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DETERMINING THE MOISTURE CONTENT OF THE SOIL USING (TME 419) VARIETY OF MANIHOT ESCULENTA UNDER (2014) THE FEDERAL GOVERNMENT TRANSFORMATION AGENDA@EVWODE OVIA NORTH EAST LGA, EDO STATE. NIGERIA.

Brai M.A[1], Ehiomogue P[2], Eriakha E.C.[3]
[1]Department of Sciences National Institute of Construction Technology (NICT), Uromi Edo State
[2]Department of Agricultural Engineering, Michael Okpara University, Umudike
[3]Department of Agricultural and Bio-Environmental Engineering, Auchi Polytechnic, Auchi.
Email: maxcellusng6@gmail.com,

ABSTRACT

The use of mechanized method of cassava cultivation tends to assist in reducing the cost of production and increase plant yield. (Akande L.O. 2006) Therefore, the essence of this study is to increase the output of fresh cassava using the recommended International Institute of Tropical Agriculture(IITA) TME419 and TMS98/0581 in sustaining the nation's food security and being able to feed the cassava processing factories in the state. The study was carried out at Evbode in Ovia North East Local Government area of Edo State. Two hectares area of cassava arable land was cited and preliminary soil analysis was carried out using the soil sample and recorded to detect the fertility of the soil.

INTRODUCTION

Cassava (Manihot Esulenta) is an important food crop both for Urban and rural customers in sub Sahara Africa. In Nigeria production has moved from small scale enterprise to the medium scale production with a lot of emphasis on how to go mechanized and commence full time exportation. This plays a major role as a basic staple food in Nigeria and other African countries like, Tanzania, Ghana, Zimbabwe. (Akande L.O. (2006). Recently cassava has gained importance as a biennial crop for small holder farmers in the region. Africa being the largest cassava producing region in the world. About 9% of the produce is consumed as food. In contrast to Latin America and Asia

where less than half is utilized for food consumption which is used to produce starch ,ethanol, glucose syrup, garri, fufu, flour, and high quality cassava flour and the local market failing to view it as a platform for economic development. In addition cassava cultivation production with recent researches in sill analysis and putting practices in place has witnessed a tremendous increase due to the introduction of high yielding disease resistant varieties and labour saving technology are required to obtain a more profitable output.(Olatide O.J,et al.1980)Nigeria being the key to the production of cassava especially in the South Western region of Edo State having a fertile soil that can be tractorized and cultivated with high variety of cassava stem to sustain food security in the country.

MATERIALS AND METHODS

Study Area

The experiment was carried out at the experimental site of Ovia North East Local Government area (Evwode) in Edo State. The area lies between latitude 8 o15'N and Longitude 6o12'E.There are two major season in a year namely the dry and the rainy season. The dry season usually commences towards November to January while the rainy season normally starts at April and ends at October or November. The minimum temperature is about 21oc while the average maximum range is 38oc.The relative humidity in the study area is on the high side ranging from 75% to 97% in the early hours of the day and later reduces to between 38% and 62% during the hamathan season which is usually from November to January.

Land Preparation

The farmland was slashed, felling of trees was carried out and harrowed before spot burning of the dried weed was done. Two hectares of land was utilized in the course of this cassava demonstration. The plot of Land was stumped from unwanted roots in the soil that may likely prevent the crop from receiving its

required plant nutrient which will eventually have an adverse effect on the yield. The cassava cuttings were planted1mx1m apart within rows and 0.5mx1m respectively.

Soil Physical Properties of Experimental Site

Soil sample were taken for analysis to obtain the physical properties of the soil at the experimental site.

Determination of Field Capacity

The field capacity of the soil was taken using the gravitational method. The water available for the crop to grow was observed to be stable for plant growth and development. The plot of land was timed such that natural rain fell on it and a time frame of two days was given before commencing the experiment to prevent evaporation of the moisture present in the soil. An auger was introduced into the soil of various depth 10cm, 20cm, 30cm, and 40cm.This was done by screwing the auger into the soil and collecting the wet soil sample into a polythene bag. Small can was tagged A10, A20, A30, and A40 were weighed and the soil sample was poured into the empty can and weighted immediately, so that the moisture content in the soil will not evaporate before weighing. The samples were later taken to the oven and allowed to dry with a temperature of 104oc for about 6 hours .Finally, the dried soil sample were re weighted and result was computed using the formula:

$$\% \text{ Field capacity} = \frac{\text{Loss in weight}}{\text{Final dry weight}} \times \frac{100}{1} \quad \text{- -- - ----------Eq. 1}$$

Determination of Moisture Content (M. C.)

The moisture content was carried out on various plots on a weekly basis, of which the soil samples was taken at various depth ranging from 10cm,20cm,30cm,40cm,and 50cm with the aid of the auger. The soil was poured into a black nylon and taken for analysis following the current standard procedures for soil moisture content analysis.

Weed and Insect Control

The primitive method of weeding was implemented using hoe after weeding. After which the knapsack sprayer was introduced to weed the crop at the 8th month and sprayed with Nuvacron 40 which was mixed at the ratio of 50ml/10litres to prevent them from insects and pest attack. The primitive maintenance of the crop was carried out twice before harvesting. The first weeding was carried out third week after planting while the second was carried out the 8th month after planting.

RESULTS AND DISCUSSION

Physical Properties of Soil at the Experimental Site

This shows the physical properties of the soil at the experimental site.

TABLE 3.1 Physical Properties of Soil

Parameters	Percentage Composition
Field capacity	22.72%

This indicates that the soil is fertile and porous enough for the successful growth of manihot specie (cassava) at the demonstration site at Evwode in Ovia North East Local Government area of Edo State.

Average Moisture Content

Table4.2. Soil Moisture Content by Weight at the Demonstration Site.

Depth of soil (cm)	Mass of Water in the soil	Moisture content in percentage (%)	Volume of soil water	Depth of water in the soil (mm)	Days after planting
10cm	0.15	14.92	0.19	1.78	14
20cm	0.16	16.31	0.20	3.95	21
30cm	0.18	18.35	0.23	9.25	28
40cm	0.19	19.40	0.25	7.42	35

Table 4.3 Determination of Field Capacity

TRIAL POSITION	DEPTH OF SOIL(cm)	WEIGHT OF EMPTY CAN(gm)W	WEIGHT OF CAN AND WET SOIL (W1)	WEIGHT OF CAN AND DRY SOIL (W2)	WEIGHT OF SOIL SAMPLE (W3)	WEIGHT OF DRY SOIL SAMPLE (W4)
1A	10	26	107	85	81	59
B	20	27	123	101	86	74
C	30	26	175	158	149	132
2A	10	28	109	92	81	64
B	20	26	129	107	103	81
C	30	27	146	131	119	104

ANALYSIS

$$\text{Field capacity percentage (\%)} = \frac{\text{Loss in weight}}{\text{Final Dry weight}} \times \frac{100}{1}$$

$$\text{Field capacity (F.C.)} = \frac{W3-W4}{W4} \times \frac{100}{1}$$

CONCLUSION

Successful project do not just happen, they require structured planning using the right tools, insight management, and good interpersonal skills. The low rate of the adoption of an appropriate mechanization technology has remained one of the major factors militating against cassava production in Edo State. This tends to deprive the agricultural engineers from keying into the new paradigm shift of the value chain approach where they can easily identify reasonable points of interventions which drive towards solving the problems of cassava disease resistant varieties. (Doughty, L.R.1958).

RECOMMENDATION

Adequate financing of the agricultural sector in purchasing tractors powered equipments, implementation of policies and monitoring transformation programmers in the agro sector need to be properly addressed in order to sustain cassava production, harvesting and

post harvesting operation practices Mittal V.K et al 1988). I must say that cassava has taken a new pivot position in the agricultural sector because it is produced primarily for food in form of fufu, garri with little or no use in the agro business sector as an industrial raw material. Farmers should be encouraged to come together and form co operative and also placing competent executives who are agro inclined to supersede the affairs of the society in order to attract incentives. As such the farmers will be able to enjoy Government protection in their business. Tractors and accessories should be provided and readily available for them to hire at a subsidized rate. I will also indulge the management of the agro sector to see the need to introduce seminars on entrepreneurship development which will also serve as a forum for farmers to converge and share ideas and problems facing them in their respective cooperative units in the various local Government areas of the state. (Food Agricultural organization 1996).

REFERENCES

Akande L.O. (2006) Empowerment of the rural people through agricultural mechanization 'presented at the 2006 school conference, school of science, sun State College of Education.Ila –Orangun.

Alatise M.O. (1996).Research and mechanization, key to better agricultural production, Department of Agricultural Engineering Federal University of Technology, A paper published in the Nigerian Engineer official Journal.

Doughty, L.R.1958.Cassava breeding for resistance to mosaic and brown streak.1958pp48-55

Food Agricultural organization (1996).Declaration on World Food Security. World food Summit, November 13-17 (FAO) Rome.

Mittal V.K., Bhatia BS (1988).Low Cost Mechanization: its role in Green Revolution in India. Proceedings of C.I.G. Agriculture

Engineers held at the National Centre for Agricultural Mechanization, Ilorin, Nigeria, and Sept.5-10.1988.

Olatide O.J, Emeka, A, Bello Osagie V.E.(1980)Nigeria small farmers: Problems and prospects in Integrated Rural Development. CARD. University of Ibadan Pp 18-155.

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