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EVALUATION OF THE ECOTOURISM POTENTIALS OF IKOGOSI WARM SPRING AND ARINTA WATERFALL WATERSHEDS IN EKITI STATE, NIGERIA.

Olujobi O.J*
Department of Forest Resources and Wildlife Management, Ekiti State University, P.M.B. 5363, Ado-Ekiti, Nigeria.

Corresponding Author: -
E-mail: olujobioj@yahoo.com +234 803 8079 501

Abstract:-
Ecotourism has attracted increasing attention in recent years as an alternative to mass tourism because it takes into account the natural ecological attraction, their conservation and development. This study evaluates the ecotourism potentials of Ikogosi warm spring and Arinta waterfalls watersheds in Ekiti State. Direct observation, oral interview and vegetation assessment were methods used for data collection in this study. Two hectares (ha) of land were measured in each of the study sites. Each hectare was divided into four plots of 50 m by 50 m. Two plots were diagonally selected within each hectare. Trees above 1 m in height and basal diameter ≥10 cm were identified and classified into families. The vegetation was classified into three layers. Sorenson's coefficient was used to compare sites for overlapping of similarity. The results revealed that Ikogosi warm spring centre is well equipped in term of infrastructural facilities than Arinta waterfall centre. Seventy eight (78) species and 25 families were recorded in both watersheds with family Malvaceae having the highest species density (15). Malacantha alnifolia (5) and Voacanga africana (5) were the species most frequently encountered. Sorenson's coefficient revealed similarity in the vegetation of the two study sites. It is recommended that environmental impact assessment be carried out in Arinta waterfall before any alteration is made to the flora and fauna of the site in the name of infrastructural development.

Key words:- *Ikogosi warm spring, Arinta waterfalls, ecotourism, potentials, Ekiti State.*

1.0. INTRODUCTION

Tourism is widely perceived as business activity connected with providing accommodation services and entertainment for people who are visiting a place for pleasure (Kukoyi *et. al.*, 2013). Tourism and environment are inextricably linked because the sustainability of tourism depends on the attractive environmental factors (Kukoyi *et. al.,* 2013). Many countries depend on tourism for income and it is an important factor in the world trade and a major element of payment of many countries (Agbu, 2002). The international tourism has long been a major source of foreign currency earning and it has created jobs for local people and increase the economy of nations (Ayodele, 2002).

Ecotourism being a nature based tourism, takes into account the natural ecological attraction, their conservation and development. Ecotourism has attracted increasing attention in recent years, not only as an alternative to mass tourism, but also as a means of economic development and environmental conservation (Slinger-Friedman, 2009; Stankov *et. al.*, 2011). The aim of an ecosystem manager is to protect the environment, making it profitable to the community people by generating revenue, educating and serving the pleasure of tourists. Ecotourism has been described as "travelling to relatively natural or undisturbed areas with the specific objectives of studying, admiring and enjoying the scenery of its wild plants and animals, as well as any existing cultural manifestations found in such areas (Blamey, 2001).

Ecotourism has been seen as a measure or key to eradicate poverty of the community people as well as improving their standard of living. There has been an acknowledgement that sustainability of a tourism site is dependent on communities benefiting directly from it; thereby enabling them to conserve and protect the resources upon which tourism is based (Scheyvens, 1999). Communities however, not only possess the indigenous knowledge or systems they have used for generations to preserve the resources through their unique culture and heritage, they are also part and parcel of the attraction that draws tourists to the resources. Ecotourism is one strategy that has direct relationship to nature conservation. Protected areas are areas of land dedicated to the protection of biological diversity and associated natural and cultural resources which are managed through legal or other effective means (McNeely, 1993). In natural resources management operations, inventories of biodiversity are used to determine the nature and distribution of biodiversity of an area being managed. This also determined the measure to be put in place in the management of such area to enable the resources to fulfill their potentials.

The potential of Ikogosi warm spring and Arinta waterfall watersheds in terms of environmental, social, and economy cannot be over emphasized as they have impacted positively on the host communities. To achieve a sustainable management of these natural resources to become an international ecotourism centres it is necessary to know much about the potentials embedded in the watersheds. This paper aims at highlighting the tourism potentials of Ikogosi warm spring and Arinta waterfall watersheds and suggests sustainable management strategy of the watersheds by stake holders to improve its ecotourism potential.

2.0 MATERIALS AND METHODS

2.1. Study Area

Ikogosi-Ekiti and Ipole-Iloro-Ekiti are situated in Ekiti West Local Government, Ekiti State, Nigeria. They are situated between lofty; step sided and heavily wooded, north-south trending hills and lies on an area underlain by metamorphic rock. The landscape is generally undulating, consisting of old plains broken by step-sided out-crops that occur in groups of ridge (Ogunjemite *et al.*, 2013). Ikogosi-Ekiti (7^{o} 35^{1} 0" N., 4^{o} 92^{1} 0" E.) and Ipole-Iloro-Ekiti (7^{o} 40^{1} 0" N.4^{o} 59^{1} 0"E.) have tropical climate of West Africa monsoonal type with two distinct seasons. These are the rainy season (April-October) and the dry season (November-March). The annual rainfall ranged from 1,200 mm to 1,500 mm. Temperature ranges between 21°C and 34°C with high humidity. The South Westerly wind and the North-East trade wind blow in the rainy season and dry (Harmattan) season respectively. The vegetation is of tropical rain forest.

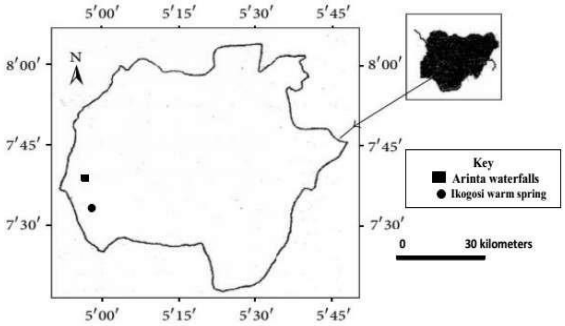

Figure 1: Map of Ekiti State showing the location of the study areas

2.2. Method of data collection

Direct observation, oral interview of the attendants and vegetation assessment are the three methods used for data collection in this study. Direct observation involves taking inventory of infrastructural facilities available in each of the study sites. Vegetation assessment of the watersheds was done by total enumeration method as described by Olaniyi and Ogunjemite, (2015). Two hectares (ha) of land (one close to places where visitors could easily assess and one in the undisturbed area of the watershed) were measured in each of the study sites. Each hectare was divided into four plots of 50 m by 50 m. Two plots were diagonally selected within each hectare. This make a total of 8 plots in the two study sites.

Five (5) transects were laid at an interval of 10 m in the selected plots. Individual trees above 1 m in height and basal diameter ≥10 cm were identified with the help of a taxonomist using standard key. In a situation where the tree's botanical name was not known it was identified by its commercial or local name and later translated to correct botanical names using standard key. The height of each tree was measured to the nearest meter with Spiegel Relaskop.

2.3 Data analyses

Data collected were presented in tables. The tree species were classified into families. Percentage distribution of trees within strata of each forest was compiled and classified into three layers using method of Longman and Jenik (1987). Sorenson's coefficient was also used to compare sites for overlapping of similarity in diversity.

3.0 RESULTS

3.1 **Infrastructural facilities at the tourism centres and the host communities**

The result in table 1 shows that Ikogosi warm spring centre is well equipped with the presence of facilities such as hotel, swimming pool, relaxation sport, fitness shop and multipurpose hall than the Arinta waterfall centre.

Table 1: Facilities at the ecotourism centres and the host communities

Infrastructural facilities	Ikogosi-Ekiti	Ipole-Iloro-Ekiti
	Status	Status
Hotel and restaurants	√	√
Federal/State chalets	√	X
Relaxation sport	√	√
Swimming pool	√	X
Beauty centre	√	X
Fitness Shop	√	X
School	√	√
Health centre	√	√
Arts and crafts shops	√	X
Electricity	√	√
Shopping mall	√	X
Car parking facility	√	√
Staff quarters	√	X
Worship centre	√	√
Market	√	√
Road	√	√
Concrete walkway	√	X
Multi-purpose hall	√	X
Water bottling plant	√	X

√ = present x= absent

3.1.2 Tree species composition in the study area.

Table 2 shows that 78 species belonging to 25 families were recorded in both Ikogosi warm spring and Arinta waterfalls. The result revealed that *Malacantha alnifolia* (5) and *Voacanga africana* (5) are the species frequently enchanter in the study area. Thirty six (36) species belonging to 18 families were recorded in Ikogosi warm spring with *Anthocleista vogelii*, *Antiaris Africana* and *Delonix regia* been the most common species with frequency of 4 each. In Arinta waterfall 66 species belonging to twenty families were recorded with *Malacantha alnifolia and Voacanga africana* been the most common species (5 each).

Table 2: Tree species composition of Ikogosi warm spring and Arinta waterfall watershed

S/N	Species	Ikogosi warm spring		Arinta waterfall	
		Freq.	Height	Freq.	Height
1	*Afzelia Africana*	3	9.15	0	0
2	*Albizia adianthifolia*	3	12	0	0
3	*Alchornea cordifolia*	0	0	2	9.12
4	*Alstonia boonei*	2	8.32	2	10.56
5	*Amphimas pterocpoides*	3	8.26	0	0
6	*Aningeria robusta*	0	0	1	7.42
7	*Anthocleista vogelii*	4	11.52	0	0
8	*Anthonotha macrophylla*	1	9.2	0	0
9	*Antiaris africana*	4	9.58	3	12.52
10	*Artocarpus altilis*	0	0	2	12.52
11	*Bombax buonopozense*	1	9.92	3	12.52
12	*Brachystegia evrycoma*	3	12.72	2	11.28
13	*Bridelia atroviridis*	1	9.36	0	0
14	*Canarium schweinfurthii*	2	10.6	0	0
15	*Ceiba pentandra*	2	10.8	0	0
16	*Chrysophyllum albidum*	1	8.77	1	9.92
17	*Cleistopholis patens*	1	9.15	3	8.48
18	*Cola hispida*	0	0	2	10.68
19	*Cola millenii*	0	0	1	11.84
20	*Cola nitida*	0	0	2	11.72
21	*Daniellia ogea*	0	0	3	9.15
22	*Delonix regia*	4	8.38	2	11.48
23	*Dracaena arborea*	1	8.38	0	0
24	*Elaeis guineensis*	2	11.2	0	0
25	*Enantia chlorantha*	0	0	1	10.88
26	*Entandrophragma cylindricum*	1	8.72	3	10.5
27	*Ficus exasperate*	0	0	2	9.54
28	*Funtumia elastic*	0	0	2	10.44
29	*Gilbertiodendron dewevrei*	2	9.52	0	0
30	*Gmelina arborea*	0	0	2	8.7
31	*Harungana madagascariensis*	1	9.7	0	0
32	*Hollarhena floribunda*	0	0	1	12.68
33	*Hunteria umbellata*	0	0	3	10.36
34	*Macaranga spinosa*	2	9.88	3	9.4
35	*Malacantha alnifolia*	0	0	5	9.48
36	*Mallotus subulatus*	0	0	3	8.96
37	*Mangifera indica*	1	9.58	2	9.98
38	*Milicia excels*	0	0	2	9.12
39	*Milicia regia*	1	8.64	4	10.85
40	*Mitragyna stipulosa*	2	9.68	1	9.12
41	*Monodora myristica*	2	9.68	2	7.52
42	*Monodora tenulfolia*	2	9.2	2	12.32
43	*Musanga cecropioides*	2	10.4	2	9.38
44	*Myrianthus arboreus*	1	10.8	1	9.84
45	*Nauclea diderrichii*	0	0	1	9.28
46	*Nauclea latifolia*	0	0	2	8.16
47	*Nesogordonia papaverifera*	2	8.16	2	9.86
48	*Newtonia buchanani*	0	0	2	8.26
49	*Nothospondias staultii*	1	8.7	2	9.84
50	*Ochroma lagopus*	1	11.4	3	9.88
51	*Pentaclethra macrophylla*	0	0	4	9.98
52	*Piptadeniastrum africanum*	0	0	3	9.48
53	*Pseudospondia microcarpa*	3	10.88	1	8.48
54	*Pseudospondias mombin*	3	9.48	3	10.85
55	*Pzydrax arnoldiana*	3	10.88	4	8.26
56	*Pzydrax subcordata*	2	9.88	3	8.16
57	*Pterocarpus osun*	2	9.98	2	8.15
58	*Pterygota macrocarpa*	0	0	3	10.98
59	*Pycnanthus angolensis*	0	0	2	8.26
60	*Raphia hookeri*	0	0	3	8.16
61	*Rauvolfia vomitoria*	0	0	1	8.96
62	*Rhodognaphalon brevicuspe*	0	0	3	9.98
63	*Ricinodendron heudelotii*	0	0	1	12.88
64	*Rothimannia hispida*	0	0	2	9.28
65	*Senna siamea*	0	0	3	8.34
66	*Spondias mombin*	0	0	3	8.55
67	*Stercospermum acuminatissimum*	0	0	2	9.44
68	*Sterculia rhinopetala*	0	0	4	11.68
69	*Sterculia tragacantha*	0	0	3	9.88
70	*Tabernamontana pachysiphon*	0	0	3	8.8
71	*Tectona grandis*	0	0	2	8.16
72	*Terminalia ivorensis*	0	0	3	11.42
73	*Terminalia superba*	0	0	2	8.64
74	*Theobroma cacao*	0	0	3	9.52
75	*Triplochiton scleroxylon*	0	0	1	9.36
76	*Uvariastrum pierreanum*	0	0	4	11.88
77	*Voacanga Africana*	0	0	5	8.64
78	*Zanthoxylum gillettii*	0	0	3	8.64
Total		72	342.21	158	648.37

3.1.3 Richness of major plant family in the study areas

The result in table 3 revealed that a total of twenty-five (25) families were identified at the two study sites with 17 and 20 families in Ikogosi warm spring and Arinta waterfall respectively. The result revealed that family Malvaceae has the highest species density (15) in the study area. This was followed by the family Fabaceae (12), Anacardiaceae and Myristicaceae (9) each. At Ikogosi warm spring, the families with highest species density include Anacardiaceae, Fabaceae, Malvaceae and Myristicaceae with density of four (4) each. While in Arinta waterfall, the family Malvaceae has the highest species density of 11.

Table 3: Contribution of family to tree species density in the study area

SN	Families	Ikogosi warm spring	Arinta waterfalls	Total Density
1	Anacardiaceae	4	5	9
2	Annonaceae	3	5	8
3	Apocynaceae	1	6	5
4	Arecaceae	1	1	2
5	Asparagaceae	1	0	1
6	Bignoniaceae	0	1	1
7	Burseraceae	1	0	1
8	Bombacaceae	0	1	1
9	Combretaceae	0	2	2
10	Euphorbiaceae	3	4	7
11	Fabaceae	4	8	12
12	Hypericaceae	1	0	1
13	Labiatae	0	1	1
14	Leguminosae	1	1	2
15	Loganiaceae	1	0	1
16	Malvaceae	4	11	15
17	Meliaceae	1	1	2
18	Moraceae	0	7	7
19	Myristicaceae	4	1	5
20	Rubiaceae	3	6	9
21	Rutaceae	0	1	1
22	Sapotaceae	2	2	4
24	Urticaceae	1	1	2
25	Verbenaceae	0	1	1
	Total	36	66	102

3.1.4 Vegetation structure and forest characteristics of the study areas

Table 4 presents results on the vegetation structure and forest characteristics of the study area. The result reveals that most of the tree species enumerated around the built- up/ recreational area of the study locations fall within the lower stratum of the forest structure. The middle layer category in Arinta waterfall has six (6) tree species while the same layer in Ikogosi has one (1). The result on lower stratum revealed more trees species in Arinta waterfall (60) while that of Ikogosi warm spring has 35. The mean height of trees in the middle stratum at Ikogosi warm spring and Arinta waterfall are 12.72 m and 12.57 m respectively while the value for lower stratum in Arinta waterfall and Ikogosi warm spring are 9.55 m and 9.41 m respectively. The Sorenson's coefficient of similarity between tree species in the study area shows insignificant value of 0.5.

Table 4: Vegetation structure of the study sites

Variables	Ikogosi Warm Spring	Arinta Waterfall
Upper stratum trees (≥ 22m and above)	0	0
Mean Height (m)	0	0
Middle stratum trees (≥ 13m ≤ 21m)	1	6
Mean Height (m)	12.72	12.57
lower stratum trees (≤ 12m)	35	60
Mean Height (m)	9.41	9.55
Sorenson's coefficient		**0.5**

4. DISCUSSION

The uniqueness of the warm spring as one of the few of its kind in the world and particularly the only one in the West African sub-region is a great potential for ecotourism and this has been a key factor that favours the choice and patronage of the centre by tourists as ecotourism destination. Another important asset of the center is the availability of modern recreational facilities such as swimming pool, restaurant, and hotel accommodation among others (Table 2). The presence of these amenities at the warm spring centre coupled with electricity and good road network that connect the two tourism centres together and to other parts of the state is another great potential for the centres as ecotourism destination.

Since one of the criteria for considering an ecosystem as a good ecotourism destination is its biodiversity richness in term of plant and animal both in diversity and population, The observed floristic diversity of the forests at the two watersheds revealed the true characteristics of a tropical forest whereby an area of land as small as one hectare could consists of so many species. This observation is a prove that the vegetation of the study area (i.e the two studied watersheds) is a repository of many tree species with high ecotourism potential. The beautiful scenery provided by the diversity of tree species coupled with the number of individual tree within the sampled plots in the watersheds is a great potential that have made the centres an ecotourism destination for tourists.

The higher number of taxa (66) tree species belonging to 20 families obtained in Arinta waterfall watershed indicates that these ecotourism sites has a great potential for flora and wildlife conservation. The floristic diversity obtained in this study is similar to results obtained in other tropical rain forests as reported by Oduwaiye *et al*., (2002) and Oladoye *et al.,* (2014) who in separate studies recorded sixty-seven plant species and twenty-five families in Okomu National Park and 57 tree species and 28 families in International Institute of Tropical Agriculture Forest Reserve respectively.

The predominantly middle and lower strata vegetation of the two study sites especially the Arinta waterfalls is an added advantage to the ecotourism potential of the whole study area. This lower stratum with a well formed canopy usually provides resting shade for visitors to the ecotourism centres. This assertion corroborates the submission of Olaniyi *et al*., (2015) who reported that Arinta waterfall is an ecotourism sites with great potentials if well managed.

Another potential of the two watersheds as much sought ecotourism destination is the closeness of the two sites to one another. The location of the two sites in the same environment makes the exploration of the two natural resources easy for the tourists in a single adventure as the distance between the two towns is about 20 minutes journey with good road. In this case the tourists could book for accommodation in Ikogosi warm spring since there are chalets for accommodation then take a ride to Arinta waterfalls and then returned for relaxation at the warm spring. Also the beautiful scenery of hills and valleys coupled with evergreen vegetation as the tourists meander through the slope of the road between the two sites could also make the journey very adventurous.

The upgrading of Ikogosi warm spring to a resort centre of international standard by the Government in the recent times with building of more infrastructural and other recreational facilities coupled with the establishment of Gossy Bottled Water Company by UAC, using the natural warm spring in Ikogosi is another potential that has made the whole environment the tourism hub of the State.

5. CONCLUSION AND RECOMMENDATION

Result from this study has revealed that Ikogosi warm spring and Arinta waterfall watersheds have great potentials for ecotourism development. The result also revealed that Ikogosi warm spring as ecotourism centre is well developed than Arinta waterfall in term of infrastructural facilities been put in place by the government. Findings from this study also revealed that the vegetation of the two studied watersheds is a repository of many tree species with high ecotourism potential. However, considering the volume of water that flow untapped throughout the year at Arinta waterfall, it is glaring that the potentials of the waterfall have not been fully harnessed. Consequence upon the above observations, it is recommended that environmental impact assessment should be carried out particularly in Arinta waterfall site before any alteration is made to the flora and fauna of the site in the name of infrastructural development. Also the water could be harnessed for micro-hydro power station to provide electricity and at the same time it could be harnessed for irrigation purposes at the downstream for dry season faming.

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