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Our Farmsteads, Our Farmlands Conserve and Sustain Biodiversity than Your Mechanized Farming: Accounts of Indigenous Farmers in Ijero, Ekiti State, Nigeria

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Abstract

The study is qualitative research that quantified the accounts of local and mechanized farmers on "biodiversity", on sampled farmlands in Ijero, Ekiti State, Nigeria. Despite that indigenous people and local communities are recognized as key stakeholders in the implementation of strategic plan by Convention on Biological Diversity; and despite that national biodiversity report in Nigeria recognizes agriculture as one of the key reasons why biodiversity must be sustained and conserved, not many efforts have been geared toward reaching out to this category of stakeholder, hence, this research. This study sets out to ascertain the level of availability, means of conservation and sustainability of the biodiversity in a local community of Ijero Ekiti. A total of 30 farmers were randomly selected from 3 local farmlands (10 per farmland) of "Okoto", "Salaro" and Oke-asa" with approximately area size of 65, 42 and 61 respectively. These local farmlands have existed for centuries and are communally farmed. Also, 30 farmers were purposively selected from 10 mechanized farms (3 per farmland) of oil palm farm, timber plantation, rice plantation, fish ponds, poultry, piggery etc. A structured questionnaire on Availability, Sustainability, and Conservation of Biodiversity for Farmers (ASCBF) containing list of commonly found plants and animals of vegetation forest where Ijero Ekiti belongs was administered on both local and mechanized farmers in guided interviews. This was considered the best method due to the literacy level of the local farmers. Six research questions were raised for the study and answered descriptively using frequency are percentages. Our main finding from the analyzed results is corroborated by the on-the-spot-assessments that sampled local farmlands retain arrays of species of plants and animals than the mechanized farmlands. Animal pathways, natural habitats of animals and availability of species of plants were all sighted on local farmlands. This is further evident as mechanized farmers practice mono-farming; hence, the needed interdependency in ecosystem is lost. We, therefore, recommend among others that, though the ever-growing human population is the reason for mechanized farming, however, provision of improved seedlings to local farmers and establishment of special agricultural intervention funds could widen their contributions to food supply while still sustaining and conserving biodiversity.

Keywords: Biodiversity; Ecosystem; Microorganism; Rainforest

Background

The conservation and sustainability of biodiversity are as cardinal and essential for our continued existence on the planet earth. Biodiversity boosts the ecosystem productively where each specimen, no matter how small, all have important role to play. Shah pointed that a large number of plant species means a greater variety of crops and that greater species diversity ensures natural sustainability for all life forms [1].

Biodiversity is a variety of life on earth and its biological diversity. Makers submitted that biodiversity is the number of species of plants, animals and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as desert, rainforest, and coral reefs is all part of biologically diverse Earth.

It is worth remarking that human activities have led to loss of biodiversity with the attendant effects now obvious on the planet earth.

The words "conservation" and "sustainability" are often used almost as if they were interchangeable in meaning, landholder institute Inc, Nid remarked. "The word sustainability is usually used to mean sustainable production of agricultural products, that is, farming the land in such a way that it stays healthy and productive and will be in good or better shape in a hundred years' time as it is now" further explained.

"The word conservation is generally used to mean the conserving of the diversity of plants and animals that live in the world and sometimes includes the concepts of conserving the various genetic strains within species as well as the actual species themselves".

The above definitions notwithstanding, there is a convergence. Plants and animals must be conserved in order to be used in a sustainable way tp make them available for generation next and avoid further disruptions of ecosystems.

Kundu pointed that "conservation is the sustainable use and management of natural resources including wildlife, water air, and earth deposit, both renewable and non-renewable" [2].

In a much similar view, Naduventh submitted that "conservation of natural resources is their careful utilization, with a view to preventing depletion". It was argued further that, we may not be able to avoid the consumption of certain natural resources, but can conserve them for future generations by remedy their consumption [3].

Conservation and sustainability of the diversity " biological diversity" means the variability and living organisms' this include diversity within species between species and of ecosystems" [4].

Rice, further remarked that Rio +20 recognizes biodiversity as "critical for sustainability (the earth's ecosystems)" with contributions to poverty eradication, sustained economic growth, food security and the creation of sustainable livelihood and decent work.

Arora pointed out that "biodiversity is a key feature of the planet earth and important for sustaining the ecosystem on it" [5]. It was further remarked that "abundance of biodiversity is also an indicator of high levels of natural resources for balance of physiochemical and biological components ". Arora is expressly putting that rich biodiversity is an indicator of well-balanced ecosystem. However, the rise of loss of biodiversity is alarming with its attendant effects on the ecosystems [5].

The place and importance of biodiversity in ecosystem

Biodiversity boosts ecosystem productively where each species, no matter how small, all have an important role to many. A large number of plant species diversity ensures sustainability for all life forms, Shah submitted [1].

Shah further pointed that; "At least 40 percent of the world's economy and 80 percent of the need of the poor are derived from biological resources [1]. In addition, the richer the diversity of life, the greater the opportunity for medical discovery, economic development, and adaptive responses to such challenges as climate change" biodiversity is variety of life on earth and its biological diversity.

The number of species of plants, animals and microorganisms, the economic diversity of genes in these specimens, the different ecosystems in the market, such as diversity, rainforest, and viral roofs are all part of biologically diverse Earth.

Millennium Ecosystem Assessment (2005), highlights a substantial and largely irreversible way in the diversity of life on earth, with some 10%-30% of mammals, birds and amphibians species threated with extinction, due to human actions. The World Wide Fund for Nature (WWF) added that earth is unable to keep up in the struggle to regenerate from the demand we place on it.

The Global Issues succinctly remarked in the International Union for Conservation of Nature (IUCN) note in a video that many species are threatened with extinction. In addition, at threat of extension are:

- 1 out of 8 birds
- 1 out of 4 mammals
- 1 out of 4 conifer
- 1 out of 3 amphibians
- 6 out of 7 marines turtles http://www.iuen.org

- 75% of genetic diversity of agricultural crops has been lost

- 75% of the world fisheries are fully or over-employed

- Up to 75% of the world's know species risk extinction if the global temperatures rise by more than 3.5%

- 1/3rd of reef-building coral around the world or threatened with extinction

- Over 350 million people suffer from severe water scarcity

A cursory look at the major highlights above slows that the world we live is in serious crises and dangers unless timely and ending intervention is carried out. With the ever increase in human population it would be suicidal to pretend all was well with the planet earth is these trends continue.

A theoretical frame for biodiversity conservation

The concepts of biological minimum as put forward by Vanltaizhony W pointed thus " stable and complex natural environments are favorable to the formats and conservation of biodiversity, while the colony and complex practices disturbed environments and usually disrupt biodiversity".

Statement of problem

A handful of researches have been conducting researches on biodiversity but not in respect of local farmlands despite that Convention on Biological Diversity (2018) recognizes the inputs of local people in actualizing the vision 2050 of sustainable the environment.

Plamer, the Executive Secretary, Convention on Biological Diversity put "healthy biodiversity and ecosystems are critical to the health of the plant as all its people' [6]. Hence, the declaration of (2011-2020) United Nations Decide on biodiversity is timely and worthwhile. This is considering the decline of biodiversity at such alarming rates.

Remarkably, Palmer identified indigenous people and local communities as one of the parties that will be involved in order to deliberate success and challenges of collective effort to safeguard nature within the framework of the strategies plan for biodiversity 2011-2020 [7,8].

However, little has been done with respect to the spot assessment of these biodiversities on local farmers and their farmlands, hence this study.

Research questions

What is the sustainability level of biodiversity on local farmlands?

What is the sustainability level of biodiversity on mechanized farmlands?

What is the conservation level of biodiversity on local farmlands?

What is the conservation level of biodiversity on mechanized farmland?

Population, sample and sampling techniques

A total of 30 farmers were randomly selected from 3 local farmlands (10 per farmland) of "Okoto" "Salaro" and "Oke-asa" with approximately area size of 65, 42 and 61 respectively. These local farmlands have existed for centuries and are communally farmed. Also, 30 farmers were purposively selected from 10 mechanized farms (3 per farmland) of oil palm farm, timber plantation, rice plantation, fish ponds, poultry, piggery etc. A structured questionnaire on Availability, Sustainability and Conservation of Biodiversity for Farmers (ASCBF) containing list of commonly found plants and animals of forest where Ijero Ekiti belongs, was administered on both local and mechanized farmers in guided interviews.

Results

Research question 1

What is the sustainability level of biodiversity on local farmlands?

	CP	FP	SP	NP	RMK
1. How often do you plant these varieties of medicinal plants on the farmland?					
Alovera	10 (33.33)	15 (50.00)	5 (16.67)	0 (0.00)	FP
Moringa plant	17 (56.67)	8 (26.67)	2 (6.67)	3 (10.00)	CP
Bitter cola	20 (66.67)	7 (23.33)	3 (10.00)	0 (0.00)	CP
2. How often do you plant these varieties of vegetable plants on the farmland?					
Crain-crain (Ewedu)	22 (73.33)	5 (16.67)	3 (10.00)	0 (0.00)	CP
Water-leaf (Gbure)	19 (63.33)	2 (6.67)	7 (23.33)	2 (6.67)	CP
Bitter-leaf (Ewuro)	20 (66.67)	7 (23.33)	3 (10.00)	0 (0.00)	CP
Okro (Ila)	23 (76.67)	6 (20.00)	1 (3.33)	0 (0.00)	CP
3. How often do you plant these varieties of cultivated crops on the farmland?					
Maize	25 (83.33)	5 (16.67)	0 (0.00)	0 (0.00)	CP
Cassava	28 (93.33)	2 (13.33)	0 (0.00)	0 (0.00)	CP
Yam	27 (90.00)	3 (10.0)	0 (0.00)	0 (0.00)	CP
Oil palm	19 (63.33)	6 (20.00)	2 (13.33)	3 (10.0)	CP
Cocoa	20 (66.67)	5 (16.67)	5 (16.67)	0 (0.00)	CP

*CPL: Continuously Cultivated; *FP: Fairly Cultivated; *SP: Sparingly Cultivated; *NP: Not Cultivated

Table 1: The sustainability of biodiversity of plants on local farmlands in Ijero, Ekiti local government area of Ekiti State.

The table reveals that for item 1 on varieties of medicinal plants on farmlands; Alovera (50.00%) is fairly planted, Moringa plant (56.67%) and bitter kola (66.67%) are continuously planted on local farmland (Table 1).

Also for item 2 on how often they plant varieties of vegetables; crain-crrain (Ewedu), Water-leaf (Gbure), Bitter-leaf (Ewuro), Okro (Ila), are continuously planted on local farmland with respective number of farmers indicating continuously planted are 22 (73.33%), 19 (63.34%), 20 (66.67%) and 23 (76.67%) respectively. The table further reveal that for item 3 on how often they plant cultivated crops on the local farmland; Maize, Cassava, Yam, Oil palm, Cocoa are sparingly planted on local farmland with the number of farmers indicating continuously planted are 25 (83.33%), 28 (93.33%), 27 (90.00%), 19 (63.33%) and 20 (66.67%) respectively.

Research question 2

What is the sustainability level of biodiversity on mechanized farmlands?

	CP	FP	SP	NP	RMK
1. How often do you plant varieties of medicinal plants?					
Alovera	0 (0.00)	2 (6.67)	8 (26.67)	20 (66.67)	NP
Moringa plant	0 (0.00)	0 (0.00)	28 (93.33)	2 (6.67)	SP
Bitter cola	4 (13.33)	1 (3.33)	17 (56.67)	8 (26.67)	SP
2. How often do you plant varieties of vegetables?					
Crain-crain (Ewedu)	0 (0.00)	0 (0.00)	20 (66.67)	10 (33.33)	SP
Water-leaf (Gbure)	4 (13.33)	1 (3.33)	17 (56.67)	8 (26.67)	SP
Bitter-leaf (Ewuro)	0 (0.00)	0 (0.00)	28 (93.33)	2 (6.67)	SP
Okro (Ila)	0 (0.00)	2 (6.67)	8 (26.67)	20 (66.67)	NP
3. How often do you plant cultivated crops on the farmland?					
Maize	0 (0.00)	2 (6.67)	8 (26.67)	20 (66.67)	NP
Cassava	0 (0.00)	0 (0.00)	28 (93.33)	2 (6.67)	SP
Yam	8 (26.67)	3 (10.00)	15 (50.00)	4 (13.33)	SP
Oil palm	0 (0.00)	2 (6.67)	18 (60.00)	10 (33.33)	SP
Cocoa	1 (3.33)	4 (13.33)	17 (56.67)	8 (26.67)	SP

Table 2: The sustainability of biodiversity of plants on mechanized farmlands in Ijero Ekiti local government area of Ekiti State.

The table reveals that for item 1 on varieties of medicinal plants on farmlands; Alovera, Moringa plant, bitter cola are sparingly and never planted on mechanized farmland with the number of farmers indicating sparingly planted are 28 (93.33.00%), 30 (100.00%) and 18 (60.00%) respectively (Table 2).

Also for item 2 on how often they plant varieties of vegetables; crain-crrain (Ewedu), Water-leaf (Gbure), Bitter-leaf (Ewuro), Okro (Ila) are sparingly planted on machanized farmland with respective number of farmers indicating sparingly planted are 30 (10.00%), 25 (83.34%), 30 (100.00%), 28 (93.33%) and 27 (90.00%) respectively.

The table further reveals that for item 2 on how often they plant cultivated crops on the mechanized farmland; Maize, Cassava, Yam, Oil palm, Cocoa are sparingly planted on mechanized farmland.

Research question 3

What is the conservation level of biodiversity on local farmlands?

	CH	OH	SH	NH	RMK
1. How often do you harvest varieties of medicinal plants?					
Alovera	28 (93.33)	2 (6.67)	0 (0.00)	0 (0.00)	CH
Moringa plant	26 (86.67)	3 (10.0)	1 (3.33)	0 (0.00)	CH
Bitter cola	8 (26.67)	20 (66.67)	2 (6.67)	0 (0.00)	OH
2. How often do you harvest varieties of vegetables?					
Crain-crain (ewedu)	18 (60.00)	10 (33.33)	2 (6.67)	0 (0.00)	CH
Water-leaf (gbure)	17 (56.67)	8 (26.67)	4 (13.33)	1 (3.33)	CH
Bitter-leaf (ewuro)	7 (23.33)	20 (66.67)	3 (10.00)	0 (0.00)	OH
Okro (ila)	10 (33.33)	18 (60.00)	2 (6.67)	0 (0.00)	OH
3. How often do you harvest cultivated crops on the farmland?					
Maize	23 (76.67)	3 (10.0)	4 (13.33)	0 (0.00)	
Cassava	4 (13.33)	21 (70.00)	5 (16.67)	0 (0.00)	
Yam	12 (40.00)	18 (60.00)	0 (0.00)	0 (0.00)	
Oil palm	30 (100.0)	0 (0.00)	0 (0.00)	0 (0.00)	
Cocoa	23 (76.67)	3 (10.0)	4 (13.33)	0 (0.00)	

Table 3: The conservation of biodiversity of plants and animals on local farmlands in Ijero Ekiti local government area of Ekiti State.

The table reveals that for item 1 on varieties of medicinal plants on farmlands; Alovera and Moringa plant are continuously harvested while bitter cola is often harvested on local farmland with the number of farmers indicating continuous harvest are 30 (100.00%) and 29 (96.67%) respectively (Table 3).

Also for item 2 on how often they harvest varieties of vegetables; crain-crrain (Ewedu), Water-leaf (Gbure), Bitter-leaf (Ewuro), Okro (Ila) are continuously harvested on local farmland with respective number of farmers indicating 28 (93.33%), 25 (83.34%), 27 (90.00%) and 28 (93.33%).

The table further reveal that for item 3 on how often they harvest cultivated crops on the farmland; Maize, Cassava, Yam, Oil palm, Cocoa are continuously harvested on local farmland with the number of farmers indicating continuous harvest are 26 (86.67%), 25 (83.34%), 30 (100.00%), 30 (100.00%) and 26 (86.67%) respectively.

Research question 4

What is the conservation level of biodiversity on mechanized farmland?

	CH	OH	SH	NH	RMK
1. How often do you harvest varieties of medicinal plants?					
Alovera	2 (6.67)	0 (0.00)	10 (33.33)	18 (60.00)	NH
Moringa plant	1 (3.33)	0 (0.00)	26 (86.67)	3 (10.0)	SH
Bitter cola	0 (0.00)	2 (6.67)	8 (26.67)	20 (66.67)	NH
2. How often do you harvest varieties of vegetables?					
Crain-crrain (ewedu)	0 (0.00)	0 (0.00)	20 (66.67)	10 (33.33)	SH
Water-leaf (gbure)	4 (13.33)	1 (3.33)	17 (56.67)	8 (26.67)	SH
Bitter-leaf (ewuro)	4 (13.33)	1 (3.33)	17 (56.67)	8 (26.67)	SH
Okro (ila)	0 (0.00)	0 (0.00)	10 (33.33)	20 (66.67)	SH
3. How often do you harvest cultivated crops on the farmland?					
Maize	0 (0.00)	2 (6.67)	8 (26.67)	20 (66.67)	NH
Cassava	0 (0.00)	0 (0.00)	28 (93.33)	2 (6.67)	SH
Yam	8 (26.67)	3 (10.00)	15 (50.00)	4 (13.33)	SH
Oil palm	0 (0.00)	2 (6.67)	18 (60.00)	10 (33.33)	SH
Cocoa	1 (3.33)	4 (13.33)	17 (56.67)	8 (26.67)	SH

Table 4: The conservation of biodiversity of plants and animals on mechanized farmlands in Ijero Ekiti local government area of Ekiti State.

The table reveals that for item 1 on varieties of medicinal plants on farmlands; Alovera, Moringa plant, and bitter cola are sparingly and never harvested on mechanized farmland with the number of farmers indicating sparingly harvested are 28 (93.33.00%), 29 (96.67%) and 28 (93.33%) respectively (Table 4).

Also for item 2 on how often they harvest varieties of vegetables; crain-crrain (Ewedu), Water-leaf (Gbure), Bitter-leaf (Ewuro) and Okro (Ila) are sparingly harvested on mechanized farmland with respective number of farmers indicating sparing harvest are 30 (10.00%), 25 (83.34%), 25 (83.34%) and 30 (100.00%) respectively.

The table further reveals that for item 3 on how often they harvest cultivated crops on the mechanized farmland; Maize, Cassava, Yam, Oil palm and Cocoa are sparingly harvested on mechanized farmland with the number of farmers indicating sparing harvest are 28 (93.33%), 30 (100.00%), 19 (63.33%), 28 (93.33%) and 25 (83.34%) respectively.

Discussion

The quest for food security in order to cater for the astronomical growth of the human population is evidently the reason for mechanized farming. However, caution must be applied at the rate and pace at which biodiversity is being lost in course of this agricultural voyage.

Studies by Wageningen University of the research which had kick stated in 2007 documents the effects of agricultural intensification on biodiversity and ecosystem processes on European farmlands. Investigations were conducted on the "effects of farming practices; farm type (organic vs conventional) and landscape characteristics on species richness of plants, ground beetles and ground-nesting farmland birds and on the biological control potential of national enemies". The outcomes of the research show gross effects of all these farming practices on the ecosystem [9].

Agricultural activities such as tillage, drainages intercropping, rotation, grading and extensive use of pesticides and fertilizers have significant implications for wild species of flora and fauna'. MChaughlin and Mineau submitted the above is corroborated by this present study [10].

Conclusion and Recommendations

It is instrumental to note that the critical importance of conserving and sustaining biodiversity goes beyond plants, animals and micro-organism to encompass the species for healthy environment, food security, job security, human health and so on. Nigeria, in her fifth National Biodiversity report (2015) noted the status of biodiversity and the contributed to varied sectors of Nigeria economy including tourism, agriculture, water resources, health, commerce and industrial development. This again underscores the place and importance of biodiversity beyond plants, animal and micro-organism. The richness of flora and fauna must be sustained and conserved for future generation on one hand; and to ensure a healthy ecosystem on the other hand [11].

Efforts must be geared toward reaching out to the local farmers by means of special agricultural intervention funds which must be managed by organized local farmers. These local farmers should be enlightened and trained on how to continuously help preserve the richness of the ecosystem on their farmlands. The provision of improved seedling to these local farmers will in no small measure steam the dearth of food availability for human population. There should also be an immediate, short-term and long term monitoring framework which must involve the local farmers and other government supervisory agencies for periodical review of such intervention funds [12].

The quest for post-2020 global biodiversity framework should in-build the local farmers in the interior and remotest parts of the world where some of these biodiversity, though declined but could still be effectively conserved and sustained.

In order to achieve the vision of "living in Harmony with nature by 2020" as espoused by convention on biological diversity, local farmers must be adequately engaged to foster synergy that will enhance attainment of the visions practices such as poverty, a must key into the conservation and sustain many projects to achieve the required results.

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