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EVALUATION OF SELECTED WATER QUALITY PARAMETERS AND POSSIBLE TOURISM ACTIVITIES IN AYIKUNUGBA WATERFALL, OKE-ILA, NIGERIA

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ABSTRACT

This study evaluated some water quality parameters of Ayikunugba waterfall and assessed the awareness of members of the host community of tourism activities that can be done in and around the waterfall. Water samples were collected fortnightly for 4 months from 3 sampling locations to determine temperature, pH, dissolved oxygen (DO), and biological oxygen demand (BOD). Probe meters and standard laboratory methods were used to evaluate these parameters. Structured questionnaires were administered to the village and household heads from Oke-Ila community to assess the community's awareness of tourism activities that can be done using the waterfall. Results show that the water temperature (23.58±1.51ºC), pH (7.20±0.17), DO (10.34±0.57mg/L) and BOD (1.66±0.73mg/L) were within the standard limits for recreational waters. The respondents' majority were male (86.25%), 41 – 60 years of age (61.25%), with a minimum of secondary school education (65.00%). The respondents' majority (98.75%) have previously participated in a tourism activity; 90.00% of them have visited Ayikunugba waterfall during Oke-Ila Day annual celebration (27.50%) and for the discovery of the waterfall myth (25.00%). Tourism activities with high levels of respondents' awareness include swimming (98.75%), sales of arts and crafts (98.75%), cycling (97.50%), trekking (92.50) and boating (81.25%). Therefore, Ayikunugba waterfall is recommended for development to harness its tourism potential while community involvement should be employed to facilitate sustainable use.

Keywords: Water parameters, tourism development, community awareness, Ayikunugba waterfall

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INTRODUCTION

Tourism has experienced continuous growth and deepening diversification, over several decades, to become one of the fastest-growing sectors in the world. Globally, it is the third largest product of export after chemical and fuel products (Novelli *et al*., 2021). Tourism has become closely linked to the development of many local and national economies, especially those communities and countries that are endowed with naturally occurring tourism sites. The role of tourism in cultural and socio-economic development has led to a rise in the number of tourism sites and the emergence of new tourism products in different parts of the world. As a result, the economies of many countries, regions, and cities of tourism destinations have benefited from the leading contributions of tourism to gross domestic product (GDP) growth (Abbas *et al*., 2021).

Globally, tourism plays a strategic role in the world's economic growth. In the year 2019, the contribution of the tourism sector to the world economy was 9.63 trillion US dollars, from 2.57 trillion US dollars recorded in 2017, with an expected annual rise of 3.8% from 2018 to 2028 (WTTC 2018; Abbas *et al*., 2021; WTTC, 2022). However, the outbreak of the global pandemic, COVID-19, caused a huge decline in the growth of the sector, due to travel bans and restrictions adopted by many countries to stall the spread of the disease (Soliku *et al*., 2021).

This led to a decline of 50.40% (4.86 trillion US dollars) in tourism and travel GDP in the Year 2020 (WTTC, 2022). The resilience of tourism sectors to diseases, among other growth retarding factors, has not been in doubt as the sector has started recovering from the impact of the pandemic (Novelli *et al*., 2021; UNWTO, 2023). The report of UNWTO (2023) reveals that international tourism has witnessed a 63% recovery in comparison with levels obtained in 2019 before the pandemic period.

The tourism sector in the African continent has not been left out of the recovery from the global pandemic. The travel and tourism activities in the continent have attained about 65% recovery from the pre-pandemic period (UNWTO, 2023). Over the years, African countries have benefitted from the direct and indirect gains of tourism. These countries have different land- and water-based natural endowments with fascinating features, capable of attracting and sustaining tourist visits. Land-based tourism sites have enjoyed greater attention and development when compared with water-based natural endowments. Underdevelopment of the water-based tourism formations has limited the growth of many of these endowments (AfDB 2015; Oladele *et al*., 2018). Among such countries with several underdeveloped water-based endowments with huge tourism potentials is Nigeria.

Nigeria is blessed with natural water-based landforms such as waterfalls, cold and warm springs, caves, and boreholes as well as swampy environments and beaches spread in various parts of the country. Notable examples of these water-based endowments include the Erin-Ijesha waterfall in Osun State, Owu Falls in Kwara State, Assop Falls in Plateau State, Kwa, Agbokim and Ikom waterfalls in Cross River State, Farin Ruwa waterfall in Nassarawa State, Wikki warm spring in Bauchi State, Ikogosi warm spring in Ekiti State, Gurara waterfalls in Niger State, Agbokim waterfalls in Cross River State, among others. Besides that, these natural endowments have distinctive, appealing, and exciting features that fascinate tourists and offer them momentous experiences (Olatunji and Ezenagu 2016), they enjoy good spread in all parts of the country. Unfortunately, the majority of these tourism destinations are undeveloped or, at best, underdeveloped. This has limited the contribution of water-based tourism to the country's GDP growth, as well as reduced the socio-economic roles of tourism in improving the living standard of members of host communities of these natural endowments (Mejabi and Abutu, 2015; Oladele and Digun-Aweto 2017; Oladele *et al*. 2018).

Ayikunugba waterfall is one of Nigeria's natural endowments that is currently undeveloped. The waterfall which is located in Oke-Ila, a hilly agrarian town with a refreshing atmosphere in the Southwestern part of Nigeria, requires sustainable development to harness its tourism potential. A clear insight into the tourism potentials of this waterfall is pertinent to developing tourism products and sustainable management practices that are specific to the capacity of this natural endowment. Therefore, the assessment of the water quality of Ayikunugba waterfall becomes germane to the waterfall's use for tourism. Also, the awareness of host communities of the tourism potentials of the waterfall is important for the development and sustainable management of the waterfall. Hence, there is a need for an evaluation of the awareness level of members of Oke-Ila, Ayikunugba's host community, on the tourism potential of the waterfall. Therefore, this study evaluated some physical and chemical parameters of water from Ayikunugba waterfall and assessed the awareness of members of the Oke-Ila community of possible tourism activities that can be done in and around the vicinity of the waterfall.

MATERIALS AND METHODS

Study Area: Ayikunugba waterfall is located at 7º55'41.9"N, 4º57'51.9"E coordinates, and it is domiciled in Oke-Ila town in Ifedayo Local Government Area of Osun State. Oke-Ila is an ancient town with a portable but dynamic human population and a moderate geographical land mass. The town is a rural community that has a soothing and refreshing atmosphere, situated in the rainforest belt of South western Nigeria. Oke-Ila community is surrounded by hills, at an elevation of 568 metres, known to be part of the Yoruba hills used for cover during the Fulani expansionist war (Falade 2014). Ayikunugba waterfall is characterized by a gorge and showers of water from the hilltop into a pool. The gorge is located about 4 kilometers from the centre of Oke-Ila town; it is about 21 metres deep and surrounded by a lush array of trees. At the heart of this gorge lies

the scenic and breathtaking cascade of water, which takes its source from among the rocks. The water falls into the plunge pool which is about 0.3 metres deep. The magnificent nature of the fall remains the same during the dry and rainy seasons of the year. Hence, the waterfall is a unique landform with tourism significance all year round.

Collection of Water Samples: Water samples were collected from Ayikunugba waterfall for evaluation of some water quality parameters of the water body. The sampling was done fortnightly, and it lasted a period of 4 months of the dry season in Nigeria (November 2022 to February 2023). The sampling locations, labelled A, B and C, were distributed along the course of the water flow. Sampling location A was situated at the point of falling water which is about 3 metres from the plunge pool, location B is the plunge pool while location C was sited at the exit point, about 3 metres away from the plunge pool. Physical and chemical parameters such as temperature, pH, dissolved oxygen, biological oxygen demand, total dissolved solids, electrical conductivity, phosphate, and nitrate contents were determined in the water samples.

Water parameters such as temperature, pH, dissolved oxygen, total dissolved solids, and conductivity of the water body were measured in situ using a probe meter (SPER Scientific water quality meter, AF 33594 model). Water samples for determination of the biological oxygen demand (BOD) were collected using 250ml DO bottles while 75cl plastic bottles were used to collect water samples for nitrate and phosphate content evaluation. The methods of APHA (2005) were employed to determine the BOD, nitrate, and phosphate contents of the water samples. The concentrations of nitrate and phosphate in the water samples were read using an Atomic absorption spectrophotometer at 420nm and 690nm wavelengths, respectively.

Furthermore, structured interview schedules were used to evaluate the awareness of members of the Oke-Ila community on various tourism activities that can be done in and around Ayikunugba waterfall. The village and household heads of the community were interviewed as respondents. Eighty (80) households, which amounts to 20% of the estimated households in the community, were randomly selected for the administration of questionnaires. Data obtained from this study were analysed using descriptive and inferential statistics. Mean and standard deviation were used to present the water quality parameters while one-way analysis of variance was used to test differences in the water quality parameter among the sampling locations. Frequency counts and percentage distribution were used to describe variables on the awareness of the respondents on possible tourism activities.

RESULTS

The concentration of some water quality parameters evaluated in the water samples from Ayikunugba waterfall are presented in Table 1. The table revealed that each of the sampling locations had varying levels of each of the physical and chemical parameters evaluated. A significant increase ($P<0.05$) in water temperature was observed from locations A ($22.25\pm0.96^{o}C$) to C ($25.00\pm0.82^{o}C$), implying a significant rise in temperature as the water flowed through the point of falling water, through the plunge pool, to the exit point. Also, significantly different ($P<0.05$) pH values were observed among the sampling locations, although, the average pH level recorded in the water body is near neutral (7.20 ± 0.17). However, significant reductions ($P<0.05$) were recorded in the dissolved oxygen (DO) contents of the water body as the water flows from the point of falling waters (10.89 ± 0.51 mg/L) to the exit point (9.92 ± 0.23 mg/L). Similarly, significant falls in concentration ($P<0.05$) were observed in total dissolved solids, electrical conductivity, and phosphate contents of the water body as the water flows from the point of falling waters (locations A) to the exit point (location C). Contrastingly, other parameters such as biological oxygen demand (BOD) and nitrate contents rose significantly ($P<0.05$) from locations A to C.

Table 1: Physical and chemical parameters of water samples from Ayikunugba waterfall in comparison with WHO standards for recreational waters

Parameter	SL-A	SL-B	SL-C	Mean±SD	Optimum Range (WHO, 2006; 2021)
Temp. (°C)	22.25±0.96^{b}	23.50±1.29^{ab}	25.00±0.82^{a}	23.58±1.51	21.0 – 32.0
pH	7.21±0.03^{b}	7.38±0.04^{a}	7.01±0.10^{c}	7.20±0.17	7.0 – 8.5
DO (mg/L)	10.89±0.51^{a}	10.22±0.48^{ab}	9.92±0.23^{b}	10.34±0.57	≥ 7.5
BOD (mg/L)	0.90±0.06^{c}	1.50±0.11^{b}	2.59±0.14^{a}	1.66±0.73	≤ 3.0
TDS (mg/L)	70.38±2.72^{a}	68.66±1.58^{ab}	66.01±1.14^{b}	68.35±2.56	≤ 500.0
EC (µS/cm)	99.83±4.45^{a}	95.10±3.80^{a}	93.59±3.35^{a}	96.17±4.48	≤ 150.0
Nitrate (mg/L)	0.012±0.001^{b}	0.014±0.002^{b}	0.018±0.001^{a}	0.014±0.003	N/A
Phosphate (mg/L)	0.039±0.003^{a}	0.026±0.002^{b}	0.019±0.002^{c}	0.028±0.009	N/A

Key: SL: Sampling Location, Temp.: Temperature, DO Dissolved oxygen, BOD: Biological Oxygen demand, TDS: Total Dissolved Solids, EC: Electrical conductivity N/A: Not Available. Means bearing the different superscripts are significantly different among the locations (P<0.05).

The demographic and tourism-related characteristics of the respondents are presented in Tables 2 and 3, respectively. Table 2 reveals that the majority of the respondents were male (86.25%), between 41 – 60 years of age (61.25%), married (80.00%), and had a minimum of secondary school education (65.00%). Among the respondents, the major occupations were farming (43.75%) and trading (28.75%). Moreover, Table 3 shows that 98.75% of respondents' majority have participated previously in a tourism activity; 92.50% of them have visited a waterfall among other tourism destinations, while 90.00% of them have visited Ayikunugba waterfall at least once. The dominant reasons for the respondents' visit were the Oke-Ila Day annual celebration (27.50%), the discovery of the waterfall myth (25.00%), and tourism purposes (18.75%).

The level of awareness among the respondents of various tourism activities that can done in and around Ayikunugba waterfall is presented in Table 4. Tourism activities with relatively high awareness levels among the respondents were swimming (98.75%), sales of arts and crafts (98.75%), cycling (97.50%), trekking (92.50%), boating (81.25%) and picnics (77.50%). Relatively low levels of awareness (45.00% and 21.25%) were expressed by the respondents on the usage of the rocky vicinity of the waterfall for rock climbing and hiking, respectively.

Table 2: Demographic characteristics of respondents

Characteristics	Frequency	Percentage (%)
Sex		
Male	69	86.25
Female	11	13.75
Age		
≤ 30 years	2	2.50
31 – 40 years	6	7.50
41 – 50 years	24	30.00
51 – 60 years	25	31.25
61 – 70 years	16	20.00
≥ 70 years	7	8.75
Marital Status		
Single	1	1.25
Married	64	80.00
Widow	13	16.25
Divorced	2	2.50
Educational Status		
No Formal Education	13	16.25
Primary	15	18.75
Secondary	33	41.25
Tertiary	19	23.75
Occupation		
Civil Servant	11	13.75
Trading	23	28.75
Farming	35	43.75
Artisan	11	13.75
Religion		
Islam	34	42.50
Christianity	32	40.00
Traditional	14	17.50

Table 3: Ecotourism-related characteristics of respondents

Characteristics	Frequency	Percentage (%)
Previous participation in any tourism activity		
Yes	79	98.75
No	1	1.25
Places visited		
Zoos	18	22.50
Parks	4	5.00
Waterfalls	74	92.50
Visit any waterfall		
Yes	74	92.50
No	6	7.50
Places visited		
Ayikunugba waterfall	72	90.00
Ikogosi warm springs	15	18.75
Olumirin falls	7	8.75
Number of times Ayikunugba waterfall was visited		
Never	8	10.00
Once	25	31.25
Twice	8	10.00
Thrice	15	18.75
Several occasions	24	30.00
Reason for the visit to Ayikunugba waterfall		
Work	6	7.50
Discovery of waterfall myth	20	25.00
Construction of the step	5	6.25
Exploration	8	10.00
Oke-Ila day	22	27.50
Pathway to farmland	7	8.75
Tourism	15	18.75

Table 4: Awareness of respondents on tourism activities that can be done in and around Ayikunugba waterfall

Activity	Frequency	Percentage (%)
Swimming	79	98.75
Boating	65	81.25
Rock-climbing	36	45.00
Picnics	62	77.50
Sales of art and craft	79	98.75
Hiking	17	21.25
Trekking	74	92.50
Cycling	78	97.50

DISCUSSION

Water movement, from the point of falling water to the exit point, which exposes the water body to varying environmental conditions at a particular point in time may have been responsible for the differences in water quality parameters observed among the sampling locations. According to Boyd (2012), flowing attributes of water bodies expose them to varying ambient conditions and contact with different materials which alters the water quality. The presence of trees, whose canopies covered some parts of the waterbody from direct sunlight, accounted for the relatively low water temperature observed at the point of falling water. Reduction in the thickness of tree canopies and/or the absence of the canopy cover is responsible for the rise in water temperature observed as the water flows to the exit point. Also, the pH level of the water body is very close to being neutral and lies within the pH range (6.5 – 8.5) common to unpolluted surface waters in Nigeria (Kuforiji and Ayandiran, 2013). However, the differences observed in the pH levels may have indicated that the locations had varying concentrations of mineral elements, compounds, and organic matter (Boyd, 2012).

Elevated dissolved oxygen (DO) observed in the water body may be attributed to low water temperature, dissolution of atmospheric oxygen in the water, and state of purity of the water body. Besides that, low water temperature enhances high DO levels in water bodies (Ajani, 2019), low levels of microbial activities do contribute to high DO levels in water bodies (Omitoyin, 2018). Although, the biological oxygen demand (BOD) observed in the water body is low, rising BOD levels pointed to an increase in microbial activities as the water flows to the exit point. This may be attributed to an increase in the organic matter content of the water which encouraged rising microbial activities (Boyd, 2012). Furthermore, microbial uptake of nutrients for various life functions may have accounted for the reduction observed in the total dissolved solids, conductivity, and phosphate contents, as the water flows to the exit point. The observed rise in the nitrate contents of the water affirmed the presence of microbial activities in the water since nitrogenous wastes are products of microbial activities. However, the relatively low nitrate and phosphate contents of the waterbody imply that Ayikunugba waterfall may have been free from exogenous sources of nutrients such as erosion, surface runoff, and effluents from domestic, agricultural, and industrial sources (Oladele *et al*., 2019). The physical and chemical parameters evaluated reveal that the water of Ayikunugba waterfall is suitable for tourism activity, especially swimming, since all the parameters were within the WHO recommended levels for recreational waters.

Demographically, the dominant sex observed among the respondents is common in rural communities in Nigeria where the male is the head of a household and/or a community. The respondents' dominant age and marital status align with the findings of Adetola and Adediran (2014) who reported that the majority of Nigeria's rural areas are composed of individuals of active and mature ages. A relatively high respondent population with a minimum of secondary education corroborated the submission of the village head that members of the community are largely educated with access to, at least, primary and secondary school education. Farming and trading which accounted for major occupations is expected of an agrarian rural community in Nigeria (Nchuchuwe and Adejuwon, 2012) where farming and trading of agricultural produce are the commonest occupations.

The relatively high level of respondents' previous participation in tourism activities and visits to Ayikunugba waterfall and Ikogosi warm springs may be attributed to the capacity of water-based tourism sites to attract local and

international tourists (Oladele and Digun-Aweto, 2017). The contribution of the Oke-Ila Day celebration cannot be overlooked since the yearly celebration entails a visit to the waterfall as one of its annual programs. The annual celebration may have also contributed to the relatively high population of respondents who had visited the waterfall. The two prominent purposes of visiting the waterfall, being Oke-Ila day celebration and waterfall myth discovery, agree with the submission of Oladele and Digun-Aweto (2017) that cultural festivities and water-based tourism endowments attract tourists from communities within and outside the host nation.

Furthermore, the respondents' awareness of various possible tourism activities, which can be done in and within the vicinity of the waterfall, could be attributed to the level of education and adulthood status among the majority of the respondents. The relatively high level of respondents' awareness of the usage of the waterfall for swimming and boating may be attributed to the recreational importance of these activities. According to Moran and Ferner (2017), water bodies are mainly used by tourists for swimming and boating, among other recreational activities. The refreshing features of the surrounding vegetative environment may have also contributed to the respondents' awareness of the use of the waterfall vicinity for cycling and trekking exercises. The knowledge of tourism's contribution to socio-economic development (Oladele *et al*., 2018) may have informed the level of respondents' awareness of the usage of the waterfall vicinity for picnics and as a point of sale of arts and crafts. The soothing and refreshing atmosphere of the waterfall vicinity could be responsible for the respondents' awareness of using the waterfall's vicinity for cycling and trekking exercises (Falade, 2014). The relatively low level of respondents' awareness of using the water vicinity for rock climbing may have resulted from a lack of equipment and facilities for safe rock climbing in the rural community, while the forested nature of the waterfall vicinity may have accounted for the low awareness level on the usage of the waterfall environment for hiking.

CONCLUSION

The water of Ayikunugba waterfall can be regarded as suitable for tourism use since all the physical and chemical parameters evaluated in the water of the waterfall were within the standards set for recreational waters. Despite the agrarian features of the host community, Oke-Ila, the level of education among the members of the community and the Oke-Ila Day annual celebration played major roles in the community's awareness of the various tourism activities that can be done in and around the waterfall. The inclusion of a visit to the waterfall in the annual celebration aided the respondents' submission in identifying major tourism activities that can be done in and around the waterfall as swimming and boating activities as well as the use waterfall's vicinity for picnics and sales outlet for arts and crafts materials. Since Ayikunugba waterfall has acceptable water quality suitable for tourism activities, the waterfall is recommended for adequate development to harness its tourism potential. The development of tourism activities in and around the waterfall will maximise the use of the waterfall and usher in notable socio-economic development of the host community. Also, the host community's involvement in tourism development of Ayikunugba waterfall is recommended to facilitate sustainable tourism use of the waterfall.

CONFLICT OF INTEREST

We, the authors of this article, hereby declare that there is no conflict of interest in the design and conduct of the study, and the report of our findings.

REFERENCES

Abbas J., Mubeen R., Iorember P. T., Raza S. and Mamirkulova G. (2021). Exploring the impact of COVID-19 on tourism: transformational potential and implications for a sustainable recovery of the travel and leisure industry. *Current Research in Behavioral Sciences*, 2: 1 – 11. https://doi.org/10.1016/j.crbeha.2021.100033.

Adetola, B. and Adediran, O. (2014). Attitude of local residents towards sustainable tourism development in Olumirin Waterfalls Southwestern Nigeria. *Ethiopian Journal of Environmental Studies and Management*, 7(5): 561 - 571

African Development Bank (AfDB) (2015). *Maximising benefits from water for tourism in Africa*. African

Development Bank (AfDB), Abidjan, Côte d'Ivoire. 98pp.

Ajani E.K. (2019). *Engaging the fish: Elixir for Nigeria's self-sufficiency in fish production*, 465th University of Ibadan Inaugural Lecture (2018/2019 Series) presented in Trenchard Hall, University of Ibadan, Nigeria. 29th August, 2019, 130 pp.

American Public Health Association (APHA) (2005). *Standard methods of water and wastewater examination*, 21th edition. Washington D.C. Joint publication of American Public Health Association, American Water Works Association and Water Pollution Control Federation approach. 179pp

Boyd C.E. 2012. Water Quality. In: Lucas J. S. and Southgate P. C. (2012). *Aquaculture: Farming Aquatic Animals and Plants*. 2nd Edition, Blackwell Publishing Ltd., John Wiley & Sons Ltd., Sussex, UK. 52 – 82.

Falade, K. (2014). Ayikunugba Waterfall: Nature's Wonder.
http://osun.citynewsline.com,ng/news/avikunnugba-waterfall-natures-wonder. Accessed on July 14, 2018.

Kuforiji, T.S. and Ayandiran, T.A. (2013). Study of heavy metals pollution and physico-chemical assessment of water quality of River Owo, Agbara, Nigeria. *International Journal of Water Resources and Environmental Engineering*, 5(7): 434-341

Mejabi, E. and Abutu, G. (2015). Nigerian tourism: A catalyst for sustainable national Development. *International Journal of Public Administration and Management Research*, 3(1): 37-47.

Moran, K. and Ferner, D. (2017). Water safety and aquatic recreation among international tourists in New Zealand. *International Journal of Aquatic Research and Education* 10(1): Article 5, 1 – 17. https://doi.org/10.25035/ijare.10.01.05

Nchuchuwe, F.F. and Adejuwon, K.D. (2012). The challenges of agriculture and rural development in Africa: The Case of Nigeria. *International Journal of Academic Research in Progressive Education and Development*, 1(3), 45-61.

Novelli M., Adu-Ampong E., and Ribeiro M.A. (2021). Tourism in Africa – continental issues and regional contexts. In M. Novelli, E. Adu-Ampong, & M.A. Ribeiro, Routledge *Handbook of Tourism in Africa*, 3 – 32. Routledge.

Oladele A.H., Digun-Aweto O. and Sunday Y.A. (2019). Relationship between cadmium, nickel and chromium contents in *Oreochromis niloticus*, *Macrobrachium vollenhovenii*, sediments and water of Lake Asejire, Nigeria. *World Journal of Fish and Marine Sciences*, 11(2): 15 – 22. DOI: https://doi.org/10.5829/idosi.wjfms.2019.15.22

Oladele, A.H. and Digun-Aweto, O. (2017). Strength, weakness, opportunities and threats analysis of aquatic tourism in Nigeria. *Journal of Environmental Management and Tourism*, 6(22), 1259-1267. DOI:10.14505/jemt.v8.6(22).13

Oladele, A.H., Digun-Aweto, O. and Van Der Merwe, P. (2018). Potentials of coastal and marine tourism in Nigeria. *Tourism in Marine Environments* 13(2-3), 165-173. DOI: https://doi.org/10.3727/154427318X15276699095952

Olatunji, T. and Ezenagu, N. (2016). An evaluation of selected attractions in Osun state for tourism promotion. *Journal of Tourism, Hospitality and Sports*, 15: 7 – 16. ISSN (Online) 2312-5179.

Omitoyin B.O. (2018). *Calming Nigeria's troubled waters: Hope for sustainable fish production*, 440th University of Ibadan Inaugural Lecture (2017/2018 series) presented in Trenchard Hall, University of Ibadan, Nigeria. 16th August, 2018, 125 pp.

Soliku O., Kyiire B., Mahama A. and Kubio C. (2021). Tourism amid COVID-19 pandemic: impacts and implications for building resilience in the eco-tourism sector in Ghana's Savannah region. *Heliyon*, 7: 1 – 10. https://doi.org/10.1016/j.heliyon.2021.e07892

United Nations World Tourism Organization (UNWTO) (2023). *World Tourism Barometer*. 21(1): 1 – 6. World Tourism Organization, Madrid, Spain.

World Health Organization (WHO) (2006). *Guidelines for safe recreational water environments*. Volume 2, Swimming pools, spa and similar environments. World Health Organization (WHO) press, Geneva, Switzerland. 146 pp.

World Health Organization (WHO) (2021). *Guidelines on recreational water quality*. Volume 1, Coastal and Fresh Waters. World Health Organization (WHO) press, Geneva, Switzerland. 164 pp.

World Travel and Tourism Council (WTTC) (2018). *Travel and Tourism Economic Impact: 2018 Reports*. World Travel and Tourism Council, United Kingdom. 16 pp.

World Travel and Tourism Council (WTTC) (2022). *Economic Impact 2022: Global Trend*. World Travel and Tourism Council, United Kingdom. 36 pp.