| | |
|---|---|
| **Title** | **Promoting Human Waste Technology Transfer as Requirement for Sustainability of Crop Production in Nigeria** |
| **Keywords** | Human waste, crop, sustainability, poverty alleviation and Nigeria |
| **Author(s)** | Meludu, Nkiru |
| **Address** | University of Ibadan |
| **Telephone** | |
| **Fax** | |
| **E-mail** | |
| **Short CV for Introduction Purposes ( 100 words max)** | |
| **Photograph attached ( jpg)** | |

**Promoting Human Waste Technology Transfer as Requirement for Sustainability of Crop Production in Nigeria**

*Keywords: Human waste, crop, sustainability, poverty alleviation and Nigeria*

## Introduction

Nigeria is blessed with abundant resources and tropical climate, which allows for the growth of a wide variety of agricultural crops. Agriculture is expected to contribute to national development by serving as a source of abundant, affordable and high quality food for the growing population; a source of adequate and reliable supply of raw material to the industries; a source of decent employment and income for those engaged in agricultural production; a major contributor to foreign exchange earnings through export of tradable agricultural commodities. In the sixties, the sector provided food for the country's population and was a major exporter of several agricultural crops which included cocoa, groundnut, coffee and contributed about 60 percent of the Gross Domestic Product (GDP) (NISER, 2000). But as earnings from crude oil exports gained ascendancy in the seventies, the nation's agriculture started to fall and its contribution to GDP began to reduce. In the eighties, Nigeria became a net importer of food and the nation's agriculture could no longer provide adequate income for those in agricultural sector. Agriculture's share of total export has been uneven over the years but very low due to the decrease in the quantity and value of agricultural export.

## Main Traditional Commodities Produced and Exported

The main traditional tradable crops are cocoa, coffee, rubber, palm kernel, cotton seed and groundnut. Table 1 shows the production output of tradable agricultural products in the five year period under review, production increased for cocoa, cotton and groundnut by 17.9, 15.9 and 14.3 percents respectively. . For others, the growth rate was 12.7 percent palm kernel, 11.2 percent rubber, 9.8 percent coffee and 5.8 percent soy bean. Cocoa has the highest growth rate, which explains the high index of trade for the crop during the period as shown in table 2.

**Table 1: Agricultural Tradable Crop Production Trend ('000tons)**

| Crops | Years | | | | |
|---|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 2000[1] | 2001[2] |
| Cocoa | 145 | 160 | 165 | 170 | 171 |
| Coffee | 184 | 188 | 194 | 200 | 202 |
| Cotton | 309 | 329 | 351 | 353 | 358 |
| Palm kernel | 550 | 572 | 600 | 629 | 620 |
| Rubber | 250 | 255 | 265 | 275 | 278 |
| Groundnut | 2101 | 2222 | 2307 | 2390 | 2401 |
| Soy bean | 326 | 327 | 333 | 339 | 345 |

Source: CBN Annual Report, 2001.

**Table 2: Index of Trade in Tradable Crops**

| Years | Cocoa | Rubber | Oil-palm | Groundnut |
|---|---|---|---|---|
| 1960-64 | 100 | 100 | 100 | 100 |
| 1965-69 | 120.1 | 87.1 | 76.1 | 97.8 |
| 1970-74 | 119.4 | 77.9 | 46.4 | 26.4 |
| 1975-79 | 105.4 | 55.9 | 35.4 | 0.21 |
| 1980-84 | 67.0 | 34.0 | 10.3 | 0.52 |
| 1985-89 | 96.4 | 81.6 | 19.2 | 0.17 |
| 1990-94 | 78.9 | 137.9 | 14.1 | N.A |
| 1995-98 | 121.6 | N.A | N.A | N.A |

Source: Adapted from CBN (2001).

With the exception of rubber, the index of trade for cocoa, oil palm and groundnut had shown a reduction over the period from 1965 to 1994. Food crops are being intercropped with tradable annuals with similar production objectives. The non-traditional crops with potentials for export include cassava, soy bean, benni seed and other spices. These crops are being produced often with commercial objectives but are being traded within the regions in the country.

However, most of these non tradable must use fertilizers to ensure the production of substantial yields and enough quantity for export. The main medium of crop nutrient, the soil, constitutes the farmers' most important production capital (Obigbesan, 1999). Unfortunately, most Nigerian soils have low inherent fertility (Osiname, 2000; Vanlauwe, 2000) and fragile physical structures prone to degradation and erosion as a result of constant agricultural practices (Fagbami and Ogunkunle, 2000). More so that the scope of expansion in agricultural areas is limited by land tenure system, explosive demographic growth and non-agricultural land development uses (roads, urbanization, industrial estates, petrol station and packs. Therefore, farmers are forced to cultivate continuously the same pieces of land which in some places are under competition with the nomads, grazing around the farm areas. On the other hand improved crop varieties of are often very fertilizer intensive.

**Fertilizer procurement and distribution in Nigeria**

Each state government imported its own fertilizers which resulted in price difference with little or no control on the quantity of fertilizer type and packaging material. The fertilizer procurement, pricing, subsidy and distribution was centralized in 1977 after the launching of "Operation Feed the Nation" (OFN) Program.

**Table 3: Fertilizer Procurement Arrangement**

| *Year* | *Import* | *Local sources* | *Total supply* | *% local supply* |
|---|---|---|---|---|
| 1988 | 384,500 | 365,500 | 750,000 | 49 |
| 1989 | 400,000 | 500,000 | 900,000 | 56 |
| 1990 | 706,000 | 608,000 | 1,314,000 | 46 |

| | | | | |
|---|---|---|---|---|
| 1991 | 400,000 | 600,000 | 1,000,000 | 60 |
| 1992 | 610,000 | 800,000 | 1,410,000 | 57 |
| 1993 | 645,000 | 745,000 | 1,390,000 | 54 |
| 1994 | 850,000 | 800,000 | 1,650,000 | 49 |
| 1995 | - | 835,000 | 835,000 | 100 |

Source: Anon, (1980).

In a way of reducing fertilizer importation, the Federal Government of Nigeria approved plans for the domestic production of fertilizers. The Federal Superphosphate Fertilizer Company (FSFC) based in Kaduna in 1976 and National Fertilizer Company of Nigeria (NAFCON) based in Onne in 1987 (Sobulo, 2000). A recent review was commissioned by the National fertilizer Center, the technical arm of the fertilizer procurement and Distribution Division of the Federal Ministry of Agriculture and Natural Resources in 1990. However, these companies continued to import one chemical or the other. Consequently, the situation contributes to the high cost of production and the poor farmer subsequently pays high prices for the fertilizer when it is available. It has been observed that Nigeria use the largest share (60 %) of all fertilizer in Sub Sahara Africa (Naseem and Kelly, 1999). Sobulo and Aduayi, (1990) emphasized that the future of agriculture in fertilizer use will depend on development of organic based fertilizers, which will in turn provide the required nutrients as well as enhance the soil organic matter content.

It is against this background that this paper seeks to identify the predicament facing Nigerian farmers in their strategy to use fertilizer and to promote the use of human waste technology as requirement for sustainability of crop production in Nigeria. This study was carried out in Akinyele Local government of Oyo State Nigeria. The population for the study covered all crop farmers in the area. The number of the farming population was not known, however 80 head of farming households were randomly selected from ten different villages within the Local Government Area for the study. Data were collected through the use of questionnaire with open ended questions. The statistical tools that were used are descriptive (frequency and percentage and inferential statistics ($Chi^2$ & Spearman rho) using SPSS package.

**Result**

Management of soil fertility has maintained a prominent priority since the inception of agricultural production research and extension in Nigeria. Still agricultural production has continued to decline leading to food insecurity. The result showed that most of the respondents (44 %) are illiterate (Table 4); the efficient use of fertilizer by illiterate farmers remains incomprehensible. Inadequate knowledge of fertilizer type, as well as the time, rate and mode of application and growing of low yielding remains their characteristics. Most of the villages covered had no school, lack pipe born water, no electricity and very poor road networks that are not easily assessable.

**Table 4 Distribution of the educational attainment of the respondents**

| *Educational attainment* | *Frequency* | *Percent* |
|---|---|---|
| Non formal education | 35 | 43.8 |
| Adult literacy education | 2 | 2.5 |
| Primary school education | 24 | 30.0 |
| Secondary school | 19 | 23.7 |

| | |
|---|---|
| education | |

It was also discovered that majority of the respondents (70%) are above 40 years, 20 percent are 30 to 39 while 10 percent were 20 to 29 years. Table 5 shows that the respondents are all peasant generation farmers. Many of them (61 %) have been farming for more than 30 year. These generations dwindle by day and could not be expected to sustain medium scale to large scale farming extensively.

**Table 5: Distribution of the respondents experience in farming**

| *No of years* | *Frequency* | *Percent* |
|---|---|---|
| > than 10 years | 3 | 3.7 |
| 10 - 20 | 7 | 8.7 |
| 21 - 30 | 21 | 26.3 |
| 31 - 40 | 22 | 27.5 |
| 41 - 50 | 17 | 21.3 |
| Above 50 | 10 | 12.5 |
| Total | 80 | 100 |

Majority of the respondents (80 %) have very poor toilet system. About 18 percent built pit toilets while only two percent had water closet system. One can imagine how these people pass their excreta. It was found that the respondent, get into the bush and farm lands to pass out excreta. They feel that nothing was wrong with that as their culture permits it.

The respondents engage in cultivation of different types of cash crops for home consumption and for income generation for sustainability of their households due to their large family sizes. These crops include cassava, yam, maize, cocoyam, cocoa, plantain banana, fruits and leafy vegetables (Table 6). Some of these crops have export potentials; therefore, their production needs to be enhanced.

**Table 6: Distribution of the type of crop grown by the respondents**

| ***Crop grown*** | ***Frequency*** | ***Percent*** |
|---|---|---|
| Cassava | 10 | 12.5 |
| Yam | 12 | 15.0 |
| Cocoa | 8 | 10.0 |
| Maize | 5 | 6.3 |
| Cocoyam | 1 | 1.2 |
| Leafy vegetables | 11 | 13.8 |
| Yam, maize cassava, plantain | 2 | 2.5 |
| Cassava, yam, maize | 26 | 32.5 |
| Yam, cassava, cocoyam | 4 | 5.0 |
| plantain | 1 | 1.2 |
| **Total** | **80** | **100** |

Figure 1 shows that almost all the respondents (99 %) do not have access to fertilizer. In trying to determin specifically the nature of the problem facing the respondents in getting access to fertilizer, they complained bitterly that they did not see fertilizer to buy and even when they get information that it could be found in the city, it is very expensive. Thereby making it very difficult for them to buy and utilize in their farms.

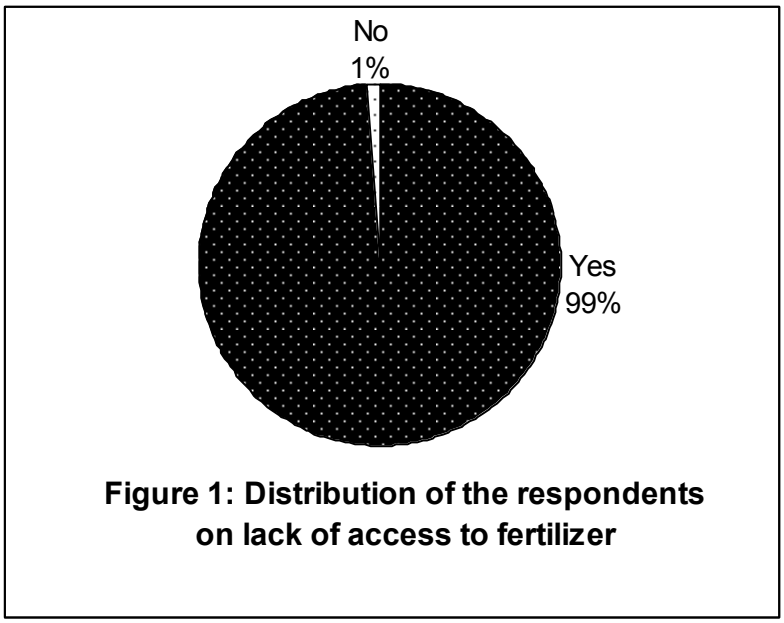


**Figure 1: Distribution of the respondents on lack of access to fertilizer**

On the alternative manure used to improve soil fertility since the respondents complained of poor soil quality that has resulted in low productivity. Many of them said they did not have. Also more than half of the respondents (64 %) believed that it is possible that human waste (excreta) can enrich the soil nutritionally, only seven percent said it is not possible and nine percent were undecided. Fifty two percent of the respondents had used human waste on their farms before not because they did apply it but because of the culture of indiscriminate passing out of excreta on every farm and in every bush. About 21 percent indicated that they had never used it before; while seven percent were don't know answers. Also more than half of the respondents (69 %) believed that it makes crop grow better. Just very few (31 %) felt that the crop grew not necessarily because of human waste. Interestingly, majority of the respondents (60 %) accepted that they could use human waste on their farm as manure if the smell is reduced. Only 12 percent opined that they will not use it. In answering the question on any form of excreta treatment or decomposition before use, 40 percent do not give it any form of treatment. However, 60 percent of the people that use excreta on their farm said they use sifting cultivation method as form of treatment. That means that they allow people to pass excreta on the farm that they are not planting during a particular season until it had regained fertility before shifting back to that farm.

**Table 7: Chi-square test of relationship**

| *Variables* | *Experience in farming* | | | |
|---|---|---|---|---|
| | $X^2$ | df | P | decision |
| Knowledge of human waste improvement on soil fertility | 30.007 | 10 | .001 | Significant |
| Use human waste | 55.851 | 10 | .000 | Significant |

The result in table 7, showed significant relationships between respondents experience in farming and their knowledge that human waste can improve soil fertility. Also there was a positive relationship between experience in farming and use of human waste on the farm. That means that only the respondents that have been farming for so many years are aware that human waste can enrich the soil nutrient and that is why they probably allow it on their

farms. However, spearman R showed no correlation between scarcity of fertilizer and use of human waste, r = -076; p = 0.504. That means that the respondents did not use human waste because they could not get fertilizer.

**Conclusion**

There is a major cultural attitude of the people that needs to be changed. Passing of excreta on open fields around the living areas and in the bushes as a health issue requires a change. This is done indiscriminately as it has become a way of life. So this is where the problem lies as indiscriminate passing of excreta is not good for health. Promoting the reuse of this waste in cultivation will be an alternative way of solving this problem. The human waste is fertilizer, which the farmers can easily see, cheap and affordable. It is therefore recommended that this promotion should be done through awareness campaign on the sanitary implications of indiscriminate excreta disposal; followed by educating the farmers on its nutritive importance to crop and for them to go on with shifting cultivation as a form of excreta management before the land will be used. By that time decomposition would have taken place and it will do little harm to the crop or human being. On a large scale as high population concentration increases the government should built public latrines for the collection of waste and then taken to a treatment center and send back to the farmers to use at affordable cost.

**References:**


Anon (1980).Fertilizer and their Application to Crop in Nigeria. Federal Ministry of Agriculture Lagos

Central Bank of Nigeria (2001). Annual Report and Statement of Accounts.

Fagbami, A.A and Ogunkunle, A.O. (2000). Soil Survey, Land and Agronomy: The Nigerian Case Study. Agronomy in Nigeria pp 163-169

Naseem, A.; Kelly, V. (1999). Food Security II Cooperative Agreement, Michigan State, University. www.http://eldi-org/static/Doc7298.htm.Accessed April 2005

Nigeria Institute for Social Economic Research (2000). The State in Nigeria Development NISER Review Ibadan pp. 35-47,193-200

Obigbesan, G.O. (1999). Fertilizers: Nigerian Farmer's Delimma. An Inaugural lecture University of Ibadan, Ibadan Nigeria. pp. 4-13

Osiname, O.A. (2000). Soil Fertility in Nigeria: My Experience. Agronomy in Nigeria. pp. 183-187

Sobulo, R.A. (2000). Fertilizer Use and Soil Testing in Nigeria. Agronomy in Nigeria page 195

Vanlauwe,B. (2000). Soil Organic and Crop Production in a West African Context. Agronomy in Nigeria page 202


**Acknowledgments**


I appreciate the effort of Mrs Moji Oyewole in the administration of the instrument and data collection for this study.