

Farmers' Awareness, Preference and Adoption of Soil Conservation Practices in Zing Local Government Area of Taraba State, Nigeria

Philip Hegarty James* Adam Lawan Ngala

Department of Soil Science, Faculty of Agriculture, University of Maiduguri, PMB 1069, Maiduguri, Borno state Nigeria

*Corresponding author's email: hega2014@gmail.com

Abstract

This study examined the awareness, preference and adoption of soil conservation practices among farmers in Zing Local Government Area of Taraba State. A multistage purposive and random sampling technique was used in selecting the respondents used for the study. A total of 50 farmers were selected from five farming communities (10 farmers in each in Lamma, Monkin, Bitako, Zing A and Zing B). The result indicated most of the farmers (80%) practice conservation techniques. 10%, 4% and 6% of the respondents are aware of the practice but never practiced it, not aware and have practiced but given up, respectively. Reasons for the practice of soil conservation techniques included immediate monetary gain (100%) and prevention of erosion (96%). Other reasons include 78%, 76%, 66%, 58% and 40% improving soil fertility (78%), preventing erosion (76%), reducing heat stress (66%), and ensuring long term sustainability of land (58%) and advice of extension agent (40%). 48% indicated that they are just doing what other farmers are doing. Farmers are aware of soil conservation practices and many are practicing various types.

Keywords: Awareness, Preference, Adoption, Soil Conservation practices

Introduction

Nothing is more basic to long term survival of the human species than the availability of fertile soils to maintain plant and animal population. Yet, soils have been mined by erosion, constant cultivation and extraction of available nutrients. The productive 'A' horizon of a soil profile that contained most organic matter, available nutrients and essential living soil organisms is virtually gone in many areas due to long cultivation, leading to land degradation. Land degradation is the temporal or permanent lowering of the productive capacity of soil caused by over grazing, deforestation, inappropriate agricultural practices, over exploitation and other man induced activities (Mbagwu, 2003). Beinroth *et al.* (1994) sees land degradation in terms of the loss of actual or potential productivity or utility as a result of natural or anthropic factors. It is the decline in land quality or reduction in its productivity. Land degradation-mostly human induced-is potentially a more critical problem. Increasing population pressure, cultivation of the marginal agro-ecological environment susceptible to various types of land degradation and inappropriate soil management are resulting in serious soil productivity decline, especially under extensive farming practices.

According to FAO, out of the approximately 2,976 million ha total land area in Africa, 2,145 million ha (72%) are problem soils with different production constraints (soil acidity, steeply sloping soils, low fertility, shallow and stony soils, saline and poorly drained soils) AGL (2000). Out of these areas about 490 million ha are affected by different types of degradation. It further noted that poor and inappropriate soil management is the main cause of physical, chemical and biological degradation of cultivated land. Junge *et al.* (2008) noted that agrarian stagnation, plaguing food security in sub-Saharan Africa (SSA) since the early 1970s may exacerbate with the projected climate change along with the attendant increase in risks of soil and environmental degradation. Soil degradation and desertification are already severe issues in SSA, where smaller size and resource poor farmers follow extractive farming practices. Soil depletion and erosion thus, constitute a hazard whose containment is a prerequisite for national development, particularly in societies that are agriculture-based (Iheke and Onyenorah, 2012). In many SSA, fallow periods are being reduced considerably and farmers are increasingly cultivating marginal lands susceptible to various forms of degradation. This is manifested by declining yields, decreasing vegetation covers, salinization and fertility decline and increasing erosion (Mbagwu, 2003).

In Nigeria, human induced soil degradation is a common phenomenon. Its severity is high for 37.5% of the area (342, 917 km²), moderate for 4.3% (39, 440 km²), high for 26.3% (240, 495 km²) and very high for 27.9% (255, 167 km²) (FAO, 2005). Soil erosion is the most widespread type of soil degradation in the country and has been recognised for a long time as a serious problem (Stamp, 1938). The expansion of agriculture into marginal areas, deforestation, the shortening and elimination of fallows, inappropriate farming practices and low input inevitably have several environmental and economic impacts in Nigeria where the resilience ability of the soil is limited (Lal, 1995). Mbagwu *et al.* (1984) observed that soil erosion caused a yield reduction of about 30 – 90%

in some root sensitive shallow lands of southern Nigeria. Land degradation will remain an important global issue for the 21st century because of its adverse impacts on agronomic productivity, the environment and its effect on food security and the quality of land (Eswaran *et al.*, 2001).

Scherr, (1999) observed that soil provide living things with food, fibre and fuel. It supports wildlife and rural and urban activities. From the end of the 1940s to the beginning of the 1990s, over 90% of the degradation of the productive lands was due to overgrazing, deforestation and inappropriate agricultural practices. The changes in the soil affect over 2 billion people, most of the people (852 million) suffering from hunger in particular. In Nigeria, over 80% of the cropland region is ravaged by erosion (NEST, 1991). The mean annual loss of crop productive capacity through land degradation is estimated to be 25 million tonnes (Adediji, 2000). This has led to low yield, famine, low standard of living, decrease in availability of fuel wood, food insecurity, poverty and migration of rural dwellers (Olatunji, 2003). Rural farmers often aim at maximizing immediate returns from the land regardless of erosion. It has been noted that yields of crops are higher on crop farms with conservation practices than farms without conservation practices in the same ecological zone (Ibewiro *et al.*, 2000; Salako and Tian, 2003; Tian *et al.*, 1999). Aromolaran (1998) observed that land owners received the benefit of soil conservation in the long term. The author further stated that maintenance of soil productivity in the long run is a proper social goal of conservation, but it is only a minor economic factor influencing the farmers small scale farms.

From the foregoing, it is imperative to examine farmers' awareness, preference and adoption of soil conservation practices in Zing Local government Area of Taraba State. This is important owing to the fact that farming is the major occupation of the inhabitants and high incidences of soil degradation especially erosion is recorded there.

The Study Area

The study was conducted in Zing Local Government Area of Taraba State, Nigeria. Zing lies between latitude 8° 45' and 9°10'N and longitudes 11°35' and 11°50'E. It has a total land area of 867 km² and a population of 127, 362 inhabitants with an annual growth rate of 3.0% (NPC, 2006). The study area consists of six districts with 75 major villages; each village having approximately farm families ranging from 255 – 783 (TADP, 2005). The climate of the study area is typically a tropical climate marked by dry and rainy seasons. The mean annual rainfall ranges from 819 to 1761mm spreading over seven months (April to October). The study area is within the Savannah grassland belt particularly in the Guinea Savannah sub-region characterised by scattered deciduous tall trees with broad leaves and tall grasses. The major soil types are the hydromorphic and ferruginous tropical soils. The soil type is a mixture of loams and sands, and on the hilly terrain, deep loamy soils are found in between rocks. On the relief configuration, the study area can be categorised into two zones, highland mountain range and lowlands. The highlands occupy the southern region stretching from west to south in chains of mountain with elevation ranging from an average of 1, 800 – 2, 400 metres high forming the Atlantica, Shebshi and Adamawa massifs ranges. The lowland which occupies about 60% of the region hosts most of the settlements in the region. Major food crops cultivated in the area include yam, sorghum, bambaranut, groundnut, millet, maize and rice.

Methodology

A multistage purposive and random sampling technique was used in selecting the respondents used for the study. Five communities were selected from the Local Government area based on the concentration of farmers in these communities using simple random sampling. The selected communities were Lamma, Monkin, Bitako, Zing A and Zing B. Then the purposive selection of crop farmers in each chosen community formed the respective sampling frames from which 10 crop farmers were randomly selected from each of the selected community. In all, a total of 50 respondents were used for detailed study.

Results and Discussion

Farmers' awareness and practices of soil conservation practices were identified and each of these practices were analysed and presented in Table 1. Most of the farmers (80%) are currently engaged in the practice of manure/plant residue application which involves leaving plant residues on the furrows to rot and add to soil nutrient, 10% of the farmers are aware of the practice but never practiced it, 4% are not aware and 6% have practiced but given up. All the farmers in the area are currently engaged in mixed farming and mixed cropping. This agrees with Olukosi *et al.*, (1991) who reported that mixed farming and mixed cropping has been traditionally practiced and is still very common in Nigeria. Majority of the farmers (80%) in the study area are currently engaged in using fertilizer. Fertilizers are applied on farm purposely for direct supply of plant nutrients, especially on depleted soils. About 10% of the farmers have given up on the practice probably due to non-accessibility and high cost.

The farmers in the study area are very much aware of the practice of crop rotation, bush fallowing and

shifting cultivation. 80% of the farmers are currently engaged in crop rotation and shifting cultivation and 70% in bush fallowing. They are aware that soil nutrients rejuvenate after the soil is lay fallow for some time.

The results for the reasons for choosing particular soil conservation practices by farmers are presented in Table 3. Multiple responses were recorded. All the farmers chose immediate monetary gain as the main reason for engaging/adopting soil conservation measures. 96% indicated preventing soil erosion as the reason why they adopt certain soil conservation measures. 78%, 76%, 66%, 58% and 40% indicated improving soil fertility, preventing erosion, reducing heat stress, and ensuring long term sustainability of land and advice of extension agent, respectively as the main reason for adopting certain soil conservation measures. 48% indicated that they are just doing what other farmers are doing.

Conclusion

Results from the study have shown that farmers in the study area are aware of many soil conservation practices and many of them are currently engaged in them. This, probably, is due to the many advantages of soil conservation.

References

- Aromolaran, A. B. (1998). Economic Analysis of Soil Conservation Practices in South West Nigeria. Issues in African Rural development. Monograph Series. African Rural Social Research Network, WinRock Int.
- Beinroth, F. H., H. Eswaran, P. F. Reich and E. Van Den Berg (1994). Land Related Stress Agroecosystems. In: Virmani, S. M., J. C. Katyal, H. Eswaran, and I. P. Abrol (eds). *Stress Ecosystems and Sustainable Agriculture*, New Delhi: Oxford and IBH
- Eswaran, H., R. Lal and P. F. Reich (2001). Land Degradation: an overview. In: Bridges, E. M., I.D. Hannam, L.R. Oldeman, F.W.T. Pening de Vries, S.J. Scherr, and S. Sompatpanit (eds). Responses to Land degradation Proc. 2nd. International Conference on Land degradation and Desertification, Khon Kaen, Thailand, Oxford Press, New Delhi, India.
- Food and Agriculture Organization (2005). Global Assessment of the status of Human-induced Soil Degradation. FAO, Rome.
- Junge, B., R. Abaidoo, D. Chikoye, and K. Stahr (2008). Soil Conservation in Nigeria: Past and Present On-Station and On-Farm Initiatives. Soil and water Conservation Society, Ankeny, USA.
- Ibewiro, B., N. Sanginga, B. Vanlauwe, and R. Merckx (2000). Nitrogen contributions from decomposing cover crops residues to maize in a tropical derived savannah. *Nutrient Cycling in Agroecosystems*, Vol. 57: 131 – 140.
- Iheke, O. R., and C. O. Onyenorah (2012). Awareness, Preferences and Adoption of Soil Conservation Practices among Farmers in Ohafia Agricultural Zone of Abia State, Nigeria. *Journal of Sustainable Agriculture and the Environment*.
- Lal, R. (1995). *Sustainable management of Soil resources in the humid tropics*. New York: United Nations University Press.
- National Population Commission (NPC). (2006). 2006 Census Result, National Population Commission, Abuja, Federal Republic of Nigeria.
- Nigerian Environmental Study/Action Term (NEST) (1991). Nigerians Threatened Environment: A National Profile. NEST Publications, Ibadan.
- Salako, F. K., and G. Tian (2003). Soil Water Depletion Under various leguminous cover crops in derived savannah of West Africa. *Agriculture, Ecosystems and Environment*, 100(2&3): 173 – 180
- Scherr, S. J. (1991). *Soil Degradation: A Threat to Developing- Country Food Security by 2020?* International Food Policy Research Institute, Washington, DC
- Stamp, L. D. (1938). Land Utilization and Soil Erosion In Nigeria. *Geographical Review*. 28: 32-45
- Taraba Agricultural Development Programme (TADP) (2005). Taraba State Village Listing Form
- Tian, G., G. O. Kolawole, F. K. Salako, and B. T. Kang (1999). An Improved Cover Crop-fallow System for Sustainable Management of Low Activity Clay Soils of the Tropics. *Soil Science* 164(9): 671 – 682.
- Yusuf, M. B., and H. H. Ray (2011). Farmers' Perception and Responses to Soil Erosion in Zing Local Government Area of Taraba State, Nigeria. *Ethiopian Journal of Environmental Studies and Management* 4(1) :

Table 1: Awareness and Practice of Soil Conservation Practices

Soil Conservation Practices	Awareness Status							
	Aware but never practiced		Not aware		Currently engaged		Practiced but given up	
	Freq	%	Freq	%	Freq	%	Freq	%
Manure/plant residues	5	10	2	4	40	80	3	6
Use of cover crops	4	8	1	2	35	70	10	20
Mulching	8	16	5	10	30	60	7	14
Use of fertilizer	2	4	0	-	43	86	5	10
Crop rotation	5	10	0	-	40	80	5	10
Bush fallowing	0	-	0	-	35	70	15	30
Shifting cultivation	0	-	0	-	40	80	10	20
Minimum tillage	20	40	12	24	18	36	0	-
Zero tillage	35	70	0	-	15	30	0	-
Mixed farming	0	-	0	-	50	100	0	-
Mixed cropping	0	-	0	-	50	100	0	-
Strip cropping	15	30	20	40	15	30	0	-
Terracing	10	20	35	70	5	10	0	-
Agro-forestry	35	70	2	4	15	20	3	6

Table 2: Farmers' Preference of Soil Conservation Practices

Soil Conservation Practices	Preferences					
	Most preferred		More preferred		Preferred	
	Freq	%	Freq	%	Freq	%
Manure/plant residue	40	80	6	12	4	8
Use of cover crops	35	70	10	20	5	10
Use of Fertilizer	35	70	10	20	5	10
Mulching	34	68	11	22	5	10
Crop rotation	38	76	12	24	0	-
Bush fallowing	35	70	10	20	5	10
Shifting cultivation	30	60	15	30	5	10
Minimum tillage	10	20	30	60	10	20
Zero tillage	10	20	15	30	25	50
Mixed farming	42	84	6	12	2	4
Mixed cropping	45	90	5	10	0	-
Strip cropping	0	-	40	80	10	20
Terracing	2	4	28	56	20	40
Agro-forestry	25	50	10	20	15	30

Table 3: Reasons for choosing particular soil conservation practice

Reason for adopting soil conservation practices	Frequency	*Percentage
To increase yield	48	96
To improve soil fertility	39	78
To prevent erosion	38	76
To ensure long-term sustainability and productivity of land	29	58
To prevent or reduce heat stress	33	66
To ensure immediate monetary gain	50	100
Advised by extension agent	20	40
Just doing what others are doing	24	48

* = multiple responses

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library , NewJour, Google Scholar

