

Agricultural Land Revitalization/Management Practices Against Climate Change Menace in Land Degraded Areas of Southeast, Nigeria

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Abstract

The study was carried out to assess land revitalization and management practices against the menace of climate change in southeast, Nigeria. Multi-stage sampling technique was used in selecting a total of 180 respondents in the study area. Well structured questionnaire was used to elicit information from the respondents. Descriptive statistics such as percentages and mean presented in tabular forms were used to analyze and interpret data. The study revealed that the major causes of land degradation were flooding (96.6%), erosion (97.7%), heavy rainfall (91.6%) among others. To revitalize/manage land in the study area, the respondents practiced land rotation (fallow), crop diversification, cover cropping, agro-forestry, crop rotation, regular weeding and others. Again, the study revealed the problems in use of the practices to include high cost of labour, low productivity, poor price of produce, land tenure and fragmentation problems among others. It was recommended that government should provide the respondents with soft-loan without interest, and reform the agrarian law of the land to give farmers more access to land.

Keywords: Land degradation, climate change, management

INTRODUCTION

The countries of sub-Saharan Africa are besieged by serious environmental degradation resulting in desert encroachment, draught and soil erosion due to either wind impact or very high intensive rainfall resulting in heavy runoff and soil loss. The problems have adversely affected agricultural productivity and thus casting doubt of food security in the zone (Igwe, 2012). The ecological and social settings in the zone are often distorted some times leading to losses in human and material capitals. In Nigeria desertification and aridity are the major environmental problems of the Northern part of the country, while the high torrential rainfall of the southern Nigeria creates enabling environment for catastrophic soil erosion in the region.

Throughout the history of the world, one of the greatest and persistent threats to human existence has been environmental degradation (Onumadu *et al.*, 2001). Nigeria has a growth rate of about 2.5 percent with an estimated population of about 130 million (Akegbejo-Samson and Aromolaran, 2000). This population explosion has put significant pressure on the natural resource base available for human sustenance with resultant decrease in fallow period of land, intensification in land use, declining land productivity, rapid soil losses and disruption of water resources (Kuponiyi, 2001). The rapid increase in population means a reduction in the available land space for farming and consequently reduced food production. In many agriculture-based poor economies soil erosion and degradation of agricultural land present a threat to food security and sustainability of agricultural stagnation. According to Shiferaw and Holden (2001), declining per capita, availability of cultivable land, accompanied by lack of technologies for intensification of land use, force rural people to either expand farming into marginal erodible slopes or the remaining forest. In Nigeria, it has been found that most people engage in several income generating activities to 'make a living' with various combination of farm

and non-farm activities (Olawoye, 2001). The sustainability of many of these income generating activities is however often not assured under conditions of insecure access to productive and natural resources, environmental degradation and economic instability (Olawoye, 2001).

The threats and subsequent destruction of land by soil erosion and land degradation has been the subject for intensive debate in the literature (Scherr and Satya, 1997; Brabant, 1996). Over the years the destructive process has continued with increased intensity, quantum and rate, such that its devastating effects had subjected the communities to high risks of loss of lives, properties and the natural land that supports their livelihood including extreme difficulties in marketing their products. The land in south East Nigeria has been considered as low lying nature that exposes the surface areas to flooding, coastal and sheet erosion, thus, resulting to the removal of the affected soil (Urama, 2005). This paper examines the extent of threats and mitigation of soil erosion and land degradation in south east Nigeria that may have affected the market potentials of the area in the marketing of their products.

The physical damages to land and soil through land degradation in the South East portend the greatest threats to the lives and properties of the citizens that living a normal life is seen as a war to survive natural land disasters. The exposure of the citizens to unpredictable land disaster and the consequent crises of not cropping with the effect of going without food, sudden evacuation and relocation of inhabitants of the areas especially in planning the marketing of products among others have remained highly disturbing, that prompted the urgent need to investigate these situations empirically.

Objectives of the Study

The objectives of this study are to determine:

- (i) The causes of land degradation in the study area,
- (ii) To identify land management and revitalization practices in the area,
- (iii) To describe constraints the respondents sustainable land revitalization

METHODOLOGY

The study was carried out in South-East, Nigeria. South-East is one of the geo-political zone of Nigeria. It lies within latitude 5° N to 6° N of the equator and longitudes of 6° E and 8° E of the Greenwich meridian. The zone is made up of five (5) states – Abia, Anambra, Ebonyi, Enugu and Imo. The zone occupies a land mass of about 10,952, 400 hectares with a projected population of about 16,381,729 persons (NPC, 2006). The economy is agro-based. The crops grown include cassava, yam, maize, plantain, banana, pineapple, oil palm among others. Animals like sheep, goats, pigs poultry etc abound. There exist pockets of fish ponds. The zone is also acclaimed for crude oil deposit in Imo and Abia and recently Anambra. Multi-stage sampling technique was used to select respondents. The first involves the purposive selection of three (3) states – Imo, Anambra and Abia from the zone. The second stage involved the selection of two (2) local area councils from each state where land degradation is a problem, making six (6) area councils. The third stage involved the purposive selection of two (2) communities each from the local councils where land degradation is a constant problem. This gives us twelve (12) communities. The final stage involved the random selection of fifteen (15) farmers each from the list of households obtained from the village/community heads. This gives a total of one hundred and eighty (180) respondents. Questionnaire was used to collect data from respondents. Data collected were analyzed using descriptive tools of analysis such as percentages to achieve objectives 1, 2 and 3. While objective 4 was achieved using a 4 point likert-like scale of measurement of very serious, serious, less serious and not serious assigned weight of 4,3,2 and 1 divided by 4 to get a discriminating index of 2.50. Any mean response 2.50 and above was adjudged serious constraint to land management.

Causes of Land degradation in Southeast Nigeria

Table 1 shows the causes of land degradation occasioned by climate change variability. The major causes included overgrazing of land with 91.0%, sand excavation (93.8%), uncontrolled urban expansion with 82.2%, erosion with 97.7%, flooding with 96.6%, oil spillage (76.1%), heavy rainfall with 91.6%, while over-cultivation of farmland had 93.3%. Other causes were deforestation (87.2%), and population pressure with 78.3%. The causes of threats to land can not be isolated from the natural and human activities. Land has been subjected to intensive pressure from human uses that induce degradation. The human factors may include overgrazing, excessive farm activities, tillage, clearing of bushes, extractive industries, road construction, bush burning, over population, lumbering, residential buildings, development of urban centers, industrialization, fumigation with pesticides, agricultural activities, mining (open cast and soil excavation, has left deep gully at various locations). This includes mining of lime stone, quarry sites, coal and other illegal mining of

minerals. There is also the borrowed pits for road construction works that are left open and untreated, the exploration for firewood and bad management of forests including pollution of land and natural habitat with chemicals. The natural factors in land degradation could include wind and water soil erosion, torrential rainfall, floods, land slides, earth quakes, desertification, drought, acid rain, acid and salt accumulation, retreating forests, and sand dunes accumulation as well as pests' attacks that decimates the forests trees. The use of irrigation as potential source of agricultural farming and water supply could have negative effects with improper management. This may result in increased erosion, pollution of surface water and ground water from agricultural biocides, deterioration of water quantity, increased nutrient levels in the irrigational drainage water resulting in algal blooms, proliferation of aquatic weeds, and entrophication in irrigation canals and downstream water ways (FAO, 1997; Urama, 2003).

Table 1. Causes of Land degradation in selected states

Causes of Degradation	* Frequency	Percentage
Deforestation	157	87.2
Overgrazing	164	91.1
Population pressure	141	78.3
Sand excavation	169	93.8
Uncontrolled Urban expansion	148	82.2
Erosion	176	97.7
Flooding	174	96.6
Oil pollution/spillage	137	76.1
Heavy rainfall	165	91.6
Over cultivation	168	93.3

Field survey Data, 2015 *Multiple response

Land Revitalization/Management Practices

Table 2 at a glance shows the various land management/revitalization practices used by respondents to adapt under climate change menace. There were about 17 practices employed by respondents. These practices included intercropping with 97.2% response, fire management with 92.7% response, regular weeding with 96.6%, proper timing of planting (87.2%), practice of agro forestry with 92.7%, crop rotation (94.4%), crop diversification (97.2%), avoidance of slash and burn (87.7%), manure application (93.3%) compost making (85%), Land rotation (91.6%), Mulching (71.6%), planting basin/pit (86.1%), diversion ditches/drainage (82.2%), and terrace making with 78.8%.

Table 2. Land Revitalization/Management Practices Against Climate Change

Management Strategies	*Frequency	Percentage
Raising mounds/ridges	134	74.4
Mulching	129	71.6
Land rotation (fallow)	165	91.6
Compost Making	153	85.0
Manuring/cover cropping	168	93.3
Zero tillage	147	81.6
Avoiding slash and burn	158	87.7
Agro-forestry practices	167	92.7
Crop rotation	170	94.4
Crop diversification	175	97.2
Timing of planting	157	87.2
Regular weeding	174	96.6
Inter cropping	176	97.7
Terrace making	142	78.8
Planting basin/pits	155	86.1
Diversion ditches/drainage	148	82.2
Fire management	167	92.7

Field Data, 2015 *Multiple response

Constraints to Land Management/Revitalization

Table 3 showed the problems respondents faced in managing their lands. With a discriminating index of 2.50, the table showed that non-availability of labour with a mean 3.42. This could attribute to the fact that young men are leaving the village for the cities in search of white collar jobs instead of engaging in farm work. Other constraints are lack of credit

opportunities (M=3.30), high cost of labour (M=3.41), low produce price (M=3.31), insufficient fund (M=3.44), land tenure problems (M=3.52) among others

Table 3. Constraints to Use of Land Revitalization Practices

Constraints	VS	S	LS	N	Mean	SD
Non availability of Labour	96	70	9	5	3.42	0.717
Lack of credit opportunities	89	67	14	10	3.30	0.839
High labour cost	90	80	5	5	3.41	0.684
Low produce price	88	65	20	8	3.28	0.835
Inadequate planting material	76	92	4	8	3.31	0.726
Insufficient fund	91	79	8	2	3.44	0.635
Land fragmentation	64	101	10	5	3.24	0.681
Land tenure problem	103	70	4	2	3.52	0.611
Low level of extension visit	102	65	10	3	3.47	0.680
Use of traditional farm implements	70	70	15	8	3.30	0.740

Field survey, 2015

CONCLUSION

This study explored the land revitalization/management strategies adopted by households in communities around land degraded areas in Southeast, Nigeria, considering the changing climatic conditions (rainfall and temperature among others). The study showed that households increased the adoption of sustainable coping strategies such as mulching, land/crop rotation, crop diversification, regular weeding, terrace making, among others. Again, in the face challenges to land management adoption, government should reform the existing agrarian laws of the land to address issues of fragmentation.

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