

Assessment of the Edo State of Nigeria Tractor Hiring Services

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ABSTRACT

A study was undertaken to assess the tractor-hiring unit of Edo state, Nigeria. The criteria used were fleet of equipment, personnel and workshop facilities and its impact on the farming populace in the state. The study adopted the use of a questionnaire and interview schedules. Among the information requested from the respondents were access to services rendered by the unit and increment in farm sizes. Records available at the headquarters and zonal offices of the unit provided additional sources of information.

The unit has seven Steyr, 18 Fiat and nine Massey Ferguson tractors, eight ploughs, 17 harrows, seven tipping trailers, two boom sprayers, one fertilizer spreader, three maize shellers, two rotary slashers, one drilling machine, two ridgers and a pick-up van which are located in the various zones of the unit. Most of these equipment are either functional or require minor repairs to be used on the field. There is sufficient number of tractors but insufficient implements to fully utilize them. Workshop facilities and personnel are inadequate. The maintenance culture adopted is customer motivated. This is not a good practice as it has resulted in about 12% of the equipment being abandoned as scraps. There has been a general increase in farmsizes since the introduction of the unit. Some old time peasant farmers have been able to increase the sizes of their cultivated farmlands from below 2.5ha to between 5 and 10ha, while the aggressive new entrants have also been able to establish sizeable farms of over 25ha. This has considerably increased their economic fortunes. Some farmers have however not benefited from the activities of the unit. Three reasons account for this, and these are inability to raise the cost of hiring, the remoteness of their farms, which make them inaccessible to farm machinery and their small holdings, usually below 2.5ha, for which the use of farm machinery is unprofitable. The unit has great potentials for improving the agricultural productivity of the state if the equipment available can be effectively utilized. Recommendations made towards achieving this goal include adoption of regular maintenance culture; staff recruitment, retraining and motivation; upgrading of workshop facilities and establishment of new ones in the zones, and adequate funding by the state government.

Keywords: Edo state Nigeria; tractor hiring, tractor operators, tractor mechanics, farm machinery workshop, farm sizes, farm power.

1. INTRODUCTION

Agriculture was and until the discovery of oil, the mainstay of the Nigeria economy. Agriculture provided employment for well over 60% of the populace most of whom were resident in the remote and rural areas of the country. Though the population engaged in farming was high, most of the farmers were subsistence or peasants, hardly producing enough to meet their individual family requirements and in rare cases only small surpluses to meet the need of the non-farming population and export. With this level of production, the country was still an exporter of some cash crops such as cocoa *Theobroma cacao*, groundnut, *Arachis hypogaea* and oil palm products *Elaeis guineensis* while the country was also self-sufficient in staple food crops such as yam, *Dioscorea spp*, cowpea, *Vigna unguiculata*, maize, *Zea mays* and rice, *Oryza sativa*. (Balogun, 2001; Moorhead, 2005; Anon, 2005)

The introduction of the nationwide universal primary education in the early 1970s and free education in the south western part of the country in 1979, reduced farm labour as many able bodied youths withdrew from the farms to go to school, and thereafter migrated to the urban areas in search of white collar jobs for which most of them were then adequately equipped. (Anon, 1990). The old and less productive were left to till the land and the agricultural production was on the decline. With an ever increasing population, it became increasingly difficult to feed the teeming masses and the country resorted to importing food to supplement the one grown at home (Anon, 2005). It was considered necessary to reverse the trend and the three approaches adopted were the use of improved and high yielding varieties of crops, use of agro-chemicals and expansion of hectareage under cultivation. (Anon, 2005). If the manual labour, which hitherto provided farm power, had dwindled at a time when the farmland had to be expanded, the only option was to increase the productivity of the reduced population on the farm. This required the introduction of methods with power output much more than could be provided manually. Animal traction was introduced to perform such tasks as ploughing and harvesting of crops especially groundnut. This was an improvement over the direct use of human labour but was restricted to environment that supported the survival of the draught animals. The desirability for efficient power sources that could be used under varied climatic and soil conditions motivated the introduction of farm power and machinery into the Nigerian agricultural system.

Farm power may be described as any source of energy that makes power available for farming operations. This includes animal power, wind power, hydro (water) power, electric power, solar power and internal combustion engine, while farm machinery is a collection of machines for farm operations and include all types of implements and devices for applying power on the farm such as plough, harrows, seeder/seed drills and planters, cultivators, harvesters, haying machines and tractors. (Aduayi and Ekong, 1981). The tractor is the most important machinery because it is the prime mover for all the implements. It is the most used and most prone to wear and tear. It is also the most expensive item of all farm machinery. Ellis and Wainwright (1994), put the cost of machinery used in developing countries including Nigeria, at about 30% of the total investment in agriculture while Igbeka (1986), stated that the cost of operating machinery is the largest single farm expenditure.

As a result of the high cost of tractors and implements, equipment ownership was mainly by government through the ministries of agriculture and lately by departments and parastatals whose mandate involved substantial land clearing and development. In order to make the services available to the farming populace who were not economically strong to acquire the equipment, special units were established and referred to as tractor hiring units.

All the 36 states in Nigeria operate tractor-hiring units while a few individuals; cooperatives and parastatals whose mandate include land clearing also maintain a good fleet of tractors and implements that are accessible to farmers at varied charges. It has been argued that the volume of tractors and equipment in Nigeria is not commensurate with the work done by machines on Nigerian farms. Hamidu and Simon (1999) reported that even though the establishment of tractor hiring services were expected to make farmers have access to tractors and implements for various farm operations, this opportunity had not been fully exploited by farmers because of irregular and untimely availability of tractors due to frequent breakdown, lack of spare parts and bureaucratic bottlenecks. Thus farm operations, especially land preparation were still predominantly a manual activity. Yohanna (2001) attributed the low level of farm mechanization in Nasarawa and Plateau states of Nigeria to the frequent breakdown of machinery caused by the hard soil pans and rocks that normally inflict injuries and damages to the tractors and implements. Anazodo (1982) reported that 90% of tractors that operated in some states in Nigeria broke down yearly and that repairs and maintenance cost constitute about 47.7% of operating costs. Ijioma (2000) reported that farmers faced difficulties in obtaining spare parts and after sale services while the scarcity of well-trained mechanics increased the breakdown rate of machinery. Tractor breakdown is, therefore, a major limitation to the use of farm machinery on Nigerian farms.

A failure or breakdown is any inability of a part, component or the whole machine to carry out its specified function, partially or completely. It is as a result of inherent failure in the machine or due to misuse (Apollos, 2001). In most cases, misuse is the cause of breakdown. Misuse is a deliberate act by the user, which reduces the reliability, maintainability and operability of a given machine. It involves the use of a machine in such a way not envisaged by the designer, which may cause damage in, or shorten the life of machine. Machine misuse include use of adulterated fuel, use of machine for undesigned purposes, overloading or over speeding, incorrect adjustments and improper housing. The effects of misuse include decreases in the design and useful life of machine, disruption of production schedules, and increase in downtime and overhead costs.

Maintenance has been identified as one of the practices that could improve the efficiency of farm machinery. The ignorance of it or deliberate attempt to ignore it, could cause a lot of damage to the fleet of equipment. Usman and Bobboi (2003) observed that the main cause of early failure in farm tractors is the failure to adopt preventive maintenance practice. This leads to frequent tractor breakdown and high operating costs. Tuft and Hitts (1982) reported that most machines of the same make and model are designed to have same performance efficiency and life span but the subsequent differences observed in practice are due to the operators, environmental and maintenance practices.

Tractor and implements maintenance can be broadly grouped into preventive and replacement. Preventive maintenance is any action taken in advance of trouble shooting the objective of which is to avoid failure of the machine occurring. The benefits of preventive maintenance are that the time loss due to machine breakdown is minimized or eliminated, maintenance costs are cheaper than replacement, maximum output is guaranteed and prolongs the life of the machine, and also prevent injury due to failure. Preventive maintenance is often carried out at regular time interval or mileage coverage by the equipment as provided by the manufacturer. Radford and Richardson (1977) observed that a more practicable schedule for preventive maintenance could be developed for equipment through keeping records of frequency of unscheduled breakdowns. Replacement maintenance on the other hand is carried out when a machine component has failed and has to be replaced or repaired before the equipment can be put to use. Where this happens, other parts of the machine may also be affected which is expensive to rectify.

Edo state is one of the food basket states in Nigeria and is a major producer of cash crops such as oil palm, cocoa and rubber, and staple food crops such as cassava, yam, cocoyam, grains and cereals. The predominant occupation of the populace especially in the rural areas is subsistence farming. In order to raise the level of agricultural production, there is the need for more productive power sources. The climate does not support the survival of livestock commonly used for animal traction and hence the tractor has become the only alternative to the use of human labour. The state ministry of agriculture has always maintained a few tractors and implements but when it was considered necessary to empower the farmers through the provision of improved labour, the tractor hiring unit was created. At inception, the unit was charged with the responsibilities of maintaining the plants and equipment of the state ministry of agriculture, offering of maintenance service to individuals and co-operative owned equipment, land preparation and other labour services to farmers in the state. This paper examines the activities of the tractor hiring unit with particular reference to equipment inventory and impact on the farming community

2. METHODOLOGY

The Edo state tractor hiring service has its headquarters in Benin City, the state capital. (Fig.1) Towards ensuring effective service delivery to the nooks and crannies of the state, the activities of the unit are executed through five zonal stations. The stations are located at Sabongida Ora, Iguobazuwa, Irrua, Auchi and Ehor

Questionnaires and interview schedules were employed for the purpose of information collection. Among the information sought were sizes of farm holdings, access to the activities of the unit, increment in farm sizes and the unit's response to requests for services. A questionnaire to adequately capture this information was designed (appendix 1) and in order to ensure that it was clear and contained no ambiguity, it was validated and pre-tested with some selected farmers who did not form part of the final respondents. The selection of respondents and data collection were accomplished through the assistance of the extension staff of the state agricultural development project.

Thirty questionnaires were administered to farmers randomly selected in each of the areas covered by the headquarters and five zones, making a total of one hundred and eighty. Additional information was equally gathered through personal communication while administering the questionnaires. Mechanized farms were excluded because they usually own their machinery and don't depend on tractor hiring units. Farmers selected were evenly spread to cover the zones. Records at the headquarters and zonal offices, and interaction with staff of the unit provided additional sources of information. The results were analysed using frequencies and percentages and presented in tables

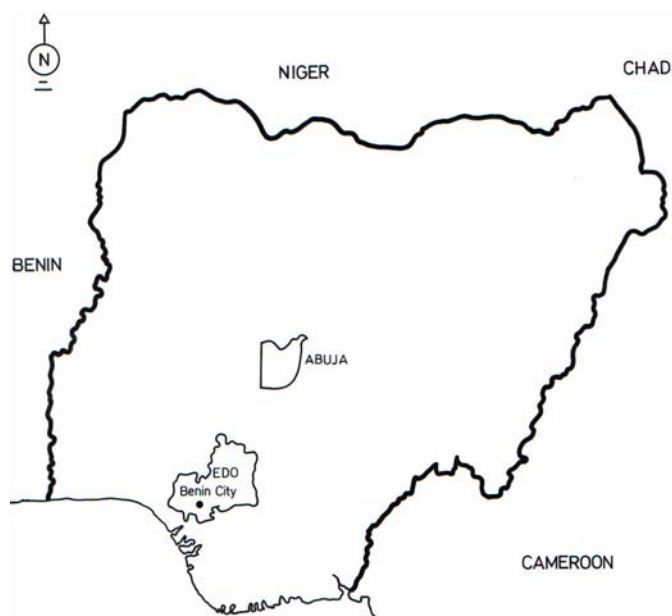


Fig.1: Map of Nigeria showing Edo state

3. RESULTS AND DISCUSSION

3.1 Equipment Inventory and Condition

Table 1 shows the inventory of equipment in the fleet of the unit while Table 2 shows the location of the equipment as at survey period. The inventory includes seven Steyr, 18 Fiat and nine Massey Ferguson tractors, eight ploughs, 17 harrows, seven tipping trailers, two boom sprayers, one fertilizer spreader, three maize shellers, two rotary slashers, one drilling machine, two ridgers and a Pick-up van

In order to ascertain the capacity of the unit for service delivery, the tractors and implement were classified as functional, serviceable and scrap. Scrap was used for those equipment that have broken down to such a state that the unit believes that it may as well be better to acquire a new one rather than invest on its repairs while serviceable was for all those that repairs was a better option to get them back to the field. 20% of the machinery were functional, 68% serviceable while 12% were regarded as scraps. While the number of tractors is considered adequate, the implements are insufficient. Tractors are more or less permanent in the zones to which they are

allocated, while the implements are rotated among the zones depending on the demand. Transferring of implement from one zone to the other could be difficult especially if such an implement is already programmed for jobs in the zone where it was. This practice of rotating implements retards the service delivery as the implements rather than the tractors do the job; the tractor only provides the motive force.

Table 1: Machinery inventory of the Edo state tractor hiring unit

| Equipment | No of Units | Year | | <u>Present Condition</u> | | |
|---------------------------------|-------------|-----------|------------|--------------------------|-------|--|
| | | Purchased | Functional | Serviceable | Scrap | |
| 1. Steyr 768 tractor | 7 | 1987 | 1 | 6 | - | |
| 2. Fiat 80 – 66 18 tractors | | 1992 | 1 | 16 | 1 | |
| 3. Massey Ferguson 375 tractors | 9 | 1998 | 6 | 3 | | |
| 4. Ploughs | 4 | 1987 | 1 | 2 | 1 | |
| | 1 | 1992 | 1 | 2 | 1 | |
| | 3 | 1998 | | | | |
| 5. Harrows | 9 | 1987 | 2 | 5 | 2 | |
| | 5 | 1992 | | 5 | | |
| | 3 | 1998 | | 3 | | |
| 6. Tipping trailer | 2 | 1992 | | 2 | | |
| | 5 | 1998 | | 4 | 1 | |
| 7. Ridger | 2 | 1992 | | 2 | | |
| 8. Boom sprayer | 1 | 1987 | | | 1 | |
| | 1 | 1992 | | | 1 | |
| 9. Rotary slasher | 2 | 1992 | 1 | 1 | | |
| 10. Maize sheller | 2 | 1992 | 1 | | 1 | |
| | 1 | 1998 | 1 | | | |
| 11. Fertilizer spreader | | | | | | |
| | 1 | 1992 | 1 | | | |
| 12. Drilling machine | | | | 1 | | |
| | 1 | 1992 | | | | |
| 13. Isuzu pick-up van | 1 | 1987 | | 1 | | |
| Total | 78 | | 16 | 53 | 9 | |
| % | 100 | | 20 | 68 | 12 | |

Table 2. Zonal location of machinery of the Edo state tractor hiring unit

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| Equipment | Benin City | Sabon Gida Ora | | | |
|---------------------------------|------------|----------------|-------|-------|------|
| | | Iguobazuwa | Auchi | Irrua | Ehor |
| 1. Steyr 768 tractor | 1 | 2 | 1 | | 3 |
| 2. Fiat 80 – 664 Tractors | 4 | 3 | 2 | 3 | 2 |
| 3. Massey Ferguson 375 Tractors | 3 | 1 | 2 | 2 | |
| 4. Ploughs | 7 | | | | 1 |
| 5. Harrows | 8 | | | | |
| 6. Tipping trailer | 3 | | | | 4 |
| 7. Ridger | 1 | | | 1 | |
| 8. Boom sprayer | 1 | | | 1 | |
| 9. Rotary slasher | 1 | | | | 1 |
| 10. Maize Sheller | 1 | | | 2 | |
| 11. Fertilizer Spreader | | | | 1 | |
| 12. Drilling Machine | | | | 1 | |
| 13. Isuzu Pick-up van | | | | | 1 |

3.2 Workshop Facilities and Personnel

The unit has a workshop at the headquarters in Benin City. It has a pit and a power crane for servicing, repairs and complete tractor engine overhauling. Welding when necessary, is done outside, as the workshop is not equipped for that. Only minor repairs are carried out at the zones most of which are on the field and when a serious problem develops, the tractor is towed to the central workshop at the headquarters for repairs. Although a number of staff are in the unit, this study was more interested in the technical staff especially the mechanics and operators as these are the prime movers of the unit. The headquarters is manned by the Director of Agricultural Engineering assisted by 2 Agricultural Engineers, 1 Principal Technical Officer, 1 Work Superintendent, 3 Operators, 2 Tractor Drivers and 2 Craftsmen. In the Zonal offices such as Ehor, the staff strength comprises of a Chief Agricultural Engineer, one Technician, one Operator and one Tractor Driver. While it may be difficult to argue on the total number of staff in the unit, the hierarchical distribution of staff appears inappropriate as there are more supervisors than those being supervised and who actually do the work.

While it may not be necessary that every tractor has an operator, the existing tractors to operator ratio which is as much as 5 : 1, is too high and this is one of the many problems besetting the unit. Inadequate operators to drive the tractors and implements to use with them constitute a major

bottleneck in the service delivery of the unit. As a result of the low staffing, during the off-season period, some of the staff in the zones are redeployed to the headquarters. Interaction with operators revealed that there are no in-service trainings for staff through which they could upgrade their expertise.

3.3 Services Rendered and Mode of Operation

Table 3 outlines the services rendered and service charges. The charges exclude fuel and lubricants, which has to be provided by the customer. Intending customers collect and complete a service request form, which is then submitted to the unit. Upon ascertaining the availability of the relevant machine to deliver the service required, payment is authorized and made after which the relevant equipment is released with the operator. Where it is not possible to provide services as at when demanded by the customer, either as a result of equipment breakdown or excess demand, the customer is either advised to wait for when the equipment will be ready or seek services elsewhere. Farmers who patronize the units complained of delay in service delivery which in most cases either make them to reduce the area of land they would have cultivated or affects the crop yields because of delayed operations. Hamidu and Simon (1999) made similar observations in Bauchi state.

Table 3. Charges for services rendered by the Edo State Tractor Hiring Services (2004)

| Service | Charge* (US \$) |
|--|---------------------|
| Bush clearing and fish pond construction, | 400.00 |
| Deep ploughing with D6 bulldozer | 250.00 |
| Non- farming operations | 40.00 |
| 4Slashing | 40.00 |
| Ploughing | 40.00 |
| Harrowing | 40.00 |
| Planting | 40.00 |
| Fertilizer application | 40.00 |
| Spraying | 40.00 |
| Tractor trailer for transportation of agricultural produce | 30.00 |

*All charges are per day assuming a working period of eight hours

3.4 Impact on Farming Communities

Most farmers in Edo state are aware of the existence and activities of the unit but it is not all of them that have access to these services. The farmers in the state can be grouped into two. Group

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one are those farmers who have benefited from the services of the unit and have been able to increase their farm sizes and income. The group consists of full-time farmers and new entrants who are mainly civil servants and have taken to farming after retirement. The changes in farm size holdings are presented in Table 4. The increase in farm holdings varies with farmers and depends mainly on the capital available for investment and the size of land that can be acquired. The land tenure system is a barrier to farm size expansion in some cases. For full-time farmers, some have been able to expand from previous holding of between 5 – 10ha to between 15 and 25ha while some of the new entrants who are more aggressive maintain holdings of between 20 and 50ha.

The second group are those who have not benefited from the services and could be further subdivided into three classes. One class is those who have sufficient landholdings but cannot afford the cost of hiring equipment, the second class are those who are in areas far remote from the zonal headquarters and there are no access routes for machines to be taken to such places for work even if the farmers can afford the cost of renting, and the third class are those whose farm holdings are too small, usually below 2.5ha and have no means of acquiring more land. In many instances, these small holdings are used for mixed cropping. The use of farm machinery by such individual farmers is uneconomical while the variability in the farming practices of contiguous farms does not allow the use of farm machinery on co-operative basis.

During the study, it was observed that changes in sizes of cultivated land was not only dependent on the activities of the unit. Some farmers who could not afford to rent machinery, employed more manual labour to increase their farmsizes while in some cases, individuals had to surrender a portion of their farms to other members of the family thus reducing the amount of land available to them. Farmers who recruited manual labour to increase their farm sizes were encouraged to do so by the financial fortunes of those who rented equipment from the unit. Thus the introduction of the unit has directly and indirectly resulted in increased farm sizes.

Table 4: Changes in sizes of cultivated farm sizes by farmers in Edo state

| | previously | | | presently | | | | |
|---------|--------------------|-----|---|--------------------|-------|------------|---------|-------|
| No farm | Range of farmsizes | | | Range of farmsizes | | | | |
| | Below | 2.5 | – | Above | Below | 2.5 – 10ha | 10 – 25 | Above |

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| at all | 2.5ha | 10ha | 10ha | 2.5ha | ha | 25ha |
|-----------------------------|---------|---------|---------|-----------|-----------------------------|--------|
| No of farmers in each group | | | | | No of farmers in each group | |
| 25(14%) | 70(39%) | 65(36%) | 20(11%) | 55(30.5%) | 85(47.5%) | 15(8%) |

3.5 Maintenance Culture

A maintenance culture is a programme which specifies what action needs to be taken, at what time, by who and in what form in order to sustain a system. Buhari (2000) reported that the lack of a maintenance culture in Nigeria has been the most serious bane of our predicament of inadequate and non-functioning infrastructure and that the inculcation of good maintenance culture by the operators of public infrastructure and the public at large remains one essential condition to the resuscitation of our ailing infrastructure. It is also essential that all infrastructures should at the planning stage contain provisions for the necessary requirements for its effective upkeep.

Although a workshop exists at the headquarters, periodic maintenance is not a practice of the unit. Maintenance is only carried out when there is a request for the use of equipment and for which payment has been made. The consequence of this is that simple faults graduate to serious problems, which become more expensive to rectify. During the survey, efforts were made to find out why periodic maintenance culture is not adopted and inadequate funding was the responsible factor, which is why the responsibility of maintenance has been transferred to the customers. Another observation is the lack of proper care for implements in terms of storage. No implement sheds are provided and equipment are not protected against inclement weather

4. CONCLUSIONS AND RECOMMENDATIONS

The Edo state tractor hiring unit has seven Steyr, 18 Fiat and nine Massey Ferguson tractors, eight ploughs, 17 harrows, seven tipping trailers, two boom sprayers, one fertilizer spreader, three maize shellers, two rotary slashers, one drilling machine, two ridgers and a Pick-up van which are located in the various zones of the unit.

Most of these equipment are either functional or require minor repairs to be used on the field. The tractors are considered adequate in number but the implements are insufficient for their effective use. Workshop facilities and personnel are inadequate. The maintenance culture adopted is customer motivated. This practice should be discouraged as it has resulted in the loss of equipment that would have been repaired with only little resources. Some farmers have increased their farm holdings through the services of the unit but others have not benefited from the services. The inability to raise the cost of hiring, remoteness of farms and small holdings are responsible for some farmers not benefiting from the activities of the unit. The unit has great potentials for improving the agricultural productivity of the state if well managed.

Towards achieving this goal, the following recommendations are made:

- a) The Workshop at the headquarters should be fully equipped while others should be set up at the zones. This will ensure complete maintenance services in - house and eliminate the time wasted in moving equipment to the headquarters for major repairs. Relevant spare parts should be acquired and stocked so as to avoid the delay due to non-availability of spare parts.
- b) Poor funding from the state government is the factor responsible for the poor maintenance culture. While it is expedient that the state government funds the unit adequately, the unit must also effectively manage whatever meagre resources are made available. The unit should be reorganized into a self-sustaining outfit, which is feasible taking into account the possible patronage if the unit can deliver services effectively.
- c) Most of the tractors are redundant even when they are functional and this is due to lack of implements to be used with the tractors. More implements should be purchased so that the tractors can be effectively used and services can be delivered as at when needed and this will increase the financial fortune of the unit.
- d) There is gross underutilization of machinery occasioned by insufficient staff to use the equipment. More staff should be employed to beef up the activities of the unit.
- e) Regular training to upgrade the expertise of both the operators and mechanics to meet with the changing trends in farm machinery development should be organized. This can best be done during the off-season period when participants could share experiences from the previous season and map out strategies to guide against some of such problems in the next season
- f) A culture of regular maintenance should be adopted as this is cheaper and prolongs machine life

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Appendix 1

Assessment of the Edo State of Nigeria Tractor Hiring Services**Questionnaire**

1. Name of respondent :
2. Location (village) : Zone:
3. Primary occupation :(farming, civil servant, others)
4. Distance from your farm location to zonal headquarters
5. What is the type of labour used on your farm (completely manual, manual/tractor, tractor only, others)
6. If tractor is used on your farm, where do you obtain the service(Edo state tractor service, others sources, specify)
7. Are you aware of the existence of the Edo state tractor hiring unit (Yes, No)
8. Have you benefited from the activities of the unit(Yes, No)
9. If yes, in what ways have you benefited?
10. If no, why have you not benefited from the activities of the unit?
11. Has the size of your cultivated farm changed in the past ten to 15 years
12. What was the previous size of your cultivated farm?
13. What is the present size of your cultivated farm?
14. What has been responsible for the change in your farmsize?
15. What can you say about the timelines in the delivery of service by the unit
16. In what ways, if any has delay in service delivery by the unit affected your farming activities.
17. What type of farm route links your farm to the highways(motorable, non-motorable)
18. What improvement would you want to see in the activities of the unit