

**EFFECT OF PLOUGHS ON SOIL PREPARATION IN UGANDA
A CASE STUDY OF IMANYIRO SUB COUNTY MAYUGE DISTRICT**

1 Kawala Sharon, 2 Dr Ariyo Gracious Kazaara, 3 Dr Arinaitwe Julius

**1 Metropolitan International University, 2 Lecturer Metropolitan International University, 3
Lecturer Metropolitan International University**

Abstract

In essence, plowing removes the top layer of soil, breaks up clods, and prepares the ground for seeding. This investigation was started to look into how ploughs affect the development of the land. The authors of the study three main goals were to: research the impact of tractor disc agricultural implements on soil mixing; examine the effect of mold board ploughs on soil inversion; and assess the contribution of ox agricultural implements to soil loosening in the Imanyiro sub county Mayuge district.

Tractor ploughs release compressed soil downhill to produce pore volume for absorbing water and air, according to 109 (96.5%) of the 113 participants, whereas 4 (3.5%) of them were unsure about the influence. 99 (87.6%) of the participants believed, 6 (5.3%) were unsure, and 8 (7.1%) objected that the soil's mechanical qualities can be changed by disintegrating, vacuum distillation, overturning, and combining the soil layers that properly aerate and oxygenate the soil.

As these engines are unaffordable for the bulk of the region covered, the study indicates that the government, through the ministry of agriculture, provide each sub county located in the main farming areas with three vehicles that producers can use to enhance the soil's qualities.

Key words: *ploughs and soil preparation*

Background of the study

(Huang, 2021) contends that in order for a nation like Uganda to strengthen its agricultural sector, attention must be given to raising the caliber and effectiveness of agricultural output.

The meager revenue generated from agriculture has significantly lowered the excitement of agricultural labourers for a long time.

The income of agricultural employees has been somewhat secured by transfer payments like the minimum grain price and other pertinent regulations, but their agricultural output has remained constant.

According to (Gao. M, 2010), improving agricultural development's quality and effectiveness is essential to maintaining the trust and zeal of agricultural labourers by raising their pay. The low usage of modern farm implements, which prevents the increase of food production productivity and results in excessive agricultural output, is the primary cause of Uganda's agricultural output being behind the curve.

Li (2019) claims that the high agricultural production depends on the competition for land for planting and harvesting.

In fighting floods, droughts, weeds, effectively managed, and soil preparedness for planting, the function of scrambling land is evident.

The use of ploughs in field preparation creates the essential soil conditions that facilitate the effective establishment of newly transplanted tissue culture plants or early offshoots.

The physical as well as chemical qualities of the soil alter as a result of land leveling for farming production.

The layer from underneath Neath and the horizons of humus and plough show the largest variations.

Compaction of soil layers beneath the plough horizon is one of the soil changes that might be seen.

The physical qualities of the soil, including its total porosity, air conditioning system, and temperature conditions, are all impacted by soil compaction. As a result, agricultural productivity

of the plants is also impacted (Barbara, 2004).

Problem statement.

According to (Adu-baffaour, 2019), farm equipment is the solution to massive unemployment on farms, drought, and the cultivation of additional land. This will increase the overall workload during the farming season while improving soil qualities and the amount of produce produced per hour of work.

(Cabral, 2019) claims that Ugandan farmers are not using ploughs to prepare their fields for germination, which has led to poor crop quality and quantity.

The exorbitant cost of the ploughs, a shortage of monetary incentives, high rates of ignorance, excessive interest rates, and repayment period that are too short and poorly adapted to the features of farming techniques are all blamed for this failure.

The purpose of the current study was to investigate how ploughs affect the development of land for agricultural cultivation.

Specific objectives

- 1. To examine the influence of tractor disc ploughs on mixing soils in Imanyiro sub county Mayuge district.*
- 2. To explore the effect of mould board ploughs on inverting soils in Imanyiro sub county Mayuge district.*
- 3. To investigate the role of ox ploughs on loosening soils in Imanyiro sub county Mayuge district.*

Research questions

- 1. What is the influence of tractor disc ploughs on mixing soils in Imanyiro sub county Mayuge district?*

2. *What are the effects of tractor mould board ploughs on inverting soils in Imanyiro sub county Mayuge district?*
3. *What is the role of ox ploughs on loosening soils in Imanyiro sub county Mayuge district?*

Methodology

Research Design

Both qualitative and quantitative methodologies were used in the study's descriptive design of research.

The use of statistical measurements and methodological descriptions as experienced by the researcher served as the foundation for quantitative procedures.

Because they showed actual, professional experience required to offer a deeper comprehension and appraisal of all associated areas, qualitative approaches were prioritized.

Source of information

Data was collected using both primary source and secondary source

Primary Data

Primary data was collected by use of questionnaires which were administered to respondents and interview guide were used to respondents since they were the ones to give first-hand information on the subject under study.

Secondary Source

Secondary data was got from sources like; sales day journals, receipts on hiring tractors and sub county records among other sources.

Population and sampling technique

The study targets a population of about 600 respondents of which the study targeted a population of 125 comprising of 10 politicians sampled by purposive sampling, 5 L.C. 1 leaders by use of cluster sampling, 5 sub county administrators by the use of purposive technique, 5 sub county agricultural office by purposive sampling and 100 farmers in Imanyiro sub-county by Simple random sampling method.

Data analysis

To make the data suitable and easier to present, the data that had been obtained had been edited. One by one, the questionnaire responses will be updated to fix mistakes that participants have made. Data was adjusted to ensure its precision, thoroughness, integrity, and homogeneity. With the use of SPSS, statistical method was sorted and statistical description, such as tables displaying percentages and frequency distributions, was generated for easier comprehension (Nelson. K, 2022).

RESULT

Presentation of research findings based on the research objective

Influence of tractor disc ploughs on mixing soils

Table 6: Distribution of respondents on the influence of tractor disc ploughs on mixing soils

No.	Statement	Agree		Not sure		Disagree	
		Freq.	%	Freq.	%	Freq.	%
1	<i>Crush the clodth cutting up and mixing stubble soils</i>	91	80.4	19	17	3	2.6
2	<i>It improves the values of soil properties, such as the available water capacity, bulk density, rooting depth and soil PH.</i>	113	100				
3	<i>Breaking up or shatter compacted soil and loosen the soil downwards to create pore volume for absorbing water and air</i>	109	96.5	4	3.5		
4	<i>Disc ploughs transforms the soil physical properties by pulverizing macerating, overturning and mixing the soil layers that provide proper aeration and oxygen to the soil.</i>	99	87.6	6	5.3	8	7.1
5	<i>Its' influence is through the depth, angle of the</i>	62	55	43	38	8	7
	<i>disc gang, weight of the harrow and sharpness of</i>						
	<i>the disc gang which it penetrates the soil</i>						
6	<i>Reduce surface run off by increasing infiltration.</i>	113	100				

7	<i>Invert the soil to bring up leached fine soil material and nutrients to the surface and decomposition of organic matter into deeper layers</i>	111	98.2			2	1.8
8	<i>Level the ground and control weeds in any farm land</i>	92	81.4	8	7.1	13	11.

Source: Primary source 2022

All 113 (100%) participants agree that tractor disc ploughs improve the value of soil characteristics, such as the groundwater resources bandwidth, maximum dry density, barracking depth, and soil PH, and effectively reduce runoff by continuing to increase infiltration. The information in the table above shows respondents' perceptions and experiences about the impact of tractor disc ploughs on blending soils in the Imanyiro sub county Mayuge district.

The survey also found that 111 participants (98.2%) agreed that vehicle disc ploughs invert the soil to bring leachable fine soils and minerals to the surface and breakdown organic matter in deeper layers, while just 2 % of the respondents (1.8%) disapproved.

Tractor ploughs release compressed soil downhill to produce volume fraction for receiving water and air, according to 109 (96.5%) of the 113 respondents, whereas 4 (3.5%) of them were unsure about the influence.

99 (87.6%) of the respondents agreed, 6 (5.3%) were unsure, and 8 (7.1%) objected that the soil's physical qualities can be changed by smashing, vacuum distillation, inverting, and mixing the soil layers that properly aerate and oxygenate the soil.

When asked whether tractor disc ploughs helped level the ground and reduce weeds on any farm property, the participants answered 92 (81.4%) affirmative responses, 8 (7.1%) negative

responses, and 13 (11.5%) indecisive responses. With respect to crushing, cutting the clodth up and mixing

stubble soils, 91 (80.4%) of the respondents agreed to the influence, 19 (17%) of the respondents were not sure while 3 (2.6%) of them disagreed to the statement. Lastly the study found out that more than half 62 (55%) of the respondents agreed that tractor disc ploughs depth, angle of the disc gang, weight of the harrow and sharpness of the discs improves its penetration depth to the soil, 43 (38%) of the respondents were not sure while 8 (7%) of them were not sure of the influence.

Effect of mould board ploughs on inverting soils

Table 7: Distribution of respondents on the effects of mould board ploughs on inverting soils

No.	Statement	Agree		Not sure		Disagree	
		Freq	%	Freq.	%	Freq	%
1	It aggregate stability as well as infiltration capacity, hydraulic conductivity and aeration.	59	52.2	39	34.5	15	13.3
2	Its' deep tillage invert deep nutrient to the surface.	102	90.3			11	9.7
3	Covering of organic matter contents such as crop residues and weeds reduce on the concentration of soil.	110	97.3	3	2.7		

4	<i>It increases organic matter content.</i>	91	80.5	9	8	13	11.5
5	<i>It harmonise soil temperature.</i>	67	59.3	42	37.2	4	3.5
6	<i>It controls water content and residual fertility.</i>	112	99.1	1	0.9		

Source: primary source 2022

For the second aim, the survey found that 112 (99.1%) of the participants believed that mould board ploughs manage moisture contents and leftover fertility, whereas 1 (0.9%) were unsure of the impact.

110 (97.3%) of the participants believe that covering organic matter contents, such as crop wastes and weeds, would reduce the quantity of soil, whereas 3 (2.7%) were unsure of the impact.

According to the survey, 102 respondents (90.3%) agreed that mold board ploughs bring deep nutrients to the surface, whereas 11 respondents (9.7%) disagreed. Regarding increasing the amount of organic matter

91 (80.5%) of the participants believed that mould board ploughs had the desired impact, 13 (11.5%) disagreed, and 9 (8%) were unsure of the result.

When it came to balancing soil temperatures, 67 (59.2%) of the participants were in favor, 4 (3.5%) were opposed, and 42 (37.2%) were unsure about the outcome.

Final results show that 59 (52.2%) of the participants believe with the effect, 39 (34.5%) of them were unsure of the effect, and 15 (13.3%) of them disputed with the effect. The study also examined concrete strength, infiltration rates, hydraulic properties, and aeration.

Role of ox ploughs on loosening soils

Table 8: Distribution of respondents on the role of ox-ploughs on loosening soils

No.	Statement	Agree		Not sure		Disagree	
		Freq.	%	Freq	%	Freq.	%
1	<i>Cutting, breaking, returning, and popularizing soil</i>	84	74.3	20	17.7	9	8
2	<i>Animals are used for tasks other than ploughing</i>	113	100				
3	<i>Weeding with oxen is a much faster and less tiring operation compared with hand weeding</i>	113	100				
4	<i>Reduces drudgery, making farming attractive</i>	84	74.3	20	17.7	9	8
5	<i>Destroys activities and breeding places of insects and pests</i>	113	100				
6	<i>Ox-ploughs can incorporate the use of Biochar</i>	71	63	29	26	13	11

Source: primary source 2022

Regarding the third purpose, which examined the function of ox-ploughs in weakening soils, the study's findings show that 113 (100%) of the participants believed on three sub-constructs, including the following: It is much faster and less laborious than hand designed to weed; and Creatures are used for other tasks besides plowing. None of the participants answered.

Ox-ploughs chop, break, turn, and disseminate dirt, according to 84 (74.3%) of the participants, 20 (17.7%) were unsure, and 9 (8%) disapproved. The same percentage, 84 (74.3%), also agreed that using an ox plough lessens laborious tasks and makes farming more appealing, while 20

(17.7%) were unsure and 9 (8%) disagreed. In regards to the third objective, the study found that 71 (63%) of the participants believed that ox-ploughs start implementing the use of biochar components, 29 (26%) of them were unsure, and 13 (11%) of them happen to disagree.

Conclusion

Ploughs as farming tools are used for initial cultivation of soil in preparation for sowing seed or planting to lose or turn the soil. Traditionally they were drawn by animal such as oxen and horses, but in modern times are mostly drawn by tractors which provide excellent soil penetration, planting and cultivating tasks for a wide variety of field crops with a power to mowing hay and for harvesting a wide area than small area.

Recommendations of the study

The study recommends the government through the ministry of agricultural to provide each sub county located in the most farming areas with three tractors that can be used by farmers to improve on their soil properties since these machines are expensive for majority of the area served.

The study furthermore recommends the sub county agricultural official to provide farmers with field training on how to use ploughs and other garden equipment's since most of them they did not study agriculture as a course so as to help them improve on their crop production.

Bibliography

- Adu-baffaour . (2019). Can small farmers benefit from big companies initiatives to promote mechanization in Africa. 84.
- Barbara stojek . (2004). plough sole as the result of the agricultural land use. Warszawa, 11.
- Cabral. (2019). Looking behind the technical fix. Apra working paper 22.
- Gao. M. (2010). Influence of china's agricultural subsidy policy on food security.
- Huang,. (2021). Exploring the way to deal with climate change and agricultural high-quality transformation and development under the new pattern of coule cycle.

Li. (2019). Study on Grain Harvest Losses of Different Scales.

Nelson.K. (2022, july). Teach yourself SPSS and STATA. International Journal of Academic Pedagogical Research, 6(7), 84-122.