Assessing Agroforestry Strategies for Poverty Alleviation Amongst Buffer Zone Communities of Cross River National Park, Nigeria

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Abstract
National Parks and Protected Areas are at the core of global strategies applied to promote biodiversity conservation and sustainable development and informed the creation of Cross River National Park (CRNP) in Nigeria, in 1991. In order to address the problem of frequent trespass into the park's territory for livelihoods (income generating) activities by buffer zone communities, a buffer zone agroforestry program was introduced about three decades ago. Agroforestry strategies applied include riparian buffers, improved fallows, and inter-cropping activities. Through document research and participatory rural appraisal exercises (e.g. historical timeline analysis, focus group discussions, interviews, field observations and resource mapping), the study assesses the impact of the program vis-à-vis poverty alleviation in buffer zone communities and the achievement of the biodiversity conservation objectives of the park. Findings reveal enhanced rural income generation from agroforestry products e.g. sale of cocoa, palm oil, citrus, bush mango (*irvingia gabonensis*), and observable rural housing transformations, and investments in self-help community development activities e.g. establishment of village schools and health centers. Findings further reveal that frequent trespass into the park for livelihood activities have reduced due to the lucrativeness and time-consuming nature of agroforestry activities. Agroforestry thus demonstrates great potentials of enhancing both buffer zone poverty alleviation and the achievement of biodiversity conservation objectives in CRNP and should therefore be backed by adequate funding and rigorous research-based innovative policies and programs.
Keywords: Parks, communities, poverty and agroforestry strategies

1. Introduction

Between 1986 and 1987, the Tropical Rainforest of Cross River State, Nigeria was internationally identified as worthy of special conservation measures through three IUCN publications: (a) Directory of Afro-Tropical Protected Areas, (b) Action Strategy for Protected Areas in the Afro-Tropical Realm, and (c) Review of the Protected Area System in the Afro-Tropical Realm. All three emphasized the extreme biological richness of the resources, its unique intact status and the increasing threats to its integrity represented by uncontrolled farming, logging and hunting activities (WWF / ODNRI, 1989a: 8). It was further strongly observed that Nigeria had lost over 90% of her pristine rainforest, and due to the accelerating rate at which rainforests are being destroyed around the world, "an international consensus now exists that further equatorial deforestation must be prevented" (WWF / ODNRI, 1989a: 1).

In response to the above, the Federal Government of Nigeria, in collaboration with the Government of Cross River State (one of the 36 States of Nigeria), established the Cross River National Park in 1989. This was during the years of military rule in Nigeria, and a Military Decree (Decree 36 of 1991) was subsequently promulgated to ratify the park's creation. The primary and overarching objective of the park is the conservation of biodiversity in the region. Indeed, the Cross River National Park is a region of species endemism and is among the 25 biodiversity hotspots in the world (Oates, 2002). The management plan document for CRNP prepared by WWF/ODNRI in 1989 recommended agroforestry activities as part of a support zone or buffer zone rural development program. On the strength of the above, CRNP has been involved in buffer zone agroforestry activities for over three decades now. The underlying assumption is that rural poverty is the main cause of villagers' frequent trespass into the park for income generation activities, and that agroforestry intervention by the park will culminate in reduced trespass into the park, and thus enhance effective biodiversity conservation and an ecologically stable CRNP. The myth and the reality of agroforestry practices as a biodiversity conservation strategy, in parks and protected areas, is what this paper seeks to unravel.

1.1 Statement of the Problem

Human activities (not natural disasters) are what constitute the greatest threat to biodiversity conservation in Cross River National Park. The 105 buffer zone communities of the park have been engaging in unsustainable environmental practices comprising slash and burn agriculture or shifting cultivation, illegal logging, commercial bushmeat hunting activities, and unsustainable harvesting of non-timber forest products (NTFPs). A study conducted by WWF / ODNRI on primary forest clearance around the Oban Division of the park in 1988 / 1989

revealed that buffer zone communities clear approximately 3,000 hectares of pristine and biodiversity rich forest yearly (see table 1), for subsistence farming purposes.

Table 1: Buffer zone primary forest clearance for subsistence agriculture in Oban Division of CRNP.

Villages	Area cleared (ha)	No. of farms	Total hectares
Ekang	1.01	45	45.5
Mfaminyen	3.51	27	94.8
Nkame	1.89	2.5	47.3
Mbeban	2.16	27	58.3
Ojok	1.55	38	58.9
Old Ndebiji	0.82	45	36.9
Owom	1.48	29	42.9
Ikpai	0.95	21	19.9
Nyaje	1.21	105	127.1
Ntebachot	1.35	23	31.1
Orem	2.02	27	54.5
Akor	2.29	139	318.3
New Ndebiji	No data	32	No data
Osomba	1.35	27	36.5
Aking	1.08	96	103.7
Oban Ext.	0.81	198	160.4
Oban	1.87	124	231.9
Okarara	1.54	80	123.2
Abung	1.15	45	51.8
Iku	1.89	7	13.2
Neghe	1.01	30	30.4
Ekonganaku	1.08	68	73.4
Nsan	1.47	120	176.4
Etiokumi	-	35	-
Obung	-	70	-
Old Netim	1.15	215	247.3
Ifumkpa	1.74	40	69.6
Ojor	0.81	110	89.1
Awai	1.50	46	69
Old Ekuri	0.95	62	58.9
New Ekuri	1.96	122	239.1
Etara	2.09	24	50.2
Ekuri Eyeyeng	1.48	20	29.6
Total	1.82 (Mean)	2,122	2,789.2

Source: WWF / ODNRI, 1989b: 50

The above level of pristine or primary forest clearance for a biodiversity hotspot and region of species endemism has huge conservation implications or impacts which need further investigation. Similar to the above, WWF / ODNRI in the same year conducted a study on the population of hunters in the buffer zone communities of Oban Division of CRNP and the results are presented in table 2.

Table 2: No. of hunters in the buffer zone villages of the Oban Division of CRNP

Villages	Adult males	Hunters	Gross income (Naira)
Ekang	169	58	8167
Mfaminyen	98	34	15,000
Nkame	91	31	8,000
Mbeban	98	34	6,000
Ojok	138	47	3,333
Old Ndebiji	163	56	1,500
Owom	105	36	4,167
Ikpai	76	26	23,330
Nyaje	381	130	10,000
Ntebachot	83	29	4,667
Orem	98	34	5,000
Akor	504	172	9,000
New Ndebiji	116	40	No data
Osomba	98	34	16,500
Aking	348	119	19,000
Oban Ext.	718	246	No data
Oban	450	154	35,000
Okarara	290	99	16,400
Abung	163	56	350
Iku	21	7	6,500
Neghe	109	37	11,500
Ekonganaku	246	84	6,660
Nsan	435	149	630
Etiokumi	127	43	500
Obung	254	87	625
Old Netim	780	266	15,000
Ifumkpa	145	50	2,300
Ojor	399	135	12,000
Awai	167	57	10,750
Old Ekuri	225	76	17,625
New Ekuri	442	151	17,100
Etara	87	30	31,667
Ekuri Eyeyeng	72	25	25,000
Mkpot 1	109	37	20,900
Total	7805	2666	11,380 mean

Source: WWF / ODNRI, 1989b:52

Again, such an active hunting population in just one of the two ecological divisions of the park poses a serious threat to biodiversity conservation and thus created a need for alternative land use strategies amongst buffer zone communities. Due to funding constraints, the park is unable to undertake current studies to establish the current level of both primary forest clearance and socio-economic survey / population of hunters in the buffer zone villages of the park. However, agroforestry was recommended in the park's management plan as a land use strategy that will reduce villagers' frequent trespass into CRNP territory and thus enhance the achievement of the park's biodiversity conservation objectives.

1.2 Brief Literature Review on Agroforestry Activities in Parks and Protected Areas

The International Council on Research in Agroforestry (ICRAF, 1983a) defines Agroforestry as "a collective name for land use systems and technologies where woody perennials are deliberately used on the same land management units as agricultural crops and / or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economic interactions between the different components." Buffer zones on the other hand are defined as "Areas peripheral to National Parks or other Reserves which have restrictions placed on their resource use to give an additional layer of protection to nature reserve and to compensate villagers for the loss of access to Protected Areas" (Blockhus, 1992).

In the Peten rainforest region of Guatemala, agroforestry has been used to stabilize buffer zone land use (Blockhus, 1992). In a study of 24 villages at the buffer zone of Sinharaja World Heritage Forest in Sri Lanka, Bandaratillake and Thorsel (1992) maintain that the people living around the buffer zone of protected areas are a

potential "threat" to the conservation of the forest, since part of their livelihoods derives from produce extracted illegally from the reserve. They however also maintain that the restoration of buffer zone vegetation is practicable through agroforestry and reforestation programs.

Masozera and Alavalapati (2001) argue that the conservation of biodiversity in protected forest areas will be more challenging if local communities are heavily dependent on the forest for energy, nutrition, medicine and other subsistence needs. Basing their argument on Nyungwe Forest Reserve in Rwanda, they comment that pine plantations in buffer zone should be "replaced with an agroforestry system producing tea, as a potential solution to conserve biodiversity and address subsistence needs of local communities." At Danau Sentarum National Park in West Kalimantan, Indonesia, Iban local communities at the buffer zone, used agroforestry system (improved fallow) to promote biodiversity conservation (Wadeley, 2002).

At Kerinci Seblat National Park (Sumatra Island, Indonesia), Farmers in buffer zone communities with "more diversified" agroforestry farms were found to have much less dependency on the National Park resources, than their counterparts who cultivated wetland rice (Murniati et al., 2001). In a wide study of the influence of the formation and management of National Parks on rural communities, (Arce and Garcia, 1997) emphasized that the use of the "term social forestry" be used to designate the focus that agroforestry should have in communities around protected areas, and should harmonize "biophysical, social, economic and cultural aspects, and take into account the conditions and local variations in the agroecosystems." With examples from Peru and Ecuador, they conclude that though social agroforestry is not a panacea for all the conflicts between protected areas and local communities, it offers an opportunity to find "better acceptance and involvement from all participants."

Agroforestry "mixed gardens" with planted indigenous tree species like Surian Bawang (*Toona sinensis*), and Surian Wangi (*Toona surenti*) has been strongly advocated by Murniati (1996) for buffer zone management at Sungai Pagu, Solok and West Sumatra districts of the Kerinci Seblat National Park in Indonesia. Traditionally managed agroforests are seen to be a valuable compromise between conservation of tropical forest biodiversity and sustainable use of natural resources (Thiollay, 1995). At Gunung Palung National Park of West Kalimantan, Indonesia, use of buffer zone agroforestry system (multi species forest gardens) promoted biodiversity conservation as "they are used by many mammals together with associated habitats" (Salafsky, 1993). From the foregoing, agroforestry as a land use system is gaining global popularity in promoting the twin objectives of ecological stability and economic sustainability of buffer zone communities of National Parks and protected areas all over the world, hence its adoption in Cross River National Park. Consistent with the foregoing submissions, Montagnini (1990: 51) emphasizes the need for indigenous tree species to be used in tropical agroforestry practices:

> "Native trees are well adapted to the local environment and are thus less likely to be affected by pests, diseases, and adverse weather conditions. Because they are adapted to local soils and vegetation, the design of mixed systems (as in agroforestry) is more feasible. Native species are in better balance with the natural ecosystem and allow better preservation of habitats for wildlife. Hence, they help preserve biological diversity."

1.3 Agroforestry Strategies in Cross River National Park

In the park management plan document for Cross River National Park, prepared by WWF / ODNRI (1989b), a buffer zone farming system was recommended which was expected to provide:

(a) Increased and sustainable levels of soil organic matter, resulting in improved provision of soil nutrients, a higher soil CEC, and improved soil structure and water retention;

(b) A permanent soil cover, dead or live mulch, to reduce soil temperatures, erosion and crusting of the topsoil, and to conserve soil moisture;

(c) Deep rooting crops to draw nutrients and soil moisture reserves from greater depth and to increase soil organic matter levels throughout the soil profile;

(d) crops which are tolerant of acid soil conditions, gravelly soils and generally low fertility;

(e) and in order to encourage a low-input system, the maintenance and improvement of soil productivity by the use of leguminous trees, shrubs, plants, cover crops and live mulches.

On the strength of the above, an agroforestry farming system which "aim to retain all the advantages of the tree component in maintaining soil fertility, whilst increasing the overall productivity of the land" was strongly emphasized. Due to differences in landscape terrain amongst buffer zone communities and its implications on appropriate agroforestry systems, the park / communities were expected to be flexible on choice of agroforestry systems from amongst the different combinations of tree and arable crops in agroforestry, such as Alley Farming, Planted Fallow, Inter-cropping and Riparian buffer strips, etc.

The specific agroforestry objectives of the park include:

(a) Acting as protective barrier against negative impacts of adjacent land use practices.

(b) Protection of watershed, stabilization of stream banks, enhancement of aquatic and terrestrial habitats and stabilization of flood plains.

(c) Improvement of fallows / shortening of fallow periods.

(d) Poverty alleviation / improvement of rural livelihoods and enhancement of community development activities.

1.4 Site Description

Nigeria is located in West Africa, lying between latitudes 4^0 N and 14^0 N and longitudes 3^0 E and 15^0 E. It has an area of 923,768 square kilometres, and a population of one hundred and forty million people (NPC, 2006). It is bordered to the south by the Atlantic Ocean, east by Cameroon, west, by Benin Republic and north by the Republics of Chad and Niger (Dublin Green et al, 1999). There are more than 250 ethnic groups in the country, the most prominent ones being Hausa-Fulani, Yoruba, Ibo, Ijaw, Ibibio, Efik, Kanuri, Idoma, and Ekoi. Nigeria's climate is equatorial in the south, tropical in the centre, and arid in the north. In terms of vegetation, the country has swamps and mangrove forest in the coastal areas, followed by equatorial rainforest in the south, Guinea savanna (a mixture of grass and stunted trees) in the middle belt, and Sahel savanna (grassland areas) in the extreme north. There are eight national parks in Nigeria, namely, Yankari, Old Oyo, Gashaka- Gumti, Okomu, Cross River, Kamuku, Chad Basin, and Kainji Lake National Park. Of the eight, only Cross River and Okomu are rainforest parks, with Cross River being the richest in terms of biodiversity.

The Cross River National Park is located in Cross River State (South Eastern Nigeria) – at the border between Nigeria and the Republic of Cameroon. The Park is contiguous in landmass with the Korup National Park of Cameroon. It comprises two ecological divisions, the Oban and Okwangwo divisions, and has a total pristine rainforest land area of 4,424 square kilometers. Prior to the codification of this forest as National Park, it used to be known as the Oban and Okwangwo Government Forest Reserves. The park has a total of 105 buffer zone villages (39 in Oban and 66 in Okwangwo divisions). Prior to the 1930s when forest lands were nationalized in Nigeria by then British Colonial Administration, the above communities owned and controlled the above forest lands.

The Oban division of the park comprises five ethnic groups namely Ejagham, Dusanga, Iyong Iyong, Ojor and Nkukorli speaking people; while the Okwangwo division is ethnically monolithic, comprising of the Boki speaking people. Cross River National Park is rich in assorted timber species, and is home to rare fauna species like Elephants, Gorilla, Chimpanzees, Drill monkeys, Leopards, assorted Duiker species, birds, reptiles, amphibians, insects, etc. The park protects the most valuable watershed in the whole of Cross River State (WWF / ODNRI, 1989a). Not only does the forest protect the land from serious flooding and soil loss, it slowly releases water throughout the dry season, and if completely cleared will result in floods and drought in Cross River State (WWF / ODNRI, 1989a). Communities around the park depend on it for their livelihoods activities which include hunting, gathering of forest products and logging.

2.   Methods

The study is a cross sectional rural livelihoods survey, cutting across buffer zone villages in the Oban and Okwangwo Ecological Divisions of Cross River National Park. At Oban Division, the villages that were randomly selected are Old Ekuri and Nsofang, while at Okwangwo Division, Abo Mkpang and Bamba villages were selected. The methods used for data collection comprise document research at Cross River National Park (CRNP), and participatory rural appraisal exercises e.g. historical timeline assessment of rural livelihoods and poverty, focus group discussions, interviews, field observations and resource mapping) in the selected villages. For the quantitative data, responses from administered questionnaire were entered into SPSS (version 17) for statistical analysis. All variables were coded with measurements defined as nominal, ordinal and scale. Based on the nature of research questions for the study, descriptive statistics were used in the analysis, to look for patterns in the data set. This paper is an offshoot of the above study.

3.   Results

From the field data collected in the four buffer zone communities of this study (Old Ekuri, Nsofang, Abo Mkpang and Bamba), a key informant commented that the Cross River National Park's agroforestry initiative with communities started from the involvement of communities at the planning stage through Participatory Rural Appraisal Exercises. Through such exercises:

(a) Villagers were able to assess their past agricultural practices, the modus operandi of such practices, and why such practices exacerbate land degradation, biodiversity loss, low productivity and rural poverty.

(b) Ranking of the revenue potentials of tree and arable crops towards making informed decision on what crops to grow and the appropriate agroforestry system to adopt.

(c) Villagers were introduced to agroforestry strategies and urged to embrace it, in the interest of more conservation friendly land use practices in buffer zone communities.

Across the four communities of the study, it was discovered that in order of income generation potentials, cocoa (*Theobroma cacao*), oil palm (*Elaeis guinensis*) and bush mango (*Irvingia gabonensis*) were popularly chosen as preferred tree crops for the park to raise nurseries and distribute the seedlings to local farmers. Based on

the above, the park has for over a decade been raising and distributing improved seedlings of the above tree crops to buffer zone farming villagers for free, culminating in the emergence of a growing number of diversified agroforestry landscapes.

In a random assessment of 20 farms per village, it was discovered that there is a growing trend towards agroforestry practices among village farmers. At Old Ekuri 15 farms embraced agroforestry (inter-cropping), while 5 had only food crops. At Nsofang, the ratio was 18:2 in favour of agroforestry (inter-cropping) practices. At Abo Mkpang, the ratio was 13:7, while at Bamba, the ratio was 16:4 all in favour of agroforestry practices. Villagers have equally taken advantage of this program and are sourcing for improved tree seedlings on their own, beyond what the park is able to provide, resulting in an emergent farming culture where agroforestry practices have become a major poverty alleviation strategy in buffer zone villages of the park.

At a Focus Group Discussion (FGD) at Nsofang, the impacts of agroforestry practices on rural income generation, community development, and biodiversity conservation in CRNP was captured as follows:

Researcher: From my daily observation of traders who come to buy things at Nsofang, it appears subsistence food crop farmers make more money than tree crop (agroforestry) farmers.

Respondent A: That is not true. Those who produce and sell food crops like cassava, gari, yams, plantain and banana are not as rich as those with tree crop farms (e.g. cocoa, bush mango and palm oil) in this village. Those with higher living standards in this village e.g. owners of aluminum roofed houses, electric generators, motor cycles, and children in tertiary institutions are tree crop farmers (agroforestry practitioners).

Respondent B: The tree crop farmers do not sell their products on a daily basis, but whenever the buyers come, the large sums of revenue involved (e.g. sale of 10 bags of cocoa) cannot be compared with that of the subsistence food crop farmers.

Respondent C: Look, hunting activities are becoming less lucrative or popular in this village. Apart from the suffering involved (trekking long distances into the forest without finding animals to kill), those who normally make the highest donation during village fundraising activities in support of our primary and secondary schools, and health center, are usually the tree crop farmers. Most young people in this village are now tilting towards agroforestry activities.

Respondent D: These days the number of violent confrontation between park rangers and poachers in this community has reduced substantially compared to what used to happen in the 1990s. Source: Field Work 2015 (FGD N 01/4)

Similar responses were obtained in the other three villages of the study confirming that agroforestry activities are enhancing higher rural income generation and poverty alleviation amongst practitioners in the buffer zone villages and strengthening biodiversity conservation in CRNP. At Ikom town, a major sub-urban market in the study area, a comparison of price differences between top ten subsistence food crops and top ten tree crops (agroforestry products) was carried to determine their lucrativeness. It was discovered that tree crop products (agroforestry products) are more lucrative in price than staple food products (see table 3 and 4).

Table 3: Prices of top ten staple food crop products at Ikom Sub-urban market.

S/No	Type of staple food crop	Price per 50kg (Naira / US $)
1	White Yam	N12,000 / $33.33
2	Local rice	N10,000 / $27.77
3	Beans	N10,000 / $27.77
4	Plantain	N7,500 / $20.33
5	Water Yam	N5,000 / $13.88
6	Gari	N5,000 / $13.88
7	Corn	N5,000 / $13.88
8	Banana	N5,000 / $13.88
9	Coco Yam	N3,000 / $8.33
10	Cassava	N2,000 / $5.55

Source: Fieldwork, 2015.

Table 4: Prices of top ten tree crop (agroforestry) products at Ikom Sub-urban market.

S/No	Type of tree crop (agroforestry) product	Price per 50kg (Naira / US $)
1	Bush Mango	N30,000 / $83.33
2	Palm oil	N28,000 / $77.77
3	Cocoa beans	N25,000 / $69.44
4	Bitter kola	N25,000 / $69.44
5	Kola nut	N15,000 / $41.66
6	Oranges	N12,000 / $33.33
7	Lemon	N10,000 / $27.77
8	Coco nut	N10,000 / $27.77
9	Lime	N8,000 / $22.22
10	Guava	N8,000 / $22.22

Source: Fieldwork, 2015.

At Abo Mkpang village, a farmer in an interview, commented that Cross River National Park is somehow unreliable in supplying them with different varieties of improved agroforestry seedlings to meet their demands. For instance, instead of planting the improved variety of bush mango (*Irvingia gabonensis*), which the park used to supply, farmers are now planting the local type which may take up to 10 to 15 years before maturing and bearing fruits. The above farmer therefore called on CRNP to scale up their agroforestry program in order to pull more farmers away from subsistence food crop farming that consumes more forest lands and is less lucrative when compared to tree crop farming.

4. Discussion

The agroforestry program of Cross River National Park has demonstrated impressive potentials of alleviating poverty in her buffer zone communities and reducing villagers' trespass into the park for extractive livelihoods activities. This implies that agroforestry interventions in buffer zone communities can enhance the actualization of the biodiversity conservation objectives of the park if properly managed. There are however strengths and weaknesses in the program. On the positive side, the agroforestry program has ushered in a major shift in land use practice patterns amongst traditional buffer zone villagers, who prior to this time exclusively practiced subsistence (food crops) farming that yielded limited rural revenue. The old system of growing only food crops in a farming season has been found to be unprofitable, and is no longer popular. Conservative traditional farmers who hesitated initially are now embracing agroforestry mechanisms, having seen how it has prospered fellow local villagers that were non-resistant to agroforestry farming innovations.

Secondly, the physical outlook of farming systems have been transformed in the buffer zone communities, evident in the evolution of farms with the following tree and food crop combinations: (a) cocoa, banana and bush mango, (b) cocoa, plantain, bush mango and banana, (c) oil palm, yams / cocoyam and citrus (oranges), (d) oil palm, plantain and bush mango, (e) bush mango, cassava, native kola tree, and pear tree.

Even though a detailed study has not been conducted to ascertain banked annual revenues accruing to villagers from agroforestry practices (compared to the past), visible signs exist to demonstrate the economic impact of the strategy. The quality of rural housing has changed in several buffer zone communities. Hitherto, thatch roof houses were ubiquitous. Today, zinc roof houses dominate the thatch houses. As cocoa, oil palm and bush mango are export commodities, buying agents of local exporters are visible in buffer zone communities, usually in search of these commodities. This implies regular inflow of external income into the affected villages. A community leader at Nsofang commented that there is increase in the number of Community Secondary Schools generally in the buffer zone communities of CRNP, and that student enrolment in these schools have been rising, indicating improved parental income status. Examples of such buffer zone Community Secondary Schools in the study area include those at Old Ekuri and Nsofang.

In the area of health care, members of several households are now able to go for hyena surgical operations in hospitals these days. This was rare prior to the 1990s, when CRNP was established. Villagers are now coming together and building village health centers. Examples include those found at Old Ekuri, Nsofang, Abo Mkpang and Bamba. Technical skills in tree crop cultivation and use of relevant agricultural inputs is growing amongst buffer zone villagers. Now they know how to manage their farms by pruning and mulching mechanisms. There is visible progressive intensification of agricultural practices amongst buffer zone communities due to agroforestry strategies. The mad rush for seasonal and reckless rainforest clearance for food crop cultivation by all villagers has reduced.

However, the agroforestry initiatives of CRNP have problems too. Due to dwindling fortunes in the funding of the park, raising of tree crop nurseries and distribution of seedlings to farmers has been crippled in the last five years. This has dampened the enthusiasm of farmers who were yet to take their turns in benefiting from the free distribution of improved agroforestry seedlings by the park. Those who had benefitted are yearning to enlarge their

farms but the improved seedlings are no longer available. Some buffer zone villagers have not benefitted at all, and such villagers are becoming less supportive of the conservation activities of the park. Hopefully, funding will eventually improve and resolve these problems, as agroforestry strategies have been well embraced by buffer zone communities.

5. Conclusion and Recommendations

Human land use practices and economic aspirations have been a major source of global deforestation, land degradation, depletion and extinction of various flora and fauna species, and ecological instability. The establishment of parks and protected areas, especially in the tropics where 75% or more of the Earth's biodiversity resides (Terborgh and Schaik, 2002), is a response to the above problem and the need to promote sustainable development. However, human land use activities still constitute a threat to the integrity and success of national parks in the tropics. The use of agroforestry systems as alternative to unsustainable agricultural land use practices around parks and protected areas, is gaining global popularity and acceptance, especially in CRNP of Nigeria. Agroforestry strategies like riparian buffers, improved fallows, inter-cropping, etc, are being practiced amongst buffer zone communities of the park, with the support of the park.

The above is resulting in observable and progressive rural livelihoods transformation and poverty alleviation amongst the affected buffer zone communities of the park. The gap between economic sustainability and ecological stability in the practices of these communities is progressively narrowing. Though the park's agroforestry program is being slowed down by funding challenges, and non-benefitting buffer zone communities are grumbling, the study reveals that in tropical parks where slash and burn agricultural practices are ubiquitous, agroforestry strategies offer great hope for buffer zone management around parks and protected areas. On the strength of the above, the study strongly concludes and recommends that agroforestry strategies backed by sustainable funding and innovative research-based policies and programs be treated as a major park management activity in CRNP in particular, and tropical parks in general.

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