Online Journal of Earth Sciences 1 (1): 47-50, 2007

Application of Indigenous Knowledge on Land Use Activities among Farmers in Central Southeastern Nigeria

[1]E.U. Onweremadu, [2]C.C. Asiabaka, [3]O.M. Adesope and [4]N.S. Oguzor
[1]Department of Soil Science and Technology, Federal University of Technology, PMB 1526 Owerri, Nigeria
[2]Department of Agricultural Extension, Federal University of Technology, PMB 1526 Owerri, Nigeria
[3]Department of Agricultural Economics and Extension, University of PortHarcourt PMB 5323, PortHarcourt, Nigeria
[4]Department of Agricultural Education, Federal College of Education (Technical), Omoku, Nigeria

Abstract: This study investigated the applicability of soil survey information on land use activities in Abia and Imo States, Southeastern Nigeria. Data were collected through the use of structured interview schedule. Simple percentages were used to analyse data. The findings revealed that soil colour (28%) and soil organic matter (27%) were known by farmers. Land use for residential homes (44%) and farming (38%) dominated other land use types. Fallowing (40%), mulching (13%) and terracing (10%) were popular soil conservation practices. Soil survey information was scarcely used in all the land use activities. It is therefore recommended that extension agents should help farmers with scientific information to complement their indigenous knowledge. It is only through this that progress can be made in effective land use.

Key words: Conservation, degradation, land use, soil information, southeastern Nigeria

INTRODUCTION

Soil as a natural resource is a significant component of land which Adesope (2002a) noted as a cherished resource of rural inhabitants. This is obviously because agricultural production depends almost always on land. There is no doubt that soil provides adequate substrate for crop and animal production enterprise. It is also useful in other enterprises like agro-processing and aquaculture. The soil resource of a nation remains one of the most invaluable natural endowments. Soil has both utilitarian and aesthetic values and varies in time and space. The value of soil for agriculture and other uses increases over time but its quality declines due to population-induced and economy-driven demands for necessities of life. It becomes demanding for soils to be investigated as a way of generating information vital to sustainable soil management (Fanning, 2004). Earlier Holdren *et al.* (1995) observed that accurate assessment and mapping of soils are imperative as many land uses depend on soil and unavailability of soil data is resulting to mismanagement of the resource and its sustainability.

Soil survey studies at varying intensities can give spatial and temporal information on soil's physical, chemical and biological properties. Consequently, the soil manager uses data acquired in survey activities in assessing the resource potential for environmental management, including soil nutrient recycling (Scherr and Yadav, 1996). This enhances wise decision on land use. Non- use of soil survey information has resulted in soil and soil-related environmental problems like nutrient depletion, nutrient toxicity, collapse of architectural structures, compaction, flooding, poor yield and food insecurity. These problems are aggravated by socio-economic pressures on the soil caused by population increase (Ruecker *et al.*, 2003).

In Nigeria and indeed most developing countries, soil data are scanty. Lal and Ragland (1993) observed that the available soil data are not translated into problem-solving technology. This could be why soil data are rarely used (Smith *et al.*, 2004). Now, many land uses depend on soil and non-application and/or untimely availability of scientific information on soil is resulting in many constraints which threaten the resource's sustainability. The spate of soil degradation in southeastern Nigeria by soil erosion and or the agency of water, becomes a source of concern to individuals, non-governmental bodies as well governmental agencies. In many instances farmers apply their common local knowledge to various land use activities. Indigenous knowledge is the local information that is peculiar to the people of a particular culture in a society. It refers to various understandings, skills, ideas

Corresponding Author: E.U. Onweremadu, Department of Soil Science and Technology, Federal University of Technology, PMB 1526 Owerri, Nigeria

that are used by members of a locality for their day-to-day activities in order to foster the development of the locality (Adesope, 2002b). According to Okwu and Okwoche (1998) the indigenous knowledge of farming community is derived from the local people`s farming experience handed down from previous generations and that of the current generation. With this knowledge they can better the natue of their soil for the purpose of improved agriculture. However, studies on soil information as it relates to indigenous knowledge are scanty. This study therefore intends to determine how indigenous knowledge is applied to land use activities. This is with a view to understanding its importance in soil survey information in central southeastern Nigeria which is one of the most ecologically degraded area in the region. Results of this investigation will equip extension agents, government and interest groups to the devise appropriate strategies for ameliorating constraints relating to non-application of soil survey information.

MATERIALS AND METHODS

The study site is Abia and Imo States with an area of 13, 032 Km^2 and lying between latitudes $4°40^1$ and $8°15^1N$ and longitudes $6°40^1$ and 8^015^1E (Federal Department of Agricultural land Resources, 1985). Abia and Imo States were divided into six agricultural zones for the purpose of the study. Each agricultural zone consists of several local government areas. In each agricultural zone, 100 big farmers were selected by simple random sampling, giving a sample size of 600 farmers. A big farmer here represents one registered and recognized by the agricultural unit of the local government area, most of whom have sizeable farms. The target population was about 50,000 farmers. Interviewers were drawn from localities for easy communication with respondents.

Data were collected with the aid of structured interview schedule, containing simple, clear, logical, less ambiguous, close and/or open-ended questions were developed and used for the investigation. The interview schedule was divided into four sections; namely: knowledge of soil parameters; the prevailing land uses; current soil conservation practices; and applicability of soil survey information on farmers' land use activities including soil conservation practices. Validation of the interview schedule was done, using content validity method, which is a way of determining the relevance and suitability of the items included in the study (Chuta, 1992). Following jury method as used by Ajayi (1996), items contained in the draft interview schedule for the research work were subjected to thorough examination and criticism by three lecturers in the Department of Agricultural Extension, Federal University of Technology, Owerri Nigeria. The relevance and suitability of items as determined by the lecturer-experts formed the base for the development of the final interview schedule which was used to collect data for the investigation. Data were collected through personal interviews with farmers. Data collected were analyzed using percentages.

RESULTS AND DISCUSSION

Soil parameters: Table 1 shows the distribution of respondents in terms of their knowledge of soil parameters. Soil colour and organic matter were popular among the respondent farmers. Soil colour was used by both literate and illiterate farmers to estimate soil fertility. To the farmers, a dark soil portends very fertile soil. Adesope (2002b) reported that farmers in rural areas have local knowledge to determine whether soil is fertile or not. In some quarters, a land that boasts of much Siam weed (*Chromolaena odorata*) is regarded as fertile. Foth (1984) identified soil colour as the most obvious and easily determined soil property useful in making many important inferences regarding soil genesis and land use. Likewise organic matter was popular possibly because respondent believe organic matter is associated with the colouring of soils especially at the epipedal level. However soil colour may not be so reliable as some parent materials of soils are naturally dark-coloured and may generically lead to the formation of dark soils. Most respondents did not understand the meanings of some other soil parameters.

Land use practices: Common land use practices in the study area are presented in Table 2, with land for

Table 1: Knowledge of soil parameters

Soil parameters	(%)
Soil reaction	4
Soil texture	7
Soil structure	16
Soil colour	28
Soil moisture	10
Soil organic matter	27
Soil consistence	2
Soil aeration	4
Soil cation exchange capacity	2
Total	100

Table 2: Distribution of common land use practices

Land uses	(%)
Farming	38
Forestry	2
Residence	44
Industry	3
Park	0
Sports	0
Mining	2
Government offices	3
Vocational centres	5
Market locations	3
Total	100

residence (44%) and farming (38%) occupying over 80% of land use. It can be adduced from these results that respondents hold housesit prime among other numerous land uses and this tends to limit the availability of land for agriculture. With poor land use planning amidst rising population, soil resource becomes the most limiting factor for the sustenance of life in the study site. The available soil resource after housing is allocated to farming with diminishing desire to go into forestry (2%). Low use of land for forestry could be due to long gestation period of forestry enterprises coupled with the fact that the venture requires large expanse of land.

Soil conservation: Using land for agriculture often results in the net removal of soil nutrients which must be replenished to provide a lasting cropping base. Non-sustainable use of land has resulted in massive land degradation and soil infertility (Udoh *et al*., 2002). Results of the study as shown in Table 3 reveals that fallowing (40%) and mulching (13%) were commonly applied in soil conservation; However, use of terraces (10%) was popular in the hilly terrains of the northernmost part of the study area. Similar findings were made by Odii who reported that fallowing was a major agronomic soil conservation practice in southeastern Nigeria. But the prime motive for adopting fallowing according to the respondents is for soil fertility regeneration while mulching and terracing are for conservation. With population explosion and shortening of fallow period in the area (Onweremadu, 1994), soils become vulnerable to forces of land degradation especially soil erosion. Again, as diversion ditches are popular on steep slopes (Hudson, 1983), it may be necessary to take into consideration subsoil characteristics in order not to initiate gully_@erosion from such channels. However, most of these traditional conservation practices are not keeping pace with the current strength of degrading forces.

Applicability of soil survey information: The rates of application of soil survey information are shown in Table 4. Majority of the respondents do not use soil survey information (8%). This could be attributed to the inability of soil scientists and farmers users to come together and share expertise ideas (Smith *et al*., 2004) as well as the fact that scientific data are not translated into problem-solving technology (Lal and Ragland, 1993). Again, the Zambian farmers opted for land capability maps in preference to soil maps as the latter were strange to them (Woode, 1981). In view of these Akamigbo (2002) called for the simplification of the language of delivery of soil survey information in sub-tropical Africa to for the enhancement of the use of soil survey data. This will certainly entrain sustainable soil management and consequently sustainable agriculture.

Table 3: Application of soil conservation practices

Conservation practices	(%)
Diversion ditch	12
Bunding	5
Terrace	10
Storm drains	4
Fallowing	40
Sand bags	3
Crop rotation	1
Stone hill	3
Agro-forestry	7
Farm yard manure	2
Mulching	13
Total	100

Table 4: Applicability of soil survey information

Rate of application	(%)
Regularly	2
Occasionally	12
Not used	86
Total	100

CONCLUSION

The importance of indigenous knowledge to farmers in Nigeria and specifically central southeastern Nigeria cannot be overemphasized. This study has found that knowledge of soil parameters was scanty except soil colour and soil-colour related organic matter,. Use of land for residence and faming dominated land use in the study site. Bush fallowing was popular in both soil conservation and soil fertility restoration. Soil survey information was rarely applied in land use activities but is an imperative for appropriate land use allocation and of sustainable soil management. It is therefore recommended that extension agents should help farmers with scientific information to complement their indigenous knowledge. It is only through this that progress can be made in effective land use.

REFERENCES

Adesope, O.M., 2002a. Compound farmers utilization of soil conservation management and improvement practices in the Niger delta area of Nigeria. J. Environ. Exten., 3: 89-92.

Adesope, O.M., 2002b. Indigenous knowledge and practices in the Nigerian society. In: Okoh C., *et al*. (Eds), General Studies Project. Science and Technology in Society. Omoku: Molsyfem United Services.

Ajayi, A.R., 1996. An evaluation of the socio-economic impact of the Ondo State Ekiti-Akoko ADP on the rural farmers. Ph.D Thesis, Department of Agric. Exten. Univ. Nig. Nsukka, pp: 134-158.

Akamigbo, F.O.R., 2002. Application of soil survey information for agricultures and environment. Paper presented at the 5-Day US-Nigeria Technical Assistance Programme. 2nd soil survey workshop, NRCRI, Umuahia, pp: 11.

Chuta, C.R., 1992. Comparative assessment of training needs for agricultural administrators in Imo and Bono States of Nigeria. Ph.D Thesis, Univ. Nig. Nsukka, pp: 1-89.

Fanning, D.S., 2004. The University of Maryland soil monoliths collection and some associated history. Soil Surv. Horizon, 45: 7-13.

Federal Department of Agricultural Land Resources, 1985. The reconnaissance soil survey of Imo State, Nigeria (1: 250,000). Soils Report, pp: 133.

Foth, H.D., 1984. Fundamentals of soil science. John Wiley and Sons, New York, pp: 435.

Holdren, J.P., G.C. Daily and P.R. Ehrlich, 1995. The meaning of sustainability: Biogeophysical aspects. In Munasinghe, M. and W. Shearer, (Eds.), Defining and measuring sustainability: The biogeophysical foundations. The United Nations University (UNU) and The World Bank, pp: 141.

Hudson, N.W., 1983. Field engineering for agricultural development. Oxford Univ. Press, NewYork, pp: 225.

Lal, R. and J. Ragland, 1993. Agricultural sustainability in the tropics. ASA Special Pub., 56: 16

Okwu, O.J. U.A.O. and Okwoche, 1998. A review of communication of agricultural technologies through indigenous knowledge system. In: Olowu, T.A. (Eds.), Sustainable agricultural extension in Nigeria. Proceedings of the 3rd Annual National Conference of Agricultural Extension Society of Nigeria.

Ruecker, G.R., S.J. Park, T. Sali and J. Pender, 2003. Strategic targeting of development polices to a complex region: A GIS-based stratification applied to Uganda. ZEF-Discussion Paper on Development Policies, Bonn, pp: 41.

Scherr, S.J. and S. Yadav, 1996. Land degradation: A threat to developing country food security by 2020? Food, Agriculture and Environment. Discussion Paper 2. Int. Food Policy Res. Inst. Washington D.C., pp: 36.

Smith, J., S. Pager and M. Holderness, 2004. Knowledge based soil health for sustainable agriculture CABI Bioscience, U.K., pp: 2-3.

Udoh, E.J., I.C. Idiong and G.N. Odok, 2002. Issues in sustainable land use and management in the rain forest belt of sub-saharan Africa. J. Environ. Exten., 3: 16-20.

Woode, P.R., 1981. We don't want soil Maps Just give us land capability. The role of land Capability surveys in Zambia. Soil and Land Eval., 11: 2-5.