Journal of Occupational Safety and Environmental Health
A Publication of the Society for Occupational Safety and Environmental Health

FARMERS' PERCEPTION OF THE INTEGRATED SOIL FERTILITY MANAGEMENT TECHNOLOGY IN KATSINA STATE, NIGERIA

Muhammad, M.B., Halliru, I. and C.A. Mayojo
Department of Agricultural Extension and Management, Samaru College of Agriculture, Ahmadu Bello University, Zaria, Nigeria
Corresponding author's e-mail: musabakomuhammad@gmail.com

ABSTRACT
Soils in Northern Guinea Savannah zone in Nigeria are continually been degraded as a result of continuous cultivation especially of cereal crops. They perceived soil degradation mainly by reduced yields. International Fertilizer Development Centre (IFDC) Africa implemented the International Soil Fertility Management (ISFM) Project to increase efficiency of resource use particularlyof fertilizer. Most of the farmers in the study area hardly use Improved Soil Management practices. This study therefore investigates farmers' perception of the Integrated Soil Fertility Management technology in Danja Local Government of Katsina State. Total of sixty (60) farmers representing 20% of the pilot farmers involved in this pilot scheme were randomly selected from Danja, Tsangamawa and Kahutu villages. Structured questionnaires were used to obtain information from the respondents. Descriptive statistics was used to analyze the data. Results of the study revealed that most (82%) of the respondents were males while 95%were married. Also, majority (35%) have non-formal education. All farmers belong to one associations or the other since it is a pre-requisite for participating in the ISFM project. The farmers generally see the ISFM technology as positively impactful in their livelihood due to the observed increased yield by 95% of the respondents and improving the soil fertility (98%)by using available nutrient resources more efficiently, effectively, and sustainably than in the past.. Major constraint is the scarcity of crystallizer and lack of sufficient credit facility. The study recommends optimising advantages of group dynamics by both governmental and non-governmental agenciesto ensure input and credit availability.
Keywords: Farmers' perception, soil fertility, integrated management technology, fertilizer

INTRODUCTION
For about 70% of the world's poor who lived in rural areas, agriculture is the main source of income and employment. But depletion and degradation of land and water pose serious threats to producing enough food and other agricultural products to sustain livelihoods in the rural areas and meet the needs of the urban populace. The dependence on agriculture is even greater in developing countries like Nigeria where it commands a relatively high proportion of the economy's land, labour and capital resources. The accomplishment of the task of self-sufficiency in crop production and improvement in the quality of life in the rural areas, it is vital to shift from the drudgery of age long use of traditional methods of production to the use of new technology or innovation. According to Onasanya *et al*., (2006) improvement in the quality of life is possible and can be faster through adoption and adaptation of modern technology in agriculture. Thus, much of the expected development in agriculture depends on the adoption and participation in diffusion of innovations. Research in the development of farming systems in crops of the Northern Guinea Savannah has been continually conducted by the Institute of Agricultural Research in Ahmadu Bello University, Zaria since its inception in 1922. Successes recorded had been due to both its staff and the support of local and international organizations. An example of the Institute's collaborative activities is the

Integrated Soil Fertility Management with the International Fertilizer Development Centre (IFDC). Integrated soil fertility management (ISFM) is a set of agricultural practices adapted to local conditions to maximize the efficiency of nutrient and water use and improve agricultural productivity. ISFM strategies center on the combined use of mineral fertilizers and locally available soil amendments such as lime and phosphate rock and organic matter such as crop residues, compost and green manure to replenish lost soil nutrients, hence improving the fertility of the soil.

Nigeria's soils, like so many of its people, are hungry. Soil nutrient depletion and population increases have caused per capita food production to decrease over the past 40 years in Sub-Saharan Africa in general and Nigeria, in particular. Nigerian farmers have traditionally cleared land, grown crops for a few seasons and then moved on to clear more land. This practice left the abandoned soil fallow, allowing it to regain its fertility. But constant population growth now forces farmers to continually plant crops on the same land, 'mining' the soil while giving no nutrients back. Soil fertility – the capacity of the soil to supply nutrients to a crop – is critical for smallholder farmers to feed themselves and increase their incomes. This results in International Fertilizer Development Centre implemented the ISFM project to increase efficiency of resource use especially fertilizer. Most of the farmers in the Nigeria as is the case with the study area rarely use improved soil management practices. This theme became more serious in the study area where soils have undergone continuous cropping of cereals over the years after experiencing the outbreak of rosette disease, which ravaged the farmers' groundnut farms due to the depletion of the major soil nutrients thereby rendering production uneconomic.

The Institute of Agricultural Research in collaboration with the International Fertilizer Development Centre introduced the Integrated Soil Fertility Management (ISFM) technology in Danja Local Government Area with the aim of reviving the soil and brings it back to production. This technology was introduced in 1999 and ended in 2005. Despite the huge investment in the ISFM project in the study area, little study has been conducted to determine the Farmers' Perception of the Integrated Soil Fertility Management Technology. Thus this study was designed with the objectives of identifying the demographic characteristics of the farmers in the study area, their perception of causes of soil erosion,level of awareness and adoption of ISFM technology by farmers and also identify the problems encountered by the farmers in the course of adoption of the ISFM project.

MATERIALS AND METHODS

The study was conducted in Danja Local Government Area of Katsina state in the Northern Guinea Savannah agro-ecological zone of Nigeria. The pilot zone consists of seven villages that were grouped into 3 contiguous areas based on proximity to one another. The villages are Danja, Tsangamawa, Alhazawa as one area; Dabai and Kahutu as the second area while Saye and Bazanga is the third area. The area has two distinct seasons – a dry season from October/ November to March/April when vegetation decrease to a minimum and the rainy season. Minimum temperature ranges between 18°-22°C. The 5-6 months rainy season receives average of 900mm-1200mm of rainfall and main crops grown include maize, sorghum, cowpea, soybean, groundnut, rice, millet and some vegetables. The vegetation in the area has been altered by man's considerably over-riding influence mainly through cultivation and bush burning. Livestock rearing, especially of cattle, sheep and goats, is also very common. Dominant Soil types in the study areas are Alfisols and Utisols. The topography of the land is gentle undulating land with shallow valleys and Fadama flood plains. A two-stage random sampling technique was employed to draw sample

Table 1: Demographic Characteristics of Farmers

Variables		Frequency	%
Age	26-35	9	15
	36-45	11	18.5
	46-55	27	45
	Above 55	13	21.7
Gender	Male	49	81.7
	Female	11	18.3
Level of Education	Qur'anic education	21	35
	Primary education	12	20
	Secondary education	10	16.7
	Tertiary education	70	11.7
	Adult education	10	16.7
Method of land acquisition*	Inheritance	54	90
	Purchase	28	46
	Lease	1	1.7
	Gift	3	5.0
Membership of Association	Cooperative society	60	100
Source of finance*	Personal savings	52	86.7
	Borrow from Esusu cooperative	11	18.3
	Borrow from family	14	23.3
Source of Input*	Open market	49	81.7
	Cooperatives	55	91.7
	Government	6	10

*Multiple responses allowed, Source: Field Survey, 2011

respondents. In the first stage, out of the total of seven villages, three villagesthat participated in the project were randomly selected. The selected villages are Danja, Kahutu and Tsangamawa. At second stage, a total of 60 farmers representing 20% of the farmers that participated in the ISFM/ IAR project were randomly selected from a sample frame from the IFDC/IAR office in Zaria. The study relied mainly on primary data collected with the use of interview schedule from the selected respondents. The interview schedules that employed a 5-point Likert scale were personally administered bythe researchers. Data was collected based on the demographic characteristics of the respondents, perception of the ISFM/IAR project and constraints the farmers face in the project..Data were analyzed using descriptive statistics such as frequency counts and percentages.

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of farmers in Table 1 revealed that most (82%) of the farmers in the study area were males while 17% were females. Also, about half (45%) of the farmers were middle aged implying probable strength to handle the drudgery involved in farming while 95% were married. This could mean eagerness in learning better ways of improving livelihoods of the household. All the respondents have one form of education or the other. 35% had Qur'anic education and 20% attained primary level of education. About 90% acquired land through inheritance while 47% purchased the land. This might have aided the acceptance of the ISFM project as the farmers saw it as a way of enhancing their soil contrary to a probable nonchalant attitude had the land been leased or borrowed. Table 1 also revealed that all farmers belong to one co-operative association or the other since it is a pre-requisite for the project. The table also showed that 87% of the respondents financed their farming activities by use of personal savings while 23% resorted to borrowings. Nearly all (92%) obtained their inputs from the cooperatives.

Table 2: Distribution of farmers according to level of awareness and adoption of ISFM technology

Technological component	Awareness		Adoption	
	Frequency	%	Frequency	%
Fertilizer P_2O_5 180g & Urea 150g/ha	58	96.7	40	66.7
2 rows of maize and 2 rows of soybean	60	100	50	83.3
2 rows of sorghum & 2 rows of soybean	60	100	56	93.3
Broadcastingmethods of fertilizer application (P_2O_5) before ridging	54	90	28	46.7
. Maize (Obasuper 2) at 0.75m x 0.5	60	100	55	91.7
Sorghum 0.75m x 0.4m, soybean at 0.75m in-between	60	100	60	100

*Multiple responses allowed; Source: Field Survey, 2011

These findings are in tune with the one of the objectives of the ISFM project in terms of enjoying dividend of group formation towards self-reliance.

Findings in Table 2 indicated that nearly all the respondents were aware of the technology while most (67%) adopted the technologies with the exception of fertilizer broadcasting in which 47% adopted. This is due to the perceived wastage of scarce and expensive resource they see in the fertilizer broadcasting component of the ISFM technology. The farmers thus prefer to use the conventional side application of the fertilizer. As shown in Table 2, therewas no resistance from the farmers to adoptmost of the ISFM technology and they have positive attitude towards it. Attitude and perceptions of the farmers who are the end users of the various activities that makes up the ISFM package must be taken into account. Genene *et al*., (2003) opined that perception and knowledge is crucial for successful research and development strategies and that many promising agricultural policies have failed because they were inappropriate to farmers need and perception. Thus, table 3 showed perceived causes of soil erosion, which led to soil depletion. from the results obtained, it shows that the main cause of soil erosion is excessive rainfall (85%) followed by Poor soil conservation technology (80%) while bush burning ranked third as perceived cause of soil erosion by farmers in the study area. Over grazing (15%) and crop residue removal accounted for the least perceived causes of soil erosion by the farmers.

Table 3: Distribution of farmers' perception of main causes of soil erosion

Main cause	Frequency	%
Excessive rainfall	51	85.0
Poor soil conservation technology	48	80.0
Bush burning	43	71.7
Over cultivation	34	56,7
Population pressure on land	19	31.7
Over grazing	9	15.0
Crop residue removal	3	5.0

Multiple responses allowed
Source: Field Survey, 2011

Table 4 identified the constraints of adoption of ISFM technology by the respondents. The study showed that scarcity and unavailability of crystallizer that is the major input promoted by this technology was identified by all as the major constraint the farmers faced in the ISFM project in the study area. Other constraints include insufficient credit facility (98%), exorbitant price of fertilizer (88%) and poor access roads to the market (67%). Least constraints the farmers mentioned include inadequate extension visits (27%) and complexity in adopting the ISFM technology (7%).

CONCLUSION

This research was designed with the objectives of examining farmers' perception of the integrated soil fertility management technology. The productivity obtained from farming activities has boosted the output of the farmers since it was observed that farmers' awareness and adoption of the

components of the ISFM technology had made the farmers efficient in the use of the soil resource thus improving their access to the otherwise degraded input. The study therefore recommends timely introduction and provision of inputs for the effective use of this technology. This, in addition to the easy provision of credit facility can be achieved through use of the advantages of group dynamics of the farmers in the study area. Also, construction of rural feeder roads by the Local Government could improve the transportation of goods and services. Lastly, the ISFM technology should be extended to other parts of the country where the soils nutrients were found to have depleted.

Table 4: Distribution of farmers according to the constraints they faced in the use of the ISFM technology

Constraint	Frequency	%
Scarcity and unavailability of crystallizer	60	100
Insufficient credit facility	59	98.3
High price of fertilizer	55	88.3
Poor access roads to the market	40	66.7
Inadequate extension visits	16	26.7
Complexity of the ISFM technology	5	6.7

Multiple responses allowed.
Source: Field Survey, 2011

REFERENCES

Genene, T, Legesse, D and Wagayehu, B. (2009). Farmers' perception of land degradation and its consequences to food insecurity at middle catchment of bilate watershed, SNNPR. pp. 65-75. *In* Proc. of the National Conference on Sustainable Land Management and Poverty Alleviation, December 2009, Ethiopia, Addis Ababa.

Institute for Agricultural Research (2001). Annual Report of the ISFM Project of the Input Accessibility Programme, Ahmadu Bello University, Zaria.

Onasanya A.S., Adedoyin, S.F. and Onasanya, O.A. (2006). Communicationfactors affecting the adoption of innovation at the grassroots level in Ogun State, Nigeria. *Journal of Central European Agriculture*, 7(4): 601-608.

Yahaya M.K and Omokhafe SB (2001). Cocoa farmers' perceived influenceof communication on utilization of improved cocoa seed technologies in Owan-East Local Government Area of Edo State. *Moor Journal of Agricultural Research*, 2(2): 199-207.