

CHAPTER ONE

1.0. INTRODUCTION

Crop production is an integral part of agriculture, the other half is animal production or husbandry. Crop production can either be on a subsistence or commercial level. It is subsistence when the farmer produces for himself and family with a little for sale but it can be commercial when the farmer produces in a large scale for market consumption. Whichever type of production a farmer wants to embark upon, the knowledge of fertilizer and the nature of the soil is of utmost importance as this would go a long way in determining the farmer's output. Since the 90's agriculture in Nigeria that used to be at the front burner as the nation's chief income earner has suddenly taken a back stage as a result of over dependency on crude. Agriculture over time has been a major sustainer of Nigeria's economy before the discovery of crude oil otherwise known as black gold (Okoro 2005). Since its relegation to the background in Nigeria, it has been practiced at an alarming peasant level with most of the active stakeholders being largely subsistence agriculturists. Soil and fertilizer type are very significant factors in crop production. It is highly heterogeneous and this is the cause of differential rates of growth and yield on a parcel of land planted to the same crop at the same time and with the same management package (Olalokun, 1998). This is a source of frustration to crop farming as farmers cannot think of a particular management package suitable for their farmlands. Intensive cultivation and fertilizer application have become the cardinal aspect of soil management especially in the West African subregion. The response to fertilizer application in some cases is nothing to write home about; hence many farmers have been forced to abandon their farmlands.

Types of fertilizers

Fertilizers can broadly be grouped into two parts namely:

i. Organic fertilizers

As the name implies, these are fertilizers derived from human excreta, animal and plant matter such as compost and manure. Organic fertilizers generally have lower nutrient concentration than inorganic fertilizers.

Advantages of organic fertilizers

The following are the advantages of organic fertilizers

- They do not harm or burn plants when excessively applied on crops.
- They do not damage ground water.
- When applied on farmlands, they have long term positive effects on farmlands.
- Organic fertilizers are renewable, biodegradable, sustainable, and environmentally friendly.
- Although rather expensive in packages, you can make your own organic fertilizer by composting or find inexpensive sources—such as local dairy farms—that may sell composted manure.

Disadvantages of organic fertilizers

Organic fertilizers break down according to nature's rules, so they may not release nutrients as soon as you need them. You have to be patient – you won't see improvement overnight. In fact, you may actually see a deficiency in your plants during the first couple of months until the first application breaks down. Hang in there! You'll most definitely be rewarded.

Nutrient ratios are often unknown, and the overall percentage is lower than chemical fertilizers. However, some organic products are actually higher in certain nutrients.

ii. Inorganic fertilizer

Inorganic fertilizers are synthetic fertilizers that are produced from chemical or synthetic materials with defined proportion of desired chemicals that are beneficial to crops.

Advantages of inorganic fertilizers

Since nutrients are available to the plants immediately, improvement occurs in days.

They are highly analyzed to produce the exact ratio of nutrients desired.

Standardized labeling makes ratios and chemical sources easy to understand.

They're inexpensive.

Disadvantages of inorganic fertilizers

· If excessively applied, they can burn or harm plants.

· When applied, it can cause water or air pollution.

· Chemical fertilizers tend to leach, or filter away from the plants, requiring additional

applications.

-Long-term use of chemical fertilizer can change the soil pH, upset beneficial microbial ecosystems, increase pests, and even contribute to the release of greenhouse gases.

1.1. STATEMENT OF THE GENERAL PROBLEM

In Nigeria today, crop production has been largely inconsistent resulting to the lack of knowledge of the combination of soil type and fertilizer. This has led to general under production of crops in Nigeria. An adequate knowledge on the right combination would help to increase crop production and maintain that for a long time. There is equally a concern by farmers and researchers on the best type of fertilizer between organic and inorganic fertilizers to be used to increase crop yield. Researchers are also interested in knowing if inorganic or organic fertilizers performances are soil based. Another problem of farmers is to know the relationship between soil type and crop yield.

1.2. AIMS AND OBJECTIVES OF THE STUDY

This study is aimed at the following:

1. To know if there is a relationship and the nature of this relationship (if any) between soil type, fertilizer type and crop yield.
2. To know if there is a relationship between soil type and crop yield.
3. To know if there is a relationship between fertilizer type and crop yield.
4. To know the best combination of fertilizer and soil type that yields more crops.

1.3. SIGNIFICANCE OF THE STUDY

The significance or importance of this study is mainly to know if there is any relationship between fertilizer type, nature of soil and crop yield. Another importance of this survey is to know the soil type that encourages more crop yield. A major significance of this study is to know if there is a relationship between the following:

Soil type and crop yield, soil fertilizer type and crop yield. The nature of these relationships (if any) is also of utmost importance to us.

1.4. SCOPE AND LIMITATIONS OF THE STUDY

For the purpose of this study as the topic depicts, the scope of the study will be focused on how crops respond to the types of fertilization in each of the different types of soils. Another scope is to know if a relationship exists between fertilizer type, soil type and crop yield. A

major scope is to know the best combination of fertilizer type and soil nature or type that enhances crop yield. In the earlier stage of the study there is a detailed coverage of the techniques and methods used in judging whether crops responded well or not to fertilization by looking at their performances.

LIMITATIONS OF THE STUDY

It is necessary to mention some of the limitations of this research work. The chief limitation is the difficulty in obtaining relevant information in that a few of our values were missing but these missing values were not statistically significant enough to be noticed.

Notwithstanding, in the highlighted limitation above, it is hoped that this research will be useful to agricultural researchers, farmers and other similar organizations that may want to know the general response of crops to the types of fertilization on different soils.

1.5. DEFINITION OF TERMS

i. **Organic:** produced by or from living things.

ii. **Inorganic:** not consisting of or coming from any living substances.

iii. **Fertilizer:** a substance added to soil to make plants grow more successfully.

iv. **Crops:** a plant that is grown in large quantities, especially as food.

v. **Synthetic:** artificial; made by combining chemical substances rather than being produced naturally by plants or animals.

vi. **Soil:** the top layer of the earth, in which plants, trees etc grow.

1.6. RESEARCH HYPOTHESES

The research hypotheses are as follows:

HYPOTHESIS 1

H₀: there is no significant relationship between the fertilizer used and crop yield.

H₁: there is a significant relationship between the fertilizer used and crop yield.

Level of significance: 0.05

Decision rule: reject H₀ if p-value is less than the level of significance. Accept H₀ if otherwise.

HYPOTHESIS 2

H₀: there is no significant relationship between the soil type and crop yield.

H₁: there is a significant relationship between the soil type and crop yield.

Level of significance: 0.05

Decision rule: reject H_0 if p-value is less than the level of significance. Accept H_0 if otherwise.

HYPOTHESIS3

H_0 : there is no significant relationship between the soil type, fertilizer type and crop yield.

H_1 : there is a significant relationship between the soil type, fertilizer type and crop yield.

Level of significance: 0.05

Decision rule: reject H_0 if p-value is less than the level of significance. Accept H_0 if otherwise.

A MULTIVARIATE ANALYSIS ON THE RESPONSE OF CROPS TO FERTILIZER AND SOIL TYPES. (A CASE STUDY OF THE FEDERAL UNIVERSITY OF AGRICULTURE UMUDIKE, ABIA STATE)

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