

Appraisal of Agricultural Mechanization in Udi Local Government Area of Enugu State, Nigeria

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Abstract: *Udi Local Government Area is a major food producing area in Enugu State of Nigeria, but over the recent years, there has been a general decline of crop yield in the area, and one of the factors that affect that agricultural output is the level of mechanization practices, thus leading to the appraisal of agricultural mechanization in the area. Nine (9) communities were randomly selected from the three Agricultural and Geographical zone that made up Udi Local Government Area and these include; Udi North, Udi Central and Udi South. Data were analyzed using descriptive statistics. Results shows that 90% of the farmer's practice subsistence farming, 98% of the farmers use locally made tools and 78% of the farmers repair their broken implement by themselves. Based on the findings, the research recommended that adequate farming education program, training, seminar and workshop practice to the farmers are required in improving their knowledge of new techniques and technologies, although existing methods/manned operations can be efficient over large areas using locally made tools. There will be potential increase of higher efficiencies when full mechanization take place, and proffered solutions implemented.*

Keywords: mechanization, farm land, crops, population, agricultural yield

1. Introduction

The agricultural mechanization in Udi Local Government Area of Enugu State, Nigeria, has become imperative considering the versed agricultural potentials that abound in that area. The arable farmland should be harnessed properly through mechanized agricultural technology by farmers for optimum productivity and utilization of farm produce and products for economic benefits, increased food supply and to improve the farmers' financial status. According to (Oluka et al, 1999), agricultural mechanization is described as application of engineering principles and technology in designing, developing, manufacturing, selecting, testing, adopting, operating, and maintaining tools, implements, machines, structures, and other technological systems and gadgets for improved agricultural production. Agricultural mechanization can also be described as the selection and efficient use of agricultural machineries for crop production including harvesting and post-harvest operations (Imonigie, 2007). In line the above definitions, therefore, the crucial factors in agricultural mechanization business are machinery selection and efficient utilization. The adherence to lay down procedures for the selection process enhances the effectiveness of agricultural mechanization most especially in the aspect of machinery maintenance (Imonigie, 2007). Very importantly, good selection needs to be complemented with proper machinery utilization to justify the usual huge investments on procurements of farm machinery and equipment for mechanization. Inadequate operation or utilization is always attended with premature machinery failure and, consequently, financial losses, (Imonigie, 2007).

In the past, various agricultural operations in the society involved the use of drudges with the attendant negative effects such as low work output rates, poor finishing, food inadequacy for the populace, etcetera. Later, intensive agricultural mechanization was adopted as an important tool to avert this drudgery and to raise agricultural

production from subsistence level to foreground of wealth creation, rural industrialization, poverty alleviation and famine/malnutrition eradication as well as to match the desired needs of population explosion (Segun, 2012). In the same vein, mechanization provides the necessary anchor for sustainable agriculture or a boost in agriculture, (Imonigie, 2007). Therefore, agricultural mechanization, if practiced fully, will reduce boredom and drudgery in our farm operations; provide good finishes for manually unattainable farm operations; reduce labour requirements and enhancement of agricultural production through higher rates of work output; enhancement of timeliness and profitability in farm operations, etcetera. (FAO 2008). Udi L.G.A inhabitants are predominantly Local farmers notable in the production of farm crops like yam, cassava, maize, melon "egusi" local cowpea "akidi". The use of local farm implements such as matches, hoes, spade, shovel, digging fork etc. demand much human muscle as the power source in farm operations. This is typical of what is obtained and applied by farmers in Udi L.G.A and therefore only Limited Land area could be cultivated. Agricultural engine powered machinery technology is therefore desired in Udi L.G.A for increased farm production since it is the highest level of agricultural mechanization commonly used in agriculture today. Therefore, the objective of this research is to appraise the level of agricultural mechanization in Udi Local Government Area, which is one of the major food sources of Enugu State.

2. Research Design / Methods

The study was conducted using questionnaires. These questionnaires were developed and administered to the farmers. Each of the respondents was visited either in the farm or at home. The literate respondents filled the questionnaires while the illiterate ones were assisted in completing the questionnaires. The questionnaires consisted of four types; A, B, C and D. Type A sought information on the socio-economic characteristic of the

farmers, type B sought general information from farmers' educational background, types of farming and total farm size. Type C sought information about the farmers' land preparation for cultivation, actual farm implement use in farming, and procurement of implement and its maintenance. While type D sought information on type of crops grown, land preparation and sequence of precedence. These questionnaires were administered at random to farmers of the nine communities selected.

3. Location of the Study Area

Udi Local Government Area is situated in Enugu State of Nigeria. It has an area of 897km² and population of 234,002 (two hundred and thirty-four thousand and two), (NPC 2006), with coordinates 6° 19'N and 7° 26' E. It is located in the region of tropical rainforest belt. Its annual rainfall

ranges between 15 to 203cm, and the prevailing temperature is between 32 and 87°C. The meteorological report indicates that the study area (Udi L.G.A) is hottest between February, May and October months. The rainfall peak is in July and September each year. The communities that make up the three Agricultural and Geographical zone in Udi L.G.A include: Abia, Abor, Affa, Agbudu, Akpakwume, Amokwe, Awhum, Ebe, Egede, Eke, Nachi, and Ngwo. Others are Nsude, Nze, Obioma, Obinagu, Okpatu, Udi, Ukana, Umuabi, Umuaga, Umulungbe, Umuoka. The research project was carried out by random selection of nine communities from Udi North, Udi Central and Udi South which are Ebe, Egede, Eke, in (Udi Central), Obinagu, Umuabi and Umuaga, in (Udi South) while Abor, Awhum, and Umulungbe in (Udi North) out of 23 communities in the study area.

Table 1: The three Agricultural and Geographical zone in Udi Local Government Area

| Udi North | Udi Central | Udi South |
|-----------|-------------|-----------|
| Affa | Abor | Abia |
| Akpakwume | Ebe | Agbudu |
| Awhum | Egede | Amokwe |
| Nze | Eke | Nachi |
| Okpatu | Ngwo | Udi |
| Ukana | Nsude | Umuabi |
| Umulungbe | Obioma | Umuaga |
| Umuoka | | Obinagu |

Table 2: Agricultural/Geographical location of the selected study area in Udi LGA

| Location | Communities | No of Tractors (A) | No of Implement | Land Areas (B)ha | Arable Land (C)ha | Tractorization Index (A/C) |
|--------------|-------------|--------------------|-----------------|------------------|-------------------|----------------------------|
| Udi North | Awhum | 2 | 10 | 84094 | 54006 | 0.0037 |
| | Abor | 3 | 15 | 50456 | 38454 | 0.0078 |
| | Umulungbe | 2 | 10 | 33638 | 22563 | 0.0089 |
| Udi Central | Eke | 1 | 5 | 10679 | 7179 | 0.0139 |
| | Ebe | 1 | 5 | 32035 | 20536 | 0.0049 |
| | Egede | 2 | 10 | 21357 | 11357 | 0.0176 |
| Udi South | Umuaga | 3 | 15 | 49833 | 21833 | 0.0137 |
| | Umuabi | 4 | 20 | 37375 | 11625 | 0.0344 |
| | Obinagu | 4 | 20 | 24917 | 10417 | 0.0384 |
| Total | | 22 | 110 | 344384 | 203730 | 0.0107 |

Source: Field Survey from Enugu State Agricultural Development Program (ENADP) and Udi Local Government Area Headquarter, 2016.

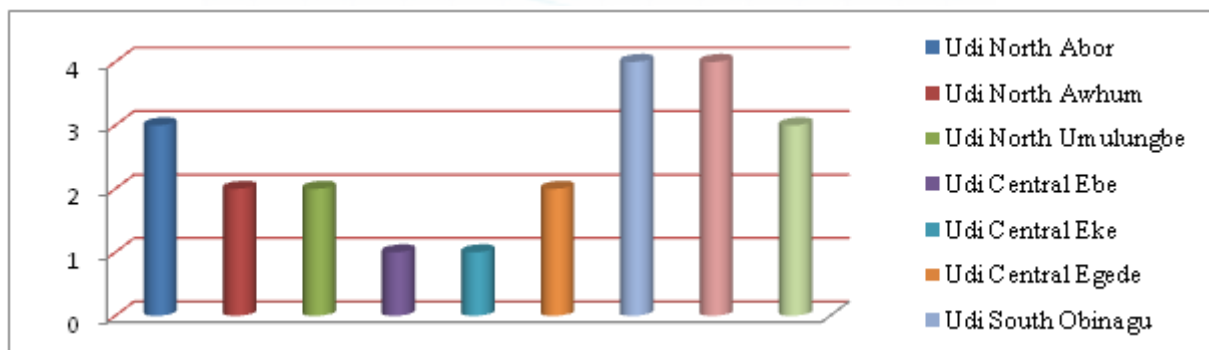


Figure 1: Charts representation of community versus number of tractors

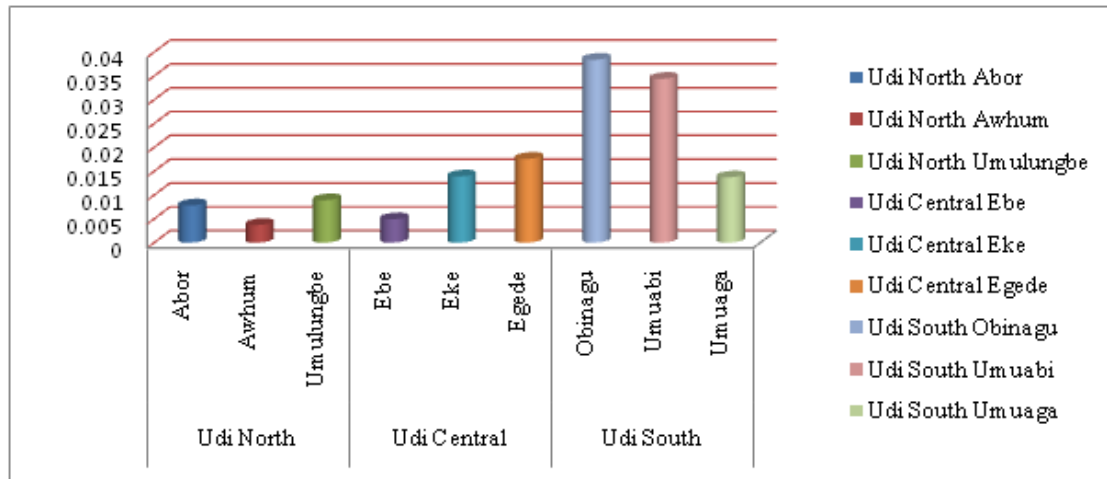


Figure 2: Charts representation of community against tractorization index

Table 3: Appraisal of Agricultural Mechanization in Udi Local Government Area

| S/No | Information | No Available | Description | Location |
|------|--|--|---|--|
| 1 | Agricultural Land Areas in Udi LGA | 897000ha | Total Land Area in Udi communities | Udi Communities |
| 2 | Agricultural Farm and Size in Udi LGA | Numerous | 50ha of Farm Land still indevelopment(Government). | Oghu community boundary between Akpakwume and Nze community. |
| 3 | Agricultural Farm Implements in Udi LGA (Mechanized Tools) | Numerous | Disc plough, Disc Harrow, Disc Ridger, Tipping Trailer, Tools Repairing kits, and Manual guide. | Udi LGA Headquarters and various communities. |
| 4 | Tractor in Udi LGA | 22 | Government ownedand Private owned. | Udi LGA Headquarter and in various communities. |
| 5 | Major Implement/Tools for farming in Udi LGA | Numerous | Hoes, Cutlass, Spades, Baskets, Machetes, lakes, etcetera. | All Communities in Udi LGA |
| 6 | Tractorization Intensity Index in Udi. | None | Very Low; Total power input to Agriculture from any Level of Mechanization to the total hectare under cultivation | All Communities in Udi LGA |
| 7 | Irrigated Farm in Udi LGA | None | Not Available | Not Available |
| 8 | Existing-Irrigation/source of irrigation in Udi LGA | Numerous | Stream/River/Lake | Eke (OguiAgu) =OkwandaAjali. Obioma =Tata. Umuabi =Agbaichekiri. Obinagu =Inyiuba. Umuaga =InyiUbubu, Onunwangene. Udi =Nvanne. Nachi =Gwogwo. Ngwo =InyiOgbodo, Ukwunwakwu, , Ngwo water fall. Nsude =Inyinta, Akparata, Nwnyi. Awlum=InyiAwlum, water fall. |
| 9 | Dominant crops and Types in Udi LGA | Numerous | Cassava, Cocoyam, Yam, Maize, Groundnut, Black beans (Akidi), Bambara nut (okpa), Palm, Vegetable. | All communities in Udi LGA |
| 10 | State of Mechanization of Agriculture in Udi LGA | NA | Human Power | All communities in Udi LGA |
| 11 | Mechanized farm Available in Udi LGA | None (Government)and Few (Private owned) | Private own Mechanized farm both Animal and Crop production | Ngwo =Phinorma poultry farm, Ozokwor poultry. Abia =Saremi world ventures farm, Okwuchukwu cocoyam produce, Fadama cooperative. Obinagu =Nneoma chime farm. |
| 12 | Agricultural Establishment/Institutions in Udi LGA | None | Not Available | Not Available |

Source: Field Survey from Enugu State Agricultural Development Program (ENADEP) and Udi Local Government Area Headquarter, 2016

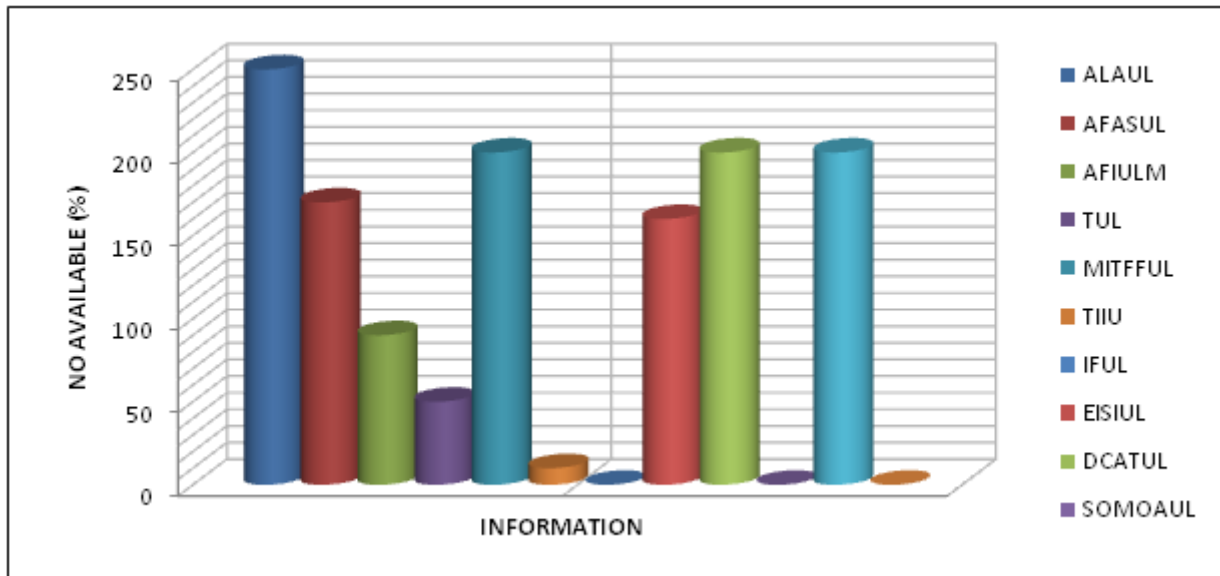


Figure 3: Charts representation on Appraisal of Agricultural Mechanization in Udi Local Government Area.

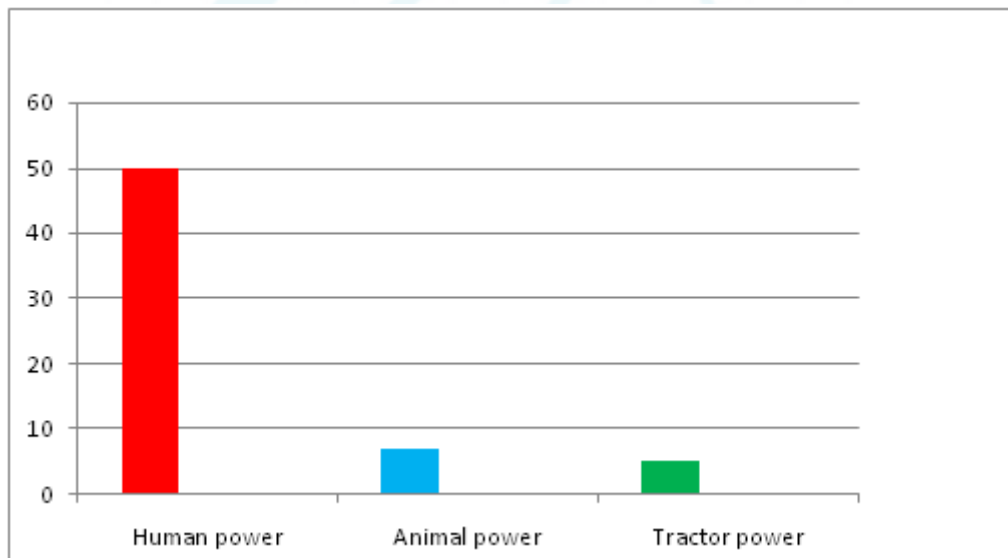


Figure 4: Bar chart on the average percentage input of agricultural production in Udi L.G.A

Table 4: Deduction from farmers. Type A: The socio-economic characteristic of the farmers from the Nine (9) communities of the three Agricultural and Geographical zone comprising Udi North, Udi Central and Udi South

| Socio-economic characteristic | Percentage |
|-------------------------------|------------|
| Gender | |
| Male | 61% |
| Female | 39% |
| Marital status | |
| Married | 75% |
| Separated | 1% |
| Widow | 20% |
| Single | 4% |
| Household | |
| 1 – 4 | 29% |
| 5 – 8 | 49% |
| 9 – 12 | 14% |
| >12 | 8% |
| Age Distribution | |
| <20 | 1% |
| 21 – 30 | 16% |
| 31 – 40 | 24% |

| | |
|-----------------------------|-----|
| 41 – 50 | 25% |
| >50 | 34% |
| Years of farming Experience | |
| 1 – 10 | 6% |
| 11 – 20 | 13% |
| 21 – 30 | 36% |
| >30 | 45% |
| Cooperative Membership | |
| Member | 5% |
| Non-member | 95% |

Table 5: Type B: Type of Farming and Land size.

| S/N | Information | Number of responses |
|-----|------------------------|---|
| 1 | Educational background | No Formal education [32], Primary [58%], Secondary [20%], Tertiary [0%]. |
| 2 | Farming Practice | Part Time farmer [43%], Full Time Farmer [57%] |
| 3 | Type of Farming | Subsistence [95%], Commercial [5%] |
| 4 | Total Farm Size | <5000m ² [100%], 5000-8000m ² [0%], 8000-10, 000m ² [0%], <10, 000 m ² [0%] |

Table 6: Type C: Land Preparation, Implement Use and its Maintenance.

| S/N | Information | Number of responses |
|-----|--|--|
| 1 | How do you prepare your farm land for cultivation | Traditional [89%], Modern [2%] |
| 2 | The actual farm Implement used in your farm | Locally Made [98%], Mechanized [2%] |
| 3 | Why do you choose the implements you mentioned | Availability [51%], Cost [39%], easy to operates [10%] |
| 4 | The Implement you choose in land preparation how did you procure it. | By Purchase [39%], Hiring [17%], Borrow [43%] |
| 5 | Maintenance of equipment | Daily [43%], weekly [57%]monthly [0%] |
| 6 | Repair of broken implement | Self-repair [78%], Mechanics [22%] |

Table 7: Type D: Crops and Planting Sequence

| S/N | Information | Number of responses |
|-----|--|--|
| 1 | What type of crops do you grow | Cassava [48%], yam [28%], maize [34%], others [0%] |
| 2 | In your Land preparation before planting state the land preparation sequence of precedence | Clearing, Stumping, Packing, Ploughing, Harrowing, Ridging, Molding [95%], Others [5%] |
| 3 | Do you sometimes apply zero tillage | Yes [5%], No [95%] |
| 4 | If No why | Normal process of farming [51%], Traditional method of farming [49%] |
| 5 | If Yes why | No Reason |

Source: Field data analysis, 2016.

4. Results Discussion

The results from the questionnaires are summarized in Tables 1 to 3. And Tables 4 to 7 shows the response from Enugu State Agricultural Development Program (ENADP) and Udi Local Government Area Headquarter, Table 4 type A shows the responses from the farmers on the socio-economic characteristic of the farmers. Table 5 type B shows the responses from the farmers on type of farming and Land size and Table 6 type C shows the responses from the farmer on land preparation and implement use while Table 7 type D contains the responses of the farmers on crop types and planting sequence. From the questionnaires administered to the farmers, it was observed that the inability of Nigeria to produce enough food has been attributed to the country's failure to accept farm mechanization to the extent that the greater proportion of the farming population are peasant farmers that depend on manually operated implements.

5. Conclusion

Adequate farmer education program, training, seminar and workshop practice to the farmers is required in improving their knowledge of new techniques and technologies.

Adequate technical knowledge to the mechanics to make use of the right tools and equipment in repair of broken implement.

Although existing method / manned operation can be efficient over large areas using Locally made tools there is a potential and increase of higher efficiencies when mechanization take place.

The appraisal of agricultural mechanization is below that recommended by agricultural extension officers and this has contributed to decline in crop yields.

6. Recommendation

Based on the research finding, the following recommendation can be made:

The local government of Udi should subsidize the cost of farm implements/machinery so that farms can acquire the right ones for specific farm operation and hence reverse the decline in crop yields.

The local government of Udi should strength agricultural financial institution so that farm can access affordable loans to enable them buy the appropriate implements and hence reverse decline in crop yields.

The local government of Udi should rehabilitate the agricultural mechanization services (AMS) station which can assist in giving farmers technical services at appropriate times and at affordable cost.

The local government of Udi should assist in upgrading the skills of Udi services mechanizes so that they can appreciate the need for high quality work in their repair and servicing of agricultural implements.

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