



## Impact of Mechanized Farming on Agricultural Production: An Implication for Poverty Alleviation in Afijio Local Government Area of Oyo State, Nigeria

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**Abstract** – To achieve the broad objective, the study identified the socio-economic characteristics of the respondents that were involved in mechanized and non mechanized farming, determined the level of awareness with the extent of use of adopted mechanized farming and the production level of mechanized and non-mechanized farmers. Data were collected from 120 registered respondents; the collected data were subsequently analyzed using frequency count, percentages and mean values as descriptive tools, while inferential statistical tool used was Pearson Product Moment Correlation and Anova which were used to determine the relationship and difference between the variables respectively. The results of the findings revealed that the mean age of the sampled mechanized farmers was 47.57. The result of the findings also revealed that majority of the mechanized and non – mechanized farmers were male. A significant relationship was found between monthly income, cultivated farm size and level of production of the mechanized farmers. Also a significant difference was found between cassava productions of mechanized and non – mechanized farmers. High cost of repair was recorded as the most serious constraint; therefore, the study recommended that government should help in subsidizing the cost of repair for the mechanized farmers so as to further boost cassava production.

**Keywords** – Impact, Mechanization, Economy, Constraints.

### I. INTRODUCTION

Agriculture is the backbone of the economy of Nigeria and the pivot of the country's poverty alleviation and indeed second to oil in its contribution to the share of the Gross domestic Product (GDP), and with about 70 percent of the population totally dependent on it for their livelihood (Andrew and Philemon, 2006). The constantly expanding population has required and will continue to demand an ever-increasing agricultural production of food and fibers (Kalu and Egbo, 1985). Hence, there is the imperative need for massive production of foods to sustain the astronomical increase of the world population and apart from ensuring and securing food availability; agriculture will remain the most important source for economic growth. This can only be achieved by embarking on the practices of farm mechanization. The need for mechanization is as a result of the global population increase which must be fed (Kepner et al, 2003). Also to meet food needs in 2050, it is necessary to increase human food production considerably (Ndu et al, 1991). The human population has been growing rapidly over the years. This implies that more food, houses,

clothes and other products of industries are required and man requires more resources now than ever which mean that he must exert an even greater influence on his environment (Brian and Joseph, 2006).

The declining role of the agricultural sector in the national development process has been well documented, so also the various factors militating against performance in the sector. Among factors identified are emphasis on inappropriate research policies and objectives, undue emphasis on promotion of export crops, low labour absorptive capacity of the sector, preference to large scale farming organization to the neglect of small holders, who produce the bulk of the nation's agricultural output and paying lip service to the development of the agricultural sector generally (Ogieva, 1998). It is now clear that the future of Nigeria depends very much on agriculture hence the call from all quarters that Nigeria go back to Agriculture, and the conscious application of policies to promote the development of the sector (Compass Magazine, 2005). According to Babatunde 2010, the process of developing agricultural machines and substituting this machine power for human and animal power in agricultural production practices is called farm mechanization. The term "mechanization" is used to describe tools, implements and machinery applied to improving the productivity of farm labour and of land; it may use either human, animal or motorized power, or a combination of these. In practice, therefore, it involves the provision and use of all forms of power sources and mechanical assistance to agriculture, from simple hand tools, to draught animal power and to mechanical power technologies. Farm mechanization is the application of engineering techniques to agricultural production. It is simply the process of using machines to do farm work instead of other sources. Mechanization finds its application in all areas and works of life and when mechanization is introduced into farming, it is called Agricultural mechanization or mechanized farming. Agricultural Mechanization in its simplest form refers to the use of mechanical technologies to cause an increase in agricultural production. It embraces all aspects of agricultural production including crop, livestock and fisheries. The types of technologies in agricultural mechanization are

- Mechanical technology: examples include tractors, threshers, plough, combine harvester.
- Chemical technology: it involves the use of agrochemicals such as insecticides, herbicides,

fertilizers, and improved seeds in the farm. It also includes plant protection measures.

- Hydrological technology: examples include tube wells.

Agricultural mechanization plays a very vital and inconsequential role in food production. One of the millennium development goals and targets for 2015 is to eradicate poverty and hunger. Any nation who therefore, cannot guarantee access to enough food for its populace is said to be food insecure. This can only be done by embarking on an intense farming practices and can be achieved by farm mechanization. To increase productivity, there must be the massive adoption of mechanization and the need for mechanization is as a result of the global population increase which must be fed. The Federal government of Nigeria since 1976 adopted a number of measures aimed at increasing production beyond subsistence level and creating surplus for export. In the process of increasing food production, programmes such as “Operation Feed the Nation” (O.F.N) and Green revolution were launched at different times, with the aims of orientating the mind of the people into farming as a profitable venture. Mechanization, together with improved crop varieties, better techniques, and more efficient food processing, has enabled the small percentage of the U.S. population living on farms to produce enough food to feed the Nation (Olaniyi, 2011).

It is evidently proven beyond reasonable doubt that increase in the agricultural output can increase the economic level of the nation and individual. This can be achieved by embarking on large scale farming with the aid of farm mechanization because human effort cannot supply the needed power input. The study therefore, identified the socio-economic characteristics of the mechanized and non – mechanized farmers and determined the level of awareness of technologies under mechanized farming in the study area. Also the study determined the extent of use of adopted mechanized farming in the study area and finally determined the levels of production between mechanized and non – mechanized farmers in the study area. Furthermore, the study determined the relationship between the socio-economic characteristics and the production level of mechanized farmers. And also determined difference between the production levels of mechanized and non – mechanized farmers.

## **II. METHOD AND DATA**

The study was carried out In Afijio Local Government area of Oyo state. The area consists of ten wards, namely; Ilora I, Ilora II, Ilora III, Fiditi I, Fiditi II, Awe I, Awe II, Aklinmorin/Jobele, Iware, and Imini. The local government area came into existence after the Federal Government carved it from Old Oyo Local Government area in 1989. It occupies a land area of area 685.085 square kilometers with 2010 estimated population size of 152,193 using a growth rate of 3.2% from 2006 census figures. The population density of the area is 222 persons per square kilometer. It is bounded in the North by Oyo East Local Government, Akinyele Local Government area

in the south and Iseyin Local Government area in the West. It also shares common boundary with Ejigbo and Iwo Local Government area in the East. The indigenes are mostly farmers who had taken the advantage of vast Agricultural land that favours the cultivation of food crops such as maize, guinea corn, yam, cassava, cowpea, soya beans, fruits, tomatoes and cash crops such as groundnuts, cocoa, oil palm, kola nuts, coffee, orange and citrus. The local Government Area is a home for one of the state farm settlements- Ilora farm settlements. (<http://oyostate.gov.ng/government/local-govt-area/afijio>). The population of study included the sampled mechanized and non – mechanized farmers in the study area. Stratified sampling technique was used in selecting 60 mechanized and equal numbers of non – mechanized farmers making a total number of 120 respondents as the sample size. The data was collected with the administration of structured interview schedule based on the objectives of the study. The variables for the study include both dependent and independent variables. The dependent variable is the impact of farm mechanization which was measured by difference in production level of mechanized and non – mechanized farmers and the independent variables were age, sex, marital status, level of education and production levels of mechanized farmers. Descriptive and inferential statistical tools were used to analyze the data collected. Descriptive statistics includes frequency count, percentages, and mean values while Pearson Product Moment Correlation was used to determine the relationship between socio economic characteristics and production level of the mechanized farmers and t.test was used to determine the difference in production level of mechanized and non-mechanized farmers.

## **III. RESULT AND DISCUSSION**

### *Socio-economic characteristics of the respondents.*

Table 1 revealed that (38%) of the mechanized farmers were within the age range of 41 and 50 years, while 46.7% of the non-mechanized farmers fell within the age range of 51 and 60 years. The mean age of mechanized farmer was calculated to be 47.57 and that of mechanized farmer was 51.2. This implies that majority of the mechanized farmers were in their active age and were expected to be more productive in agriculture. It was further revealed that 80% of the mechanized farmers were male while the remaining 20% were female; on the other hand, 81.7% of the non-mechanized farmers were male, while 18.3% were female. The findings revealed that the majority of mechanized and non-mechanized farmers were male. This may be due to the enormous physical activities involved in the practices. Majority (55%) of the mechanized farmers were Christians, while most (46.7%) of the non mechanized farmers practice islam. 83.3% of the mechanized farmers were married while on the other hand, 81.7% of the respondents were married. This implies that majority of both mechanized (83.3%) and non-mechanized (81.7%) farmers were married people who need family income for survival and enjoy the support for agricultural production from their spouses and children. It was further revealed

that most of the mechanized farmer had one form of formal education or the other as only 6.7% of the respondents had no formal education while 10.3% of the non-mechanized farmers had no formal education. This implies that majority of the mechanized farmers were more educated than the non-mechanized farmers. The high literacy level might have helped in the adoption of mechanized farming. Most (63.3%) of the mechanized farmers signified farming as their primary occupation. On other hand, most (61.7%) of the non-mechanized farmers also signified farming as their primary occupation. This implies that both the mechanized and non-mechanized farmers earn their living from farming. The findings of the study further reveals that 56.6% and 51.6% of the mechanized and non-

mechanized had about 16 years of experience farming respectively. Table 1 further reveals the approximated annual income of the respondents, 65.7% of the mechanized were earning between 1,000,000 – 2,000,000 annually while all (100%) the non-mechanized farmers earn between 200,000 – 1,000,000. This implies that majority of the mechanized farmers were earning higher annual income than the non-mechanized farmers. 50% of the mechanized farmers cultivated 6 – 10 hectares as their farm size, while 96.7% of the non-mechanized farmers cultivated 1 – 5 hectares as their farm size. This implies that majority of the mechanized farmers cultivated larger farm size.

Table 1: Distribution of respondents by socio-economic characteristics

Age	Mechanized		Non-mechanized	
	Frequency	Percentage	Frequency	Percentage
30	2	3.3	0	0.0
31 – 40	15	25.1	1	1.7
41 – 50	23	38.3	27	44.9
51 – 60	16	26.6	28	46.7
61	4	6.7	4	6.7
<b>Sex</b>				
Female	12	20	11	18.3
Male	48	80	49	81.7
<b>Religion</b>				
Traditional	1	1.7	5	8.3
Islam	26	43.3	28	46.7
Christianity	33	55	27	45
<b>Marital Status</b>				
Widow	1	1.7	3	5
Separated	1	1.7	2	3.3
Divorced	3	5.0	4	6.7
Married	50	83.3	49	81.7
Single	5	8.3	2	3.3
<b>Level of Education</b>				
No formal education	4	6.7	6	10.3
Adult literally classes	23.3	1	1.7	0.6
Primary school incomplete	5	8.3	10	23
Primary school completed	6	10	8	13.3
Secondary school incomplete	15	25	14	16.7
Secondary school complete	17	28	13	21.7
Post-secondary school	11	18.4	4	13.3
<b>Primary occupation</b>				
Other	10	16.7	13	21.1
Gathering of fire wood	2	3.3	1	1.7
Selling of petty trade	10	16.7	9	15
Farming	38	63.3	37	61.7
<b>Years of farming experience</b>				
5-15	26	43.5	29	48.4
16 years and above	34	56.5	31	51.6
<b>Monthly Income (N)</b>				
<20,000 - 100,000	15	25.1	60	100

100,001 – 200,000	40	66.4	-	-
200,001 – 300,000	3	5.1	-	-
300,001 – 400,000	2	3.4	-	-
<b>Annual Income</b>				
<200,000 – 1,000,000	6	10.2	60	100
1,000,001 – 2,000,000	40	65.7	-	-
2,000,001 – 3,000,000	12	20.7	-	-
3,000,001 – 4,000,000	1	1.7	-	-
> 4,000,000	1	1.7	-	-
<b>Cultivated farm size</b>				
< 1	-	-	2	3.3
1 – 5	30	50	58	96.7
6 – 10	30	50	-	-

Source: Field Survey, 2011.

#### 4.2 Extent of use of adopted mechanized farming

The result on table 2 revealed the extent of use of adopted mechanized farming. 53% agreed that they use tractor very often while another 30% agreed that they use plough very often. Furthermore, 3.3% agreed that they use tillage very often while 61.7% did not use it at all. It was also revealed that 8.3% agreed that they use rigger very often while 36.7% did not use it at all. The result further revealed that 6.7% often use planter, 25% agreed that they use planter on moderate level while another 15% seldom use planter and 53.3 did not use it at all. The result also showed that, 10% use sprayer very often, 36.7%

agreed that they use sprayer on moderate level while another 21.7% seldom use sprayer and 3.3% did not use it at all. It was revealed that, 8.3% agreed that they use harvester very often while 61.7% did not use it at all. Furthermore, 10% agreed that they use combine harvester very often and 83.3% did not use it at all. It was also revealed that 3.3% used sprinkler very often, while 8.3% did not use it at all. The result further revealed that, 16.7% often use harrower, while 46.7% did not use it at all. This implies that tractor is the most used machine among the mechanized farmers in the study area.

Table 2: Distribution of respondents according to extent of use of adopted machines

S/n	Machines	VO	O	M	S	N
1	Tractor	32(53.3%)	24(40%)	3(5%)	1(1.7%)	0(0%)
2	Plough	18(30%)	33(55%)	8(13.3%)	1(1.7%)	0(0%)
3	Tillage	2(3.3%)	5(8.3%)	9(15%)	7(11.7%)	37(61.7%)
4	Rigger	5(8.3%)	11(18.3%)	11(18.3%)	11(18.3%)	22(36.7%)
5	Planter	0(0%)	4(6.7%)	15(25%)	9(15%)	32(53.3%)
6	Sprayer	6(10%)	17(28.3%)	22(36.7%)	13(21.7%)	2(3.3%)
7	Harvester	5(8.3%)	3(5%)	6(10%)	7(11.7%)	39(65%)
8	Combine harvester	6(10%)	2(3.3%)	1(1.7%)	1(1.7%)	50(83.3%)
9	Sprinkler	2(3.3%)	7(11.7%)	18(30%)	16(26.7%)	17(28.3%)
10	Harrower	0(0%)	10(16.7%)	16(26.7%)	6(10%)	28(46.7%)

Source: Field Survey, 2011.

Field Note: VO – Very Often, O – often, M – Moderate, S – Seldom, N – Not at all.

#### Cultivated crops and their production level

From the findings of this study, 43.3% of the mechanized farmers cultivated yam, 93.3% of them cultivated cassava and 95% cultivated maize. Another 26.7% cultivated beans, 25% cultivated melon, while 20% cultivated tomatoes. Also 5% cultivated millet and 3.3% cultivated soya beans. On the other hand, 48.3% of the non-mechanized farmers, cultivated yam, 78.3% cultivated cassava and 90% cultivated maize. Another 23.3% cultivated beans, 30% cultivated melon, while, 23.3% cultivated tomatoes, 5% cultivated millet and 8.3% cultivated soya beans. This implies that maize and cassava were the most cultivated crops among mechanized and non – mechanized farmers.

Table 3 also revealed that 71.6% were producing above 16 pick-ups of harvested cassava tubers annually, 18.3% were in the production range of 11 – 15 pick-ups, while 6.7% produced lower than 5 pick-ups and 3.3% were producing between 5 and 10 pick-ups. On the other hand, 54.9% of the non-mechanized farmers were producing between 5 and 10 pick-ups, 35% were producing below 5 pick-ups, while 10% produced between 11 and 15 pick-ups and none of the non – mechanized farmers produced above 16 pick-ups. This implies that majority of the mechanized farmers were involved in the production of cassava than the non mechanized farmers.

Table 3: Distribution of respondents according to production level of cassava

Production level of cassava (Pick-ups)	Mechanized		Non-mechanized	
	Frequency	Percentage	Frequency	Percentage
<5	4	6.7	21	35
5 – 10	2	3.3	33	54.9
11 – 15	11	18.3	6	10
>16	43	71.6	-	-

Source: Field Survey, 2011.

### Various challenges to mechanized farming

Table 4 revealed the challenges encountered by farmers which were ranked based on the weighted mean score from highest (1) to the lowest (10). High cost of repair was ranked as the most serious challenge to farm mechanization (1.25), followed by lack of operators (1.18)

and high cost of fuel (1.6). Others were, breakdown of the machine and lack of finance were (0.95), bad roads, high cost of purchase and malfunctioning of machine were (0.92), high cost of maintenance (0.82) and scarcity of fuel (0.78). This implies that high cost of repair is the challenge mostly encountered by the farmers.

Table 4: Distribution of respondents according to various challenges encountered

S/N	Challenges Encountered	SC	MC	NC	WMS	Rank
1	High cost of repair	18 (30%)	39 (65%)	3 (5%)	1.25	1
2	Lack of operators	11 (18.3%)	22 (36.7%)	27 (45%)	1.18	2
3	High cost of fuel	16 (26.7%)	40 (66.7%)	4 (6.7%)	1.6	3
4	Break down of machine	10 (16.7%)	35 (58.3%)	15 (25%)	0.95	4
5	Lack of finance	12 (20%)	33 (55%)	15 (25%)	0.95	5
6	Bad roads	14 (23.4%)	29 (83.3%)	17 (28.3%)	0.92	6
7	High cost of purchase	18 (30%)	19 (31.7%)	23 (38.4%)	0.92	7
8	Malfunctioning of machines	9 (15%)	37 (61.7%)	14 (23.3%)	0.92	8
9	High cost of maintenance	8 (13.3%)	33 (55%)	19 (31.7%)	0.82	9
10	Scarcity of fuel	11 (18.3%)	40 (66.7%)	4 (6.7%)	0.78	10

Source: Field Survey, 2011.

Note: SC – Serious Challenge, MC – Mild Challenge, NC – Not a Challenge, WMS – Waited Mean Score.

### Hypotheses

**H01:-** There is no significant relationship between the socio – economic characteristics of the respondents and production level of mechanized farmers.

Table 5 revealed that, a significant relationship was found between, level of income, cultivated farm size and production level of mechanized farmers. This implies that, the production level of mechanized farmers is influenced by their level of income and the farm size cultivated.

Table 5: Correlation table, showing relationship between selected socio-economic characteristics and production level of mechanized farmers

Variables	r-value	Decision
Age	0.60	Ns
Religion	.294*	Sig
Level of education	-.023	Ns
Monthly income	.515**	Sig
Cultivated farm size	.424**	Sig

Source: Field Survey, 2011

**H02:-** There is no significant difference between the production levels of mechanized and non – mechanized farmers

Table 6 shows that a significant difference was found between production levels of mechanized and non – mechanized cassava farmers. This implies that of all the crops cultivated, it was only in cassava production level that a significant difference was found between the production level of mechanized and non – mechanized farmers. This indicates that mechanized farming had impacted positively on cassava production in the study area and a concentrated effort in this direction can help to alleviate poverty among cassava farmers in the study area.

Table 6: Anova table showing the difference in production level of cassava between mechanized and non – mechanized farmers

Variables	Sum of squares	Df	Mean Square	f	Sig
Between Groups	2084.495	5	416.899	2.845	.024
Within Groups	7913.905	54	146.554		
Total	9998.400	54			

Source: Field Survey, 2011.

## IV. CONCLUSION

The study examined the impact of mechanized farming on agricultural production in Afijio Local Government area of Oyo State. The results show that majority of the respondents involved in mechanized farming were middle

aged and most of them were male and educated. It was also revealed that a significant difference exist between the production levels of mechanized and non-mechanized cassava farmers. Also, a significant relationship exists between monthly income, cultivated farm size and level of production of mechanized farmers. It was further revealed that 63.3% and 61.7% of the mechanized and non – mechanized farmers indicated that farming was their primary occupation. Furthermore, 56.5% and 52.6% of mechanized and non-mechanized farmers had more than 16 years experience in farming respectively. Since high cost of repair was recorded as the most serious constraint, the study therefore recommended that government should help in subsidizing the cost of repair, for the mechanized farmers so as to further boost cassava production.

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