

Present Tractorization Density and Functional Tractor Distribution in Nigeria.

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Abstract

Despite its vast human and natural resources, Nigeria has not been able to produce enough food to feed her citizens and still depend on importation of several food substances that can be produce locally. The source of power for agricultural operations in Nigerian has been largely based on rural labour force using simple traditional implements such as hoe and cutlass on small and scattered farm holdings. Land clearing and other tillage practices are done manually with the use of cutlasses and hoes. Manual land preparation involves a lot of stress and inefficiency on the field and also reduce the area of land cultivated compared to when tractors are used. Tractorization, which is an aspect of agricultural mechanization is still far from increasing the rate of farming earnings, productivity and food security because the use of tractors is still very low in Nigeria. Government has provided various tractor services its effort to enhance tractorization. Yet the effect is far from being felt. Limited data is available on the number of tractors currently in use in different states of the country, hence, a survey was undertaken to ascertain the present tractorization density of Nigeria. One (1) state in each region, three (3) senatorial districts in each state, two (2) local government areas per senatorial district and three (3) agrarian sites/communities in each local government areas were randomly selected for the study. The survey revealed that tractorization density is low in Nigeria with five (5) functional tractors chasing 100ha of arable land. This will provide reliable data that would help government in policy planning and implementation and also serve as guide for would be investors, national and international donor organizations who want to key into enhanced agricultural productivity in Nigeria.

Keywords: Density, Distribution, Functional and Tractorization.

1. INTRODUCTION

Nigeria is blessed with natural resources that are supportive to agricultural productivity and food security. Nigerian agricultural sector is characterised majorly by crop production contributing 29.15% of Nigeria's total GDP in 2017 (NBS, 2017). It is endowed with about 84 million hectares arable land, great irrigation potential with surface water volume of about 267.7 billion cubic meters from 171 dams of various sizes and a total storage capacity of 36.7 billion cubic meters. Only 30.7 million hectares (33%) of the arable land is being cultivated (Ayoola, 2009; Chauvin et al., 2012; Lipton, 2012 and Othman, 2017).

Despite these vast human and natural resources, Nigeria has not been able to produce enough food to feed her citizens and still depend on importation of several food substances that can be produce locally. The source of power for agricultural operations in Nigerian has been largely based on rural labour force using simple traditional implements such as hoe and cutlass on small and scattered farm holdings. Land clearing and other tillage practices are done manually with the use of cutlasses and hoes. Manual land preparation involves a lot of stress and inefficiency on the field and also reduce the area of land cultivated compared to when tractors are used (Aromolarai *et al.*, 2002).

On-farm labour cost is rising due to rural- urban migration which contributed to increase in farming wages; hence, farmers pay more and get less output in term of farm operations (Oseni and Winters, 2009; Reardon et al., 2000). The need to replace human power with engines for farm operation cannot be over emphasized with 80% of food produced in Nigeria coming from small holder farmers which constitute more than 70% of the farming population (Adekanye, 2014). According to Aromolarai *et al.*, (2002), labour requirement for farm operations can be reduced from 90% to about 50-60% for mechanized farming. This would make labour available for alternative use and improve standard of living.

Tractorization, which is an aspect of agricultural mechanization is still far from increasing the rate of farming earnings, productivity and food security because the use of tractors is still very low in Nigeria. FAO's definition of tractors only covers 4-wheel machines and excludes 2-wheel power tillers despite performing the same tasks as 4-wheel tractors narrowed down the tractorization density of Nigeria to only 4-wheel tractors (Biggs et al 2011). There is need to increase the application of tractorization technologies into the field of agriculture in order to improve agricultural output, as well as deliberate conscious departure from the peasant and subsistence agriculture into a commercial agriculture (Adekanye, 2014). The demand for tractorization is highly affected by farmers' agro-ecological environment and resource constraints.

Most Nigerian farmers are low income earners and cannot afford most tractorization technologies. Hiroyuki *et al.* (2013) reported that only 6 percent of the country’s farmers used 4-wheel tractors, either owned or rented during rainy season of 2010.

PrOpCom, (2011), reported that government has provided tractor services in three categories in its effort to enhance tractorization: (1) the direct purchase and subsidized sale of tractors (including popular brands like Massey Ferguson and New Holland); (2) subsidized public-private partnership with bank loans and (3) publicly owned tractors for hire such as through the tractor hiring unit at the Agricultural Development Project (ADP) in each state. More efforts need to be put into making tractors available to farmers at a subsidized rate in due season.

Limited data is available on the number of tractors currently in use in different states of the country, hence, a survey was undertaken by selected team of professional largely agricultural engineers to ascertain the present tractorization density of Nigeria. This would help government in policy planning and implementation. It would also serve as guide for would be private investors, national and international donors who want to key into enhanced agricultural productivity in Nigeria.

2. MATERIALS AND METHODS

2.1. Study Area

The study area lies between longitudes 3 - 14°E and latitudes 4 - 14°N. The states selected and surveyed were Akwa-Ibom (South-South region), Benue (North-Central region), Ebonyi (South-East region), Kebbi (North-West region), Ogun (South-West region) and Taraba (North-East region) as shown in figure 1. Two (2) Local Government Areas from the three (3) senatorial districts in each of the selected states were surveyed. The states, local government areas and the study sites were randomly selected.

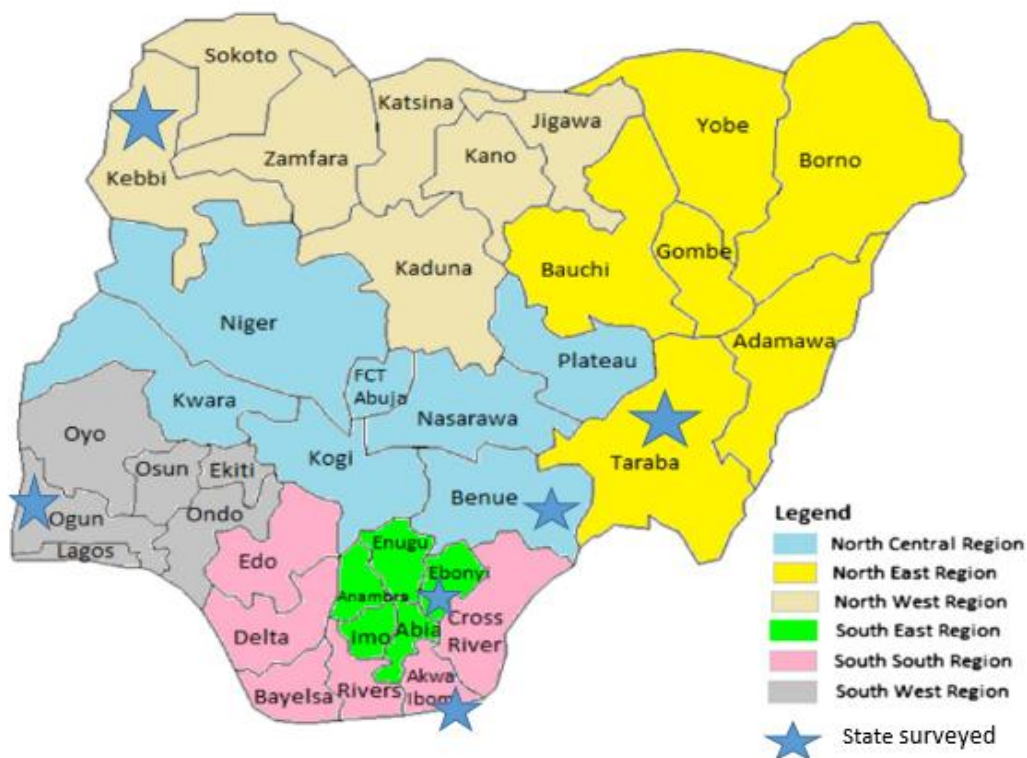


Figure 1. Map of Nigeria showing the Geopolitical Regions and the States Surveyed.

2.2. Study Procedure

Primary data collection was used for the survey through the administration of well-structured questionnaires for farmers, processors, tractors and machinery operators, government and private agricultural organizations, dealers in agricultural machines, etc. The survey lasted two (2) years. Enumerators from each of the state ADPs were trained on the administration of the questionnaires followed by testing of the questionnaires through preliminary survey which involved the administration of 360 questionnaires (60 per State). After the preliminary survey, needed corrections and

amendments were made on the questionnaires and the data base to meet the project objectives. The full survey was undertaken in the six states (one in each geo political zone) for seven (7) months. Data collation, analysis, result and report presentation followed.

2.3. Sampling Design

Stratified sampling design was used in the study. Six (6) geopolitical regions in Nigeria, one (1) state in each region, three (3) senatorial districts in each state, two (2) local government areas per senatorial district and three (3) agrarian sites/communities in each local government areas were randomly selected for the study. A total of 3240 respondents were sampled and investigated but 3201 questionnaires representing 98.80% were retrieved out of the 3,240 administered questionnaires (526 respondents were from Akwa-Ibom, 530 from Benue, 540 from Ebonyi, 527 from Kebbi, 542 from Ogun and 536 from Taraba).

2.4. Scope/ Limitation

The scope of the study was on the present in some selected agrarian communities in Nigeria. The survey was conducted in 6 out of the 36 states and the federal capital territory of the nation due to paucity of funds. Each state was randomly selected from the six geopolitical regions. Individual famers, farmers’ cooperatives and government establishments in the agricultural sector served as primary source of data. The questionnaires were administered by trained enumerators selected from the ADPs in each state. The outcome of the survey is a fair representation of the scenario of in tractorization density Nigeria.

3. RESULTS AND DISCUSSIONS

3.1. Functional Tractor Distribution

The survey revealed the distribution of functional tractors in Nigeria (Figure 2) as follow, Akwa Ibom state having the highest (321) followed by Ogun (259), Benue (198), Taraba (188), Kebbi (159) and Ebonyi (10). Looking at this distribution and the area of land under cultivation, it is clear that tractors would be overworked during planting season. This would lead to shortening of the useful life span and efficiency of the tractors.

3.2. Tractorization Density

Tractorization density is the number of functional tractors available for a given area of arable land. The survey revealed (table 1) the area under cultivation (Ha) and the number of functional tractors per respondent states (Figure 2). It is mathematically presented in equation 1.

$$Tractorization\ Density\ (TD) = \frac{Land\ Area\ under\ tractor\ cultivation\ (ha)}{Number\ of\ Tractors\ used\ for\ cultivation} \tag{1}$$

$$TD = \frac{22291.5ha}{1135} = 19.64\ ha\ per\ tractor$$

$$\approx 20\ ha\ per\ tractor$$

The survey revealed that five (5) functional tractors are available for 100ha of arable land in the sampled states; this is very low. The value falls within the range of 10 tractors per 100ha reported by Taiwo (2014) and 7 tractors reported by Kasali (2018). This is grossly inadequate compared to 241 tractors per 100ha in Indonesia (Taiwo, 2014).

Table 1. Regional representation of area under tractorization in Nigeria.

S/N	State	Regional Representation	*Area under tractorization (ha)
1	Akwa-Ibom	South-South	3,492.5
2	Benue	North-Central	3,861.0
3	Ebonyi	South-East	3,028.0
4	Kebbi	North-West	4,168.0
5	Ogun	South-West	4,514.5
6	Taraba	North-East	3,227.5
Total			22,291.5

*Statistical average of cultivated arable land area

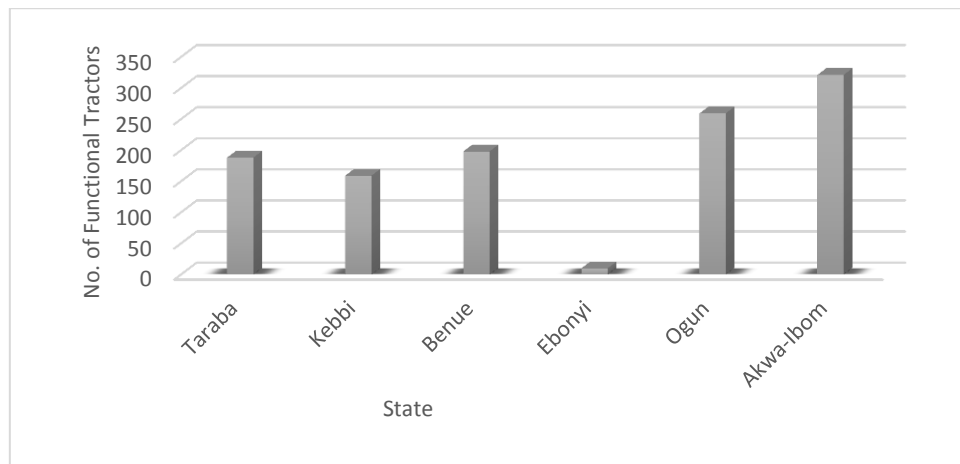


Figure 2. Regional representation of functional tractors in Nigeria.

4. RECOMMENDATIONS

The following recommendations are highlighted for improvement and sustainability of agricultural tractorization in Nigeria:

- i. The government of Nigeria should evolve the long awaited agricultural mechanization policy with an efficient implementation strategy to enhance tractorization of Nigerian agriculture.
- ii. Proper agricultural land development should be embarked on by the federal government in collaboration with the private sector to set the standard for mechanized land development in Nigeria.
- iii. The importation of tractorization technologies which can be manufactured locally should be controlled to strengthen and encourage local fabricators of the technologies.
- iv. The capacity of local fabricators should be improved through hands on training locally and internationally.
- v. All agencies of government that are involved in the provision of tractorization services in the agricultural sector should be alive to their responsibilities.
- vi. There should be an exchange programme between Nigeria and countries where identified agricultural technologies are available for possible importation, adoption and adaptation of such technologies in Nigeria.
- vii. Government should encourage public-private-partnership (PPP) investment in the agricultural sector to increase its capacity especially in the establishment of mechanization Centres across all LGAs to make mechanization accessible to all farmers and other interested practitioners in agriculture.
- viii. Periodic survey should be carried out to appraise the progress made in tractorizing Nigerian agriculture.

5. CONCLUSION

The present tractorization density of Nigeria is very low as revealed by the survey; with five (5) functional tractors available for 100ha of arable land. Synergetic efforts should be made between government, private sector, national and international donor organizations to improve the use of tractors as source of power for tillage and land preparation operations. This would increase productivity, boost the performance of the sector and enhance food security.

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