Agrosearch
Vol. 1, No. 2, December 1995 pp 117–122

SMALL-SCALE FARMERS INDIGENOUS APPROACH TO SOIL FERTILITY IN SOME VILLAGES OF OYO STATE, NIGERIA.

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ABSTRACT

This study is an attempt to highlight the indigenous approach used by farmers to determine the level of fertility of a soil. It was found that soil color, certain grasses, shrubs, trees, weeds and worm casts were dominant criteria used by majority (87%) of the respondents. Similarly without visiting a farm plot, farmers assess the fertility of a soil sample by using colour, decaying plant (debris), soil texture, stickiness and weight of the soil as common approach. It is suggested that further research should be conducted to determine the contribution of grasses such as corn grass, Gamba grass, spear grass, shrubs such as broom weed and weeds such as *Aframomum scaptum* to soil nutrient enhancement. This could give greater insight to improving the indigenous approach of these small - scale farmers.

KEY WORDS: Indigenous approach, soil fertility assessment, small - scale farmers, Nigeria.

INTRODUCTION

McNamara (1990) commented that agricultural output in Africa was inadequate. This low output has further worsened the food crises, but it is a challenge to agricultural research which often focuses on the resources used in crop production. These resources include labour, capital, management, extension education and land.

The land resource, that is the soil, is perhaps the most important which has to be properly managed without decimation of its productive potential. According to Lal (1979), land resource is, to some extent, "hard to renew or reclaim". Its management has been through recommendations made by researchers and agro - scientists.

Until the late eighties, scientists had no consideration for the soil fertility assessment by the technology end-users, that is, the predominantly small - scale farmers. These farmers have often rejected the complex evaluation techniques recommended by the scientists and have resorted to the management of the soil with their indigenous approach. This indigenous approach is by the use of certain plant species as indicators of fertility level of the soil. This (plant-species) knowledge had been acquired by farmers over a long period of association with their environment. In this vein, Warren (1991) advocated for the recognition of this indigenous knowledge and the decision making system as important national resources that need not be ignored, neglected and sometime maligned.

The decision to cultivate a soil needs proper attention. While most of the modern soil management innovations have recommended the use of inorganic fertilizers, land rotation or a combination of other approaches, the latent skills in the farmers and their indigenous soil fertility criteria have been recognised.

The necessity to understand the indigenous approaches to soil fertility assessment is to enhance the means of communicating better to the farmers. This is because the task of increasing agricultural production has to be undertaken in a wide developmental framework. This includes not only providing inputs such as fertilizers, pesticides, technology and investment, but also involving the rural people in the process of development.

Given this foregoing, this study examined some indigenous approaches that is, plant related criteria used by small scale farmers in determining the soil fertility level which forms

the basis for their decision and choice of crop for cultivation.

The objectives of the investigation were to:

(i) ascertain selected socio - economic background of the small - scale farmers.

(ii) identify the indigenous plant - soil criteria used in determining the fertility level of a farm soil.

(iii) determine the indigenous criteria used in assessing the suitability of a soil for a given crop.

METHODOLOGY

Multi-stage sampling techniques was used. Out of the 26 Local Government Area (LGA) in Oyo State, one was randomly selected. The selected LGA was Ifedapo. At the LGA level, eight villages were selected as a result of their accessibility. The villages were Baasi, Ago - Are, Sabo, Agunrege, Ago - Amadu, Irawo - Ile, Koomi and Dogo. From each village, thirteen respondents (adult males and females) were purposively selected to give a total of one hundred and four (104) interviewees.

The purposive selection was in favour of aged (above 45 years old) farmers. This was to benefit from their lengthy years of farming experience and indigenous knowledge on soil fertility assessment. Information was obtained with the aid of an interview schedule administered by trained enumerators who were indigenes of the study area. Data were analysed by the used of simple descriptive statistics such as frequency and percentages.

RESULTS AND DISCUSSION

Socio - Economic Characteristics of Respondents

Majority of the respondents (81%) were married, and those with no formal education were fifty- two percent (52%). Fourteen percent (14%) had only primary education. Eighty three percent (83%) had over ten years farming experience, while forty three percent (43%) had above twenty years farming experience. Land acquisition is mainly through inheritance. This shows considerable years of experience the farmers had in farming and suggest the fact that the farmers will be used to their type of soil and ways of enhancing its fertility.

Indigenous Plant - Soil Criteria used in determining fertility level of a soil by respondents.

Farmer in the study are classified soil into: Sand Loam, Clay and Gravel (i.e "Yanrin," "Iledu," "Bole," or "Amo" and "Taara" respectively). The colours of identification by the farmers are white, black and red; hence we have such soils as black sand, white sand and red sand ("Yanrin dudu," "Yanrin funfun" and "Yanrin pupa" respectively). This is related to the proportion of organic matter content in each soil group and its location.

Table 1: Indigenous Criteria for soil fertility assessment of a farm plot

Plant-soil Criteria	Frequency	Percentage (%)
(a) Soil colour + certain grasses + shrubs + trees + weed + worn cast	91	87.5
(b) Certain grasses + shrubs + trees + worn cast (alone)	8	7.7
(c) Grasses, shrubs + trees + worn casts and weeds	5	4.8
Total	104	100.0

Source: Field Survey (1993)

Note: It was not possible to isolate single visible criterion for soil fertility assessment. This is because is may give an inappropriate result as the respondents used a combination of physical plant-soil indicators to describe their indigenous approach.

As noted in Table 1, the most common criteria used by 87.5 percent of the respondents were colour of the soil (whether red, black or white), certain grasses (e.g corn grass) shrubs, trees and weeds found on plots to be cultivated and the existence of worn casts.

The respondents indicated that some of the plants, that is grasses shrubs, trees and weeds often used for soil fertility assessment were the wild one which were neither deliberately planted nor used for food. The examples of such grasses are corn grass (*Rottboella* sp) referred to as "Holo" by the indigenes. Others are Gamba grass (*Andropogon* spp) - "Oruwa funfun"; giant blue stem grass (*Andropogon tectorum*) - "Oruwa pupa".

Among the shrubs common on fertile virgin plots are siam weed (*Eupatorium* sp) - "Akintola - taku"; Haemorrhage plant (*Aspilia africana*) - "Yunyun". Other weeds are *Aframomum scaptum* - "bobonta". The tree species are "Idofun" (*Parinari curate*, Iliafola); "Oruwon" (*Gardenia tenifolia*) and "Orupa" (*Hymenocardia* sp).

Those wild plants often encountered by the respondents on opened land i.e fairly used or fallowed land) are "Eekan" i.e Spear grass (*Imperata cylindrica*) : "Eeran" i.e. Digit grass (*Digitaria* spp) : "Ilosun" (*Pennisetum* sp) : Roro (*Tephrosia,sp*); Olosonkutu i.e broom weed (*Sida* sp) : Teleponla i.e wild lettuces (*Lectuce lexaxacifola*) : "Emile" i.e snake weed or garden spurge (*Euphorbia hirta*)

Some of the rationale in the use of these wild plants as indicators of soil fertility level could be the nutritive needs of plants which make them thrive in different habitats. This indirectly indicates the nutrients level in the soil. It was also discovered that about 8 percent of the interviewees did not use colour of the soil as an indicator of fertility. This may be as a result of their lack of expertise in the use of colour, it also suggests the difficulty in associating a particular colour with fertility level.

The use of worm cast as soil fertility index suggests that probably the worm would have created enough air space, introduce sufficient organic matter which might have decayed or mineralised into the soil.

Farmers could also assess the soil fertility of a soil sample without necessarily visiting/seeing the farm plot. The criteria often used by the respondents are as indicated in Table 2.

Table 2: Criteria used in assessing fertility level of a soil sample.

Criteria	Frequency	Percentage %
(a) Colour of soil + decaying plant debris + soil texture + stickiness of soil + weight of soil	80	84.7
(b) All of above in (a) + consulting gods (i.e local deities)	16	15.3
Total =	104	100.0

Source: Field Survey, 1993.

Note: In assessing the fertility level of a given soil sample, farmer use a combination of criteria to ensure adequacy/accuracy of their postulations or judgement.

As noted in Table 2, the common criteria used by most of the respondents were colour of the soil (whether black, red, or white), presence of decaying plant debris (humus), texture, stickiness and weight of the soil.

A soil that is dark in colour tend to have been as a result of decay of soil fauna and flora such as earthworms, termites, fallen plant leaves and decayed stems/roots of injured plant. So, the darker the soil, the more the tendency to be assessed as being a fertile soil.

Stickiness of soil suggest that soil fauna and/or flora would have cemented the soil particles together to create sufficient micro and macropores. Hence, a study soil is assessed as being fertile.

Weight of soil usually caused by cemented soil particles which creates sufficient micro and macropores also suggest soil fertility. Farmers associate weight with positive soil fertility index.

It is also to be noted that about 15 percent of the respondents sometimes take soil sample to local deities (or gods) such as "Osaale" or "Orisa - Ile" i.e god of land; there is also "Orisa oko", i.e god of forest and also the Ifa Oracle. The legacies inherited from their predecessors include the beliefs in these gods. . . The respondents reported that they do this to inquire from the gods whether the soil is fertile enough and whether they (farmer) will have good luck (i.e good yield) on that land. It was also found that most of these farmers who consulted local deities were traditional religion adherents. The benefits of their religion could have influenced them into taking soil samples to their native deities for assessment.

Indigenous Criteria used in Assessing the Suitability of a soil for a given crop.

The need to determine the fertility level of a soil in good, but it could be more rewarding if the crops that can grow well on such soils are known. The respondents were asked to indicate what they consider as those plant - soil issues that determine the crop to plant.

Table 3: Distribution of Indigenous Criteria in Determining suitability of a soil for a crop

Criteria	Frequency	Percentage %
(a) Similarity between colour of the growing grasses and crop to be planted + presence of certain weeds + height of the growing grasses and crops	84	80.8
(b) Colour of the growing grasses and crop to be planted + Height of the grasses and crops to be planted	14	13.5
(c) Height of growing grasses and crop to be planted + presence of certain weeds	6	3.7
Total	104	100.0

Source: Field Survey 1993

As observed in Table 3, the suitability of a given soil for the cultivation of a food crop could not be determined by a single criterion. Majority of the respondents (80%) indicated that suitability of a soil for crop production depends on the similarity between the colour of the crop to be planted and the grasses growing thereon e.g Iron weed; *Vernonia, ambigun* (locally called "Taba - Agbe) closely resemble the tobacco plant *Nicotiana, tabacum* i.e the "Taba Oyinbo". Similarity between height of the growing grasses on the soil and the height of the crop to be planted is also important. For instance, land on which tall grasses such as corngrass - *Rottboella, conchinchinensis,* locally refereed to as "Holo" is found may likely support guinea corn, another tall plant.

As discussed during the interview, the presence of certain weeds such as "Akintola taku" (local name) i.e *Eupatorium sp* suggests that crops like cowpea grow more vegetatively but with less yield. This may be attributed to their nitrogen fixation. Similarly, soil on which Bobanta i.e *Afran momum secptum* is found may be good for yam production. This may be linked to their provision of support.

CONCLUSION

Cultivated crops can only perform better when the quality and quantity of soil nutrients are sufficient. However, most of the soil fertility enhancement technology have been developed without full appreciation of, and contribution from the intended beneficiaries, that is, the farmers. In most cases, the small - scale farmers have resorted to partial or selective adoption of certain elements in such innovations when found to be relevant or outright rejection of them. In the latter situation, their indigenous approach becomes a better companion. The exposition into these indigenous plant - soil criteria should serve as basis for agronomic and pathological research to determine the contribution of certain weeds such as *Eupatorium.sp* ("Akintola "taku"), *Rottboella.sp* and others to soil fertility enhancement.

Similarly, extension service should design better strategies to solicit these indigenous knowledge from the farmers with a view to making this available during the Monthly Technology Review Meetings(MTRMS) with the Researchers/Subject Matter Specialists (SMS) and the Forthnightl Trainings (FNTs) meetings with other extension peers.

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