Journal of Ecosystem & Ecography
ISSN: 2157-7625

Mini Review Open Access

Southwestern Nigeria's In Situ Forest Biodiversity: Including Local and Indigenous Knowledge Systems in Conservation Strategies

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Abstract

In Southwestern Nigeria, where 70–80% of the forest has been converted to uses other than forests, biodiversity loss has become a serious issue. Because the methods used to address conservation issues in modern conservation systems have proven insufficient, the desired results have not been achieved. As a result, the study evaluates both traditional and contemporary approaches to forest management in Southwest Nigeria. In this study, both primary and secondary data were used. Records from Osun-Osogbo Sacred Grove (OOSG) and Old Oyo National Park (OONP) provided the secondary data, which included inventories of woody species, lists of communities within the buffer zone, types of forest resources, and conservation strategies. The woody species were sampled using the quadrant method.

Keywords: Biodiversity; In situ conservation; Ecosystem.

Introduction

The biodiversity of forests is crucial to the preservation of the environment. The management of forest resources is impacted by the sustainability of both modern and indigenous systems, which both play a vital role in preserving the environment. Nigerian forest resources are receiving increased attention because of their importance in preserving biodiversity, sequestering carbon dioxide, and sustaining livelihoods. In Nigeria, there are many different indigenous and traditional forest and pasture management practices that are rich in diversity and depend on various factors such as socioeconomic status, geography, climate, and cultural practices [1-3].

Methodology

Study space

One of Nigeria's six geopolitical zones is the southwest. Latitudes 6°45'–8°45'N and longitudes 2°50'–5°56'E are where it is situated. Six contiguous states make up the zone: Lagos, Oyo, Osun, Ondo, Ogun, and Ekiti (Figure 1). As a result of the Yoruba people predominate presence in this area, it is also referred to as Yorubaland. It's situated right in the middle of the tropical rainforest.

Ife, Ijesha, Oyo, Ibolo, and Igbomina are the main sub-ethnic groups of the Yoruba people in Asuna, though there are also individuals from other regions of Nigeria. Osun State residents follow traditional forms of paganism, Christianity, and Islam. Situated outside Osogbo town in Osun state, Osun Grove (Igbo Oroo) is devoted to the goddess Osun. Since 2005, the sacred grove, also known as Igbo Oroo, has served as both Nigeria's national monument and a UNESCO World Heritage site.75 hectares make up the grove (Osun Osogbo Sacred Grove Guide, 2017).Deforestation is clearly occurring throughout Southwestern Nigeria as a result of growing population pressure on the land. The area is experiencing an ecological problem with the loss of biodiversity [4,5].

Analytical statistics

The SCD-7 index, which is the total of the SCD question answers, was the dependent variable that was employed. Greater burden or severity was indicated by higher scores for categorical variables, which were codified. Associations between the dependent and independent variables were examined using ANOVA with an R2 effect size, or contingency tables with a Cramer's V statistic (interpreted in accordance with Cohen's criteria for effect size) and a Pearson correlation coefficient, depending on whether the variables were categorical or scalar. We developed a variable called "vascular risk factors," which consists of the dichotomous scores for diabetes, dyslipidemia, and hypertension. An additional variable, the "pain index," is the total of all variables related to pain (low back, neck, migrainearthritis, taking medication, and pain [no pain, 0; mild, 1; moderate/intense, 2].

To determine predictors, a linear regression analysis was carried out, and the effect size was computed using the R2 and beta statistics. A small number of participants did not answer any questions at all; these were categorized as missing cases and were not included in the analysis. The statistical analysis was done with SPSS 20.0 [6-8].

At OONP and Osun Osogbo Sacred Grove, the research sites, a common methodology has been established. Following the standard sampling protocol for woody species, two 300-meter transects were divided into eight 50 × 50 m plots. The plots were set up in the center of the Old Oyo National Park's sacred grove and in the middle of the five ranges, specifically: Plots measuring 50 by 50 meters were placed on two 300-meter transect lines, with a 300-meter gap between each plot every 75 meters along the transect. This resulted in four plots per transect, eight total for each study site, and sixteen total for the study.

Every living tree in each plot that had a diameter at breast height (DBH) of at least thirty centimeters was found and had its DBH measured. For accuracy, tags were positioned 15–20 cm below a painted ring designating DBH. After recording the species, DBH (cm), and height (m) of all tagged trees, the measurement was repeated for Osun Osogbo Sacred Grove and OONP. Densities, frequencies, and basal errors were then computed for each species [9,10].

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Received: 03-Nov-2023, Manuscript No: jee-23-120082; **Editor assigned:** 06-Nov-2023, Pre-QC No: jee-23-120082 (PQ); **Reviewed:** 20-Nov-2023, QC No: jee-23-120082; **Revised:** 22-Nov-2023, Manuscript No: jee-23-120082 (R); **Published:** 29-Nov-2023, DOI: 10.4172/2157-7625.1000463

Citation: George J (2023) Southwestern Nigeria's In Situ Forest Biodiversity: Including Local and Indigenous Knowledge Systems in Conservation Strategies. J Ecosys Ecograph, 13: 463.

Results

The Osun Osogbo Grove is highly significant for the conservation of in situ biodiversity, as evidenced by its highest species richness (60), diversity index (3.56), number of seedlings (65 species), species evenness (0.66), and percentage of endangered species (32.8%).

But Old Oyo National Park's lower diversity indices are explained by the park's low sacredness, which has encouraged encroachment, and its ecological location in the savannah ecological zone. The highest species richness (50), diversity index (3.27), number of seedlings (55), species evenness (0.56), and percentage of endangered species (26.7%) in the case of OONP further demonstrated the significance of the Park in the conservation of in situ biodiversity.

Discussion

There were between 27 and 65 different species of trees found in all the sites; the Osun Osogbo Grove had the highest species abundance, while the OONP had the lowest abundance of species. As a result, Osun Osogbo Sacred Grove had substantially higher species abundance than OONP. In most other ecosystems, there is a similar focus on the conservation of endangered species. In the two locations, the Shannon-Weiner diversity index varied from 2.35 to 3.54, with Osun Osogbo exhibiting the highest values and OONP the lowest, respectively. After computing the exponentials (exp. H'), the Shannon-Wiener diversity indices of the two ecosystems under study were statistically analyzed.

Conclusion

There are more different species in the sacred grove. The distribution of the individuals within the community was more equitable among these species, though. Results show that there are roughly 17 fewer species and that 70% of the individuals in the OONP belong to a single species, where biodiversity conservation efforts have included the use of scientific instruments. The two knowledge system applications contribute to in situ biodiversity protection, as demonstrated in Osun Osogbo grove and OONP, and the use of natural resources, both plant and animal-based, was done with respect to and guided by conservation requirements. The relative species density result showed that Osun Osogbo Sacred Grove had more species under conservation than OONP (3.14) with a biodiversity index of 3.48, suggesting a lower level of conservation compared to the grove.

This was demonstrated by the results of the important value index, which varied from 3.01 in OONP to as much as 8.27 in Osun Osogbo Sacred Grove, and the species diversity index, which ranged from 3.14 to 3.48. The justification for establishing a contemporary, scientifically run national park differs greatly from the justification for protecting the biodiversity of sacred groves.

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