 4.41% of the farmers had undergone some form of training. This implies that majority of the farmers acquired the skill or indigenous knowledge for cattle rearing and

management from their parents, family members or friends. It can also be deduced from the study that 63.9% of the respondents had cattle farming as their primary occupation while 36.1% had other vocations (trading, fishing, barbing, transportation business, welding, clergy and bricklaying) as their primary occupation. Crops cultivated in addition to cattle rearing by respondents include cassava, maize, tomatoes, peppers, cucumbers and oil palm. This implies that majority of the respondents in the study area are sedentary farmers which was in agreement with the findings of Charray *et al.* (1992), who reported that majority of rural households in Africa keep small groups of ruminants in conjunction with crop production.

Other livestock raised in addition to Muturu cattle by the respondents (Figure 2) implies

that the agro-ecological environment of the study area is suitable for survival of the stock. This finding further revealed the sedentarization of the farmers in the study area which is responsible for their keeping of monogastrics in addition to ruminants. The higher goats and chicken might be due to the low investment requirement and quick turn over rate. Rearing of other

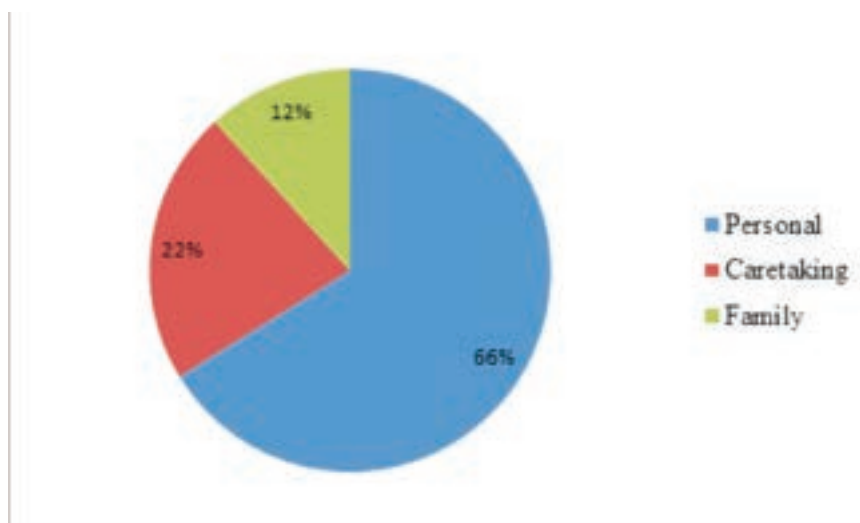
livestock could also be for consumption and to supplement cash income from the sale of Muturu cattle. The low percentage of turkey reared in the study area could be due to lack of technical know-how or managerial skill. Furthermore, integration of other livestock with Muturu cattle might be due to the cultural life style and farming system of Nigeria's peasantry (Ajala 2004).



**Figure 2: Livestock reared by respondents**

With an average of twenty (20.0) years of cattle rearing experience, most of the farmers are knowledgeable in cattle management. These farmers used the indigenous knowledge and experience of cattle management passed down to them through several generations. Average herd size of Muturu cattle raised per farmer varied from state to state (three in Ogun state, four in Lagos state and four in Ondo state). Despite being a trypanotolerant breed of cattle indigenous to South West humid Nigeria, the low herd size of Muturu cattle recorded in the study area clearly

revealed that the breed is at risk of extinction as reported by Adebambo 2001; FAO 2013; Gwaza and Momoh 2016; Gwaza et al 2018. Also, the low herd size could negatively affect the success of intervention breeding program needed to increase the population and distribution of the cattle across the humid agro-ecological zone, which is in line with Okpeku et al (2019) and Gwaza and Momoh (2016) as regards the challenges to genetic improvement of indigenous livestock in Nigeria.



**Figure 3: Ownership of Muturu cattle**

A high percentage (66.2%) of the farmers owned the cattle they reared while 11.8% reared family cattle and 22.1% were involved in cattle caretaking belonging to other people (Figure 3). The system of cattle ownership (personal and care-taking) in this study agrees with the findings of Olafadehan and Adewumi (2010). Care-taking of cattle belonging to other people also corroborates the observation of Agyemang et al (1997). The percentage of those who reared family cattle, though low, implies that some households in the study area reared Muturu cattle. Reason for

rearing cattle as reported by some (44.1%) of the respondents was for only commercial beef production. Others (8.82%) reported it as a means of financial insurance. Forty-five per cent reported a combination of reasons for rearing Muturu cattle. Despite the small body size of Muturu, the aforementioned reasons revealed that the breed of cattle contributes to the social and economic status of the farmers in the study areas. This corroborates the reports of Adedeji et al (2011), Adebambo et al (2011) that livestock play important roles in dietary needs and socio-cultural activities of the owners.



**Figure 4: Muturu cattle in study location**

**Morphometric Characterization of Muturu cattle**

The colour shades of Muturu cattle observed in the study areas include black and white, black with some white patches, brown with some shades of white, ebony black, black with white spots. (Figure 4). These are similar to the coloured variants and morphometric characterization of Muturu breed of cattle observed (Adebambo, 2001) in the Southern agro-ecological zone of Nigeria. The coat colour was dominated by black colour. Some black roan and red roan were observed with very few reds. The effect of the dilution gene causing greyed coloured animals was also observed. The multiplicity of these colour types show that the Muturu cattle breed is not yet standardized and it also indicates uncontrolled breeding method in its production system. Furthermore, the preponderance of the black and black with white coat colours indicates the high genotypic frequency of the dominant melanocortin 1 receptor gene (MC1R) within the Muturu cattle population.

**Cattle management system**

Generally, cattle are traditionally managed in the derived savannah of Southwestern Nigeria (Olanite et al 2003). Therefore, all the farmers in Ogun and Lagos states practiced tethering of their cattle. Tethering was reported to be the traditional practice to

avoid crop farm invasion by the animals which could lead to the disruption of peace between individuals and in the community at large. Cattle are tethered all day long with ropes long enough to allow them move freely within a particular radius, usually about ten yards long to graze. In Ondo state however, the management of Muturu cattle was observed to be communal management system where all the cattle in the community are pooled together and managed as one herd. This agrees with the finding of Rege et al (1994) who observed that communal production system of Muturu was common in Ondo state. In this case, all the animals graze together as a herd and sleep together in public spaces. However, the healthcare of each animal is the responsibility of the individual owner. This is consistent with the observation of Gwaza et al (2018) who equally reported communal management system for savannah Muturu cattle in the Benue trough of Nigeria.

**Feeding**

Animals grazed daily for an average of ten hours on uncultivated land areas while on tether. Cattle are usually taken between 6.00am and 8.00am to the location for grazing where they are tethered using ropes of about ten yards long for each animal. Distance from homestead to grazing location varied from 100 metres to 2.5 kilometres.

**Table 2: Dry season feed supplements given to Muturu cattle by farmers**

Dry season feed supplement	% of farmers
None	30.9
Farm/crop waste	58.8
Wheat offal + crop waste	1.47
Cassava leaves	1.47
Banana leaves + cassava leaves	1.47
Rice-water	5.88
Salt-lick vitamin/minerals	2.94

Source: Field survey, 2020

Feed supplements given by some of the farmers particularly in the dry season include dry cassava peels, fresh cassava peels, cassava leaves and rice-water (Table 2). Feed types offered as supplement during the dry season as indicated on Table 2 shows that high percentage (60.3%) of the farmers feed their cattle with post-harvest wastes while 30.9% of the farmers have no provision for dry season feeding. This indicates that farmers depended on post-harvest wastes (maize stover, banana leaves and cassava leaves) as maintenance ration for their cattle when green forages are inadequate during dry season. This is consistent with the reports of ILCA (1994) and Olafadehan and Adewumi (2010) that sedentary pastoralists feed their cattle with crop residues from their crop field after

harvesting at no cost. The implication on cattle of 30.9% farmers who have no provision for dry season feed supplement is poor growth performance and low productivity which does not guarantee quick returns on investment in the study area. From the interview schedules, only 2.94% of the farmers gave salt lick as mineral supplement to their cattle, 16.2% gave table salt in water while the rest gave no mineral supplement.

#### **Health**

The slogan 'health is wealth' applies greatly to the importance and care given by farmers to their cattle. Table 3 shows that majority of the farmers engaged the services of veterinary personnel in the treatment of their animals and observed routine healthcare practices such as deworming.

**Table 3: Health personnel engaged by farmers for care of Muturu cattle**

<b>Health personnel</b>	<b>% of farmers</b>
Veterinary doctor/Animal health technologist	70.6
Self-medication by farmers	4.41
Veterinary doctor + self-medication by farmers	5.88
None	19.1

**Source: Field survey, 2020**

Healthcare accounted for 71.7% of total management cost, which revealed the willingness of the farmers to have healthy animals. Though lower percentage of farmers treated their animals by themselves, engagement of veterinarian further suggests that the farmers are well informed of the essentials of observing adequate healthcare practices of their animals. The fraction (19.1%) of farmers that neither engage the services of veterinarian nor treat their animals by themselves might be associated with financial constraint or nonchalant attitude of the farmers as regards healthcare management practices of animals.

#### **Breeding**

Muturu cattle have been reported to be very fertile with potential of producing a viable calf per year. Adebambo (2001) reported

the age at first calving for Muturu cattle to be 635 days (1.74 years) and calving interval as 350 days. It was found from farmers under this study that the young cow needs to be strong enough to carry calf to term. Thus average age at first calving was found to be 2.78 years. Cattle were allowed to breed through flock-mating by 55.9% of the farmers while 27.9% of the farmers tether-mated their cattle, in which case the cow is tethered while the bull is let loose to mate the tethered female. On the average, breeding cows are replaced after eight calvings or at about thirteen years old while breeding bulls are replaced at about five years old (4.75 years).

#### **Marketing**

Farmers sell their Muturu cattle live at Farmgate. However, demand is currently higher than supply as farmers many times

do not have appropriate stock (number and age) when buyers make demand for them. Growers are usually sold at the age of between twelve to eighteen months.

**Land use system**

**Most of the areas surveyed are locations where farming activities are intensified, which prompted the traditional tethering practice by the livestock farmers in order to**

avoid invasion of crop farms by the animals. As displayed in Figures 5 and 6, geographical information revealed that 86.7% of the locations where the cattle are reared are within the intensive (row crops, minor grazing) smallholder rain-fed agriculture land use system while 11.7% and 1.6% were located around Agricultural Tree crop plantation and Mangrove forest areas of the study areas respectively.



Figure 5: Map showing Land use classification of Muturu locations in Ogun and Lagos States.

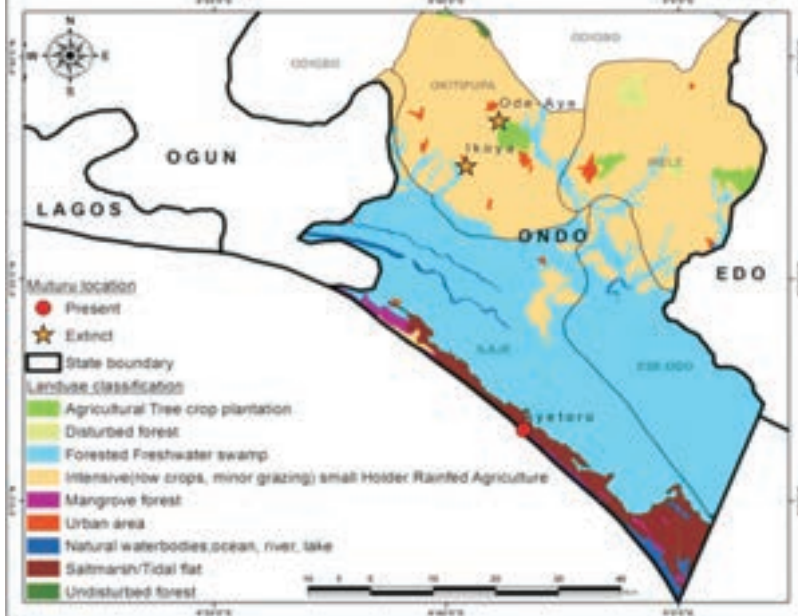


Figure 6: Map showing Land use classification of Muturu locations in Ondo State.

The process of urbanization poses a great threat to Muturu cattle rearing. This is apparent particularly in Lagos state where farmlands and animal-feeding patch lands are disappearing to give way to residential buildings. Ikoya and Ode-Aye communities of Ondo state have experienced the building of residential units which have taken over feedlots of Muturu cattle that were raised freely up until about ten years ago. This breed of cattle is no longer found in these two communities.

#### **Constraints**

Constraints reported by Muturu cattle farmers include scarcity of forages during dry season, death of animals associated with the consumption of certain leaf-insects during early rainy season and lack of funds for business expansion. Location-specific constraints include the threat of losing grazing fields to fast urbanization in Lagos state. In Ondo state, there is the threat of extinction of the Muturu cattle due to climate change – During the rainy season, some of the animals are swept away by flood while the sea also flows over into the streams and rivers, making them salty and unfit for animal drinking.

#### **Conclusion**

The survey is a step forward to the breeding and multiplication of the Muturu breed of cattle which is the indigenous breed in Nigeria. It is an endangered species with average production size of three heads of cattle per farmer in the study area. The breed is no longer available where they were found ten years ago. The demand for the calves and bulls is high as people demand for them from within and neighbouring communities. With the current level of herd size and environmental challenges such as urbanization and dry season feed scarcity, the Muturu breed of cattle in Southwest Nigeria is at a high risk of extinction. There is therefore need for the

genetic conservation of this great cattle breed.

#### **Recommendation**

1. The Muturu breed of cattle which is indigenous to Nigeria, is Trypano-tolerant, hardy and has good body conformation. It is therefore important that this cattle breed be conserved, multiplied and made available to farmers.
2. Fund should be made available for research into breeding, production and distribution of the breed to the agro-ecological zones in the country where it can thrive. This will aid in the multiplication of the pure cattle breed.
3. Youth should be encouraged to engage in cattle production by training them and supporting them with incentives to enhance their production line.

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