ASSESSMENT OF PEOPLE'S KNOWLEDGE AND PERCEPTIONS OF VULTURES IN SOME SELECTED AREAS OF PLATEAU STATE NIGERIA AND ITS CONSERVATION IMPLICATIONS

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ABSTRACT

The study was conducted to assess the perceptions, beliefs, knowledge and attitudes of people toward vultures. Four study sites from three local government areas in Jos were selected. Methods included the use of open ended, semi-structured questionnaires. Respondents were selected using stratified random sampling and purposive sampling. A hundred and sixty respondents participated in the study. Results revealed that the most seen and identified vulture species was the Hooded Vulture Necrosyrte monarchus 83(51.9%). Respondents' knowledge of what vultures eat and where they can be found showed varied knowledge among respondents. Respondents also thought that vultures had declined but could not link the decline to any human activity. Seventy-five (46.9%) of the respondents had negative perceptions of vultures, while 57(35.6%) had positive perceptions. Local beliefs about vultures revealed that vultures where perceived as evil by 38(23.7%) of the respondents. Knowledge of vulture importance in the environment was low, 77(48.1%) perceived vultures as not important while 72(45.0%) thought them important. Perception and knowledge about vultures was seen to affect the willingness of respondents to protect vultures. We conclude that knowledge and perceptions about Vultures is low, and might be related to the low sightings and interactions with the species due to the decline in vulture populations. We suggest that education and awareness programs and campaigns need to be intensified among the public to end Vulture persecution and decline

Keywords: Perception, Attitude, Vulture, Biodiversity, Conservation

INTRODUCTION
Many works over time have come to acknowledge local participation as an important tool in achieving conservation success, as such, local understanding and perceptions of wildlife need to be given more attention (Weladji *et al.*, 2003; Adams *et al.*, 2004; Baldus *et al.*, 2003; Ntuli, et al, 2019; Epanda et al, 2019). Local Perception which is usually influenced by culture, gender, education and religion can be defined as the way in which something is regarded, understood and interpreted by people (Schacter, 2011). Local perception plays a very significant role in conservation (Barrows and Fabricas, 2002) as it helps us in understanding and appreciating local views about wildlife (Median and Atran, 1999). Perceptions of people about certain species of wildlife have accumulated over the years (Ebua *et al*, 2011; Trafzer *et al.*, 2008) resulting into beliefs and cultures, making perception a strong factor to consider when tackling conservation as these would affect people's attitude towards it (Ormsby and Kaplin, 2005; Ramakrishnan, 2007). Some factors which have been linked with the decline of vulture

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species are climate change and habitat degradation (Simmons, 2007). Habitat degradation has affected vulture populations leading to population decline worldwide (BirdLife international, 2010), with the increasing number of humans and increased activities such as deforestation, farming and construction, vultures around the world have lost their homes and nesting sites, which in turn affects their population (Barai and Virani, 2004).

In Africa the cause of population decline is still largely unknown, with the combination of several factors such as hunting, killing by poachers, traditional healers and users and habitat degradation being the major factors (Rondeau and Thiollay, 2004; Virani, 2011). These declines are prevalent in Western Africa, especially Nigeria and Benin Republic due to the trade in vulture parts for cultural and for traditional medicine purposes (Adeola, 1992; Buechley and Sekercioglu, 2016; Thiollay, 2007; Ogada *et al*., 2016). This trade in Vulture species may be due to beliefs of local people about Vultures (Baral and Gautam 2007). Despite the global concerns about the state of vultures and their decline, there is still a paucity of information about reasons for the decline in Nigeria (but see Owolabi *et al* 2020), which has been identified as one of the leading countries in the decline. There is in fact, limited empirical data and information on how people perceive vultures and how their knowledge about vultures influences their attitudes towards them. This research therefore, the first on perceptions and attitudes on vultures in Jos Plateau, aims at contributing to bridging this knowledge gap by assessing people's knowledge and perceptions of vultures in some selected areas in Jos Plateau state and drawing conservation implications from the findings. Our main objectives of this study were to determine people's knowledge and perception of Vultures and the effect of perception on attitude toward vulture conservation

MATERIALS AND METHODS
Study Area
The Jos-Plateau lies within Latitude (09^0 55'N) and Longitude (08^0 54'E), with an elevation of 1,217m. it is located in the middle belt region of Nigeria, with an average population of about 900,000 people (National Population Commission 2006) and an average monthly temperature of about $21\text{-}25^0$c and an annual rainfall of 1,400mm.The study area is divided into three geo-political zones, namely Jos- North, Jos-South and Jos-East Local Government Areas,
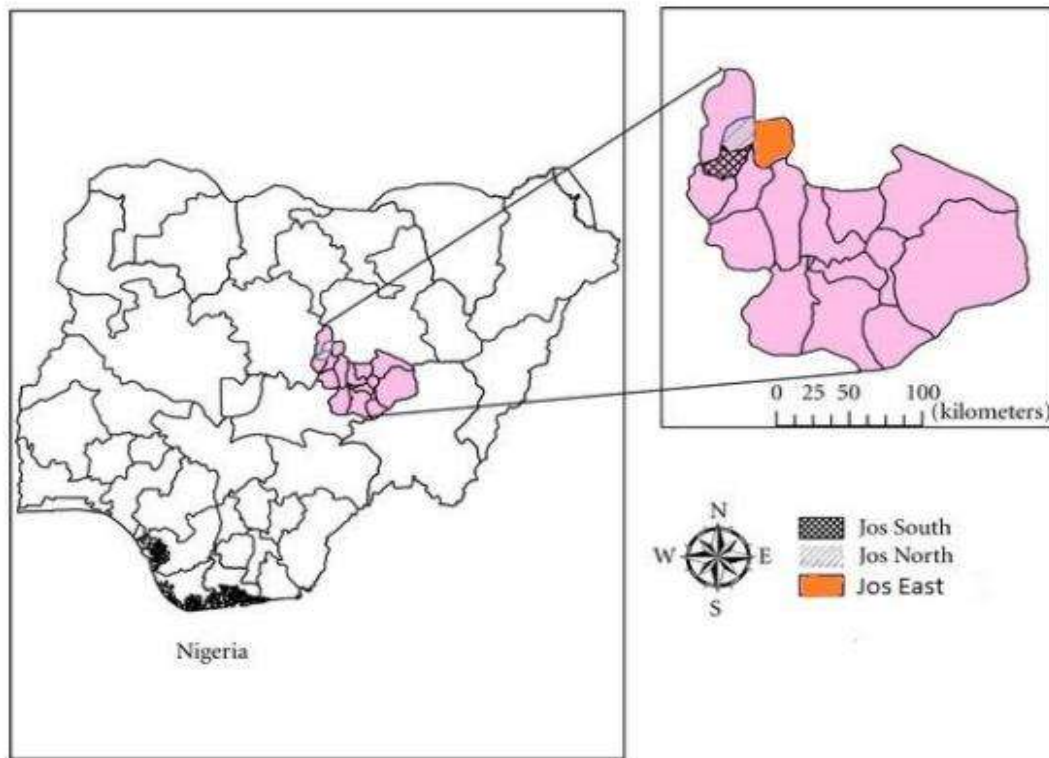
Figure 1: Map of Plateau State, showing three Local Government Areas of the study sites

Four areas namely, Amurum Forest, Jos Abattoir, Jos Wildlife Park and the Jos Zoo, where selected for this research, these sites are located in the three local government areas that make up Jos. The sites where selected to give a representation of Jos conservation areas and slaughter houses, were respondents would have most likely seen or have ideas about vultures

Study participants:
Study respondents include adults from the age of 18 years and above, residing within the selected study communities as it has been shown (e.g., Hunn, 2008; Wyndham, 2010; Kreutz, 2015; Pam *et al* 2018) that people from that age are old enough to give ideas about their environment. Consent was sought from all participants, before inclusion in the study, and no one was coerced into participating in the research, such that all participants willingly participated in the research. Forty people were sampled from each of the four study sites, bringing the total number of respondents interviewed for the research to 160 people. The study was

carried out from 17th December 2018 to 22nd December 2018, it lasted for one week. All study sites were visited once, to avoid replication and respondent bias from prior information from previous respondents, and a total of 40 individuals were interviewed from each study site. Survey was conducted using face to face interviews. Stratified random and purposive sampling methods were used in respondent selection. Stratified random sampling was used to divide the sample into male and female so as to ensure a greater degree of representation, as recommended by Babbie (1999).

Survey instrument:
A questionnaire consisting of two sections was used in the survey, the first section comprised of respondents' socio-demographic characteristics while the second section consisted of semi-structured, open-ended questions on perception and vulture knowledge. The questionnaire consisted of a total of thirty- six (36) questions (Appendix 1).). To determine respondents' knowledge, pictures of the six

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(6) vulture species used in this research were shown to the respondents, this followed same pattern used by Epstein *et al*., (2006); Bignante, 2010 and Pam *et al*, (2018), in which picture representation was used to determine knowledge. The interview began once a person was willing to participate in the study after the consent form was given to them to read and sign, for those who could not read, the consent form was read to them. Each respondent was expected to answer some set of questions from a questionnaire of 36 questions comprising of 17 open-ended questions, 13 demographic questions and 6 picture identification questions. Interview for each respondent lasted from 20-25minutes per respondents (Pam *et al*, 2018), and responses were transcribed verbatim into the questionnaires. Results were coded based on the similarities in responses, Chi- Square analysis (X^2) in Statistical Package for Social Sciences (SPSS) version 16 was used to analyze data.

RESULTS
Demographic Distribution of Respondents

Forty people from each of the four sites, where sampled making a total of 160 respondents, out of which 92(57.5%) were males, 68(42.5%) were females. A further 75(46.9%) were of the age group 15-25 years, 44(27.5%) belonged to the age group26-35 years, 18(11.3%) were of the age group 36-45 years and 23(14.4%) were of the age group 45-above. Educational Level of the respondents showed that, 5(3.1%) had no formal education, 30(18.8%) had education to primary level, 68(42.5%) had been to secondary and 57(35.6%) have had formal education up to tertiary level. On religion, 111(69.4%) where Christians (63; 56.8% males, 48; 43.2% females), and 49(30.6%) where Muslims (29; 59.2% males, 20; 40.8% females).

Furthermore, 92(57.5%) grew up in the town while 68(42.5%) grew up in villages, with a higher number of them growing up in Plateau State 106(66.3%) and a lower number outside of Plateau State 54 (33.8%).

Respondents' Knowledge of Vultures: Pictorial identification of birds revealed that the Hooded Vulture was the most seen and identified species of vulture 83(51.9), followed by the African White-Backed Vulture 18(11.3%), while the Ruppell's Griffon's Vulture was the least seen and identified (Table 1). When respondents were asked to share their knowledge of vulture local names, 84(52.5%) were able to give vulture local names while 76(47.5%) did not know the local name. There was no significant difference between those that knew a local name and those who didn't ($\chi2$= 0.400, df=1, P=0.527).

Table 1: Knowledge of Vulture Species from Pictorial Identification

Vulture Species	Seen and can identify (%)	Seen and cannot identify (%)	Have not seen and cannot identify (%)	Total Respondents
Hooded vulture	83(51.9)	40(25.0)	37(23.1)	160
African White-Backed vulture	18(11.3)	14(8.7)	128(80.0)	160
White Headed vulture	15(9.3)	18(11.3)	127(79.4)	160
Palm-nut vulture	8(5.0)	19(11.9)	133(83.1)	160
Ruppell's Griffons vulture	5(3.1)	10(6.3)	145(90.6)	160
Egyptian vulture	10(6.3)	15(9.4)	135(84.3)	160

Knowledge of what vultures eat revealed that 38 (23.8%) of the respondents did not know constitutes the diets of vultures, 99(61.9%) thought vultures feed on dead animals/flesh, while other respondents mentioned some other food items (Fig 2). There was a significant difference in the knowledge of respondents relating to vulture feeding ($\chi2= 60.762$, DF=2, P<0.01).
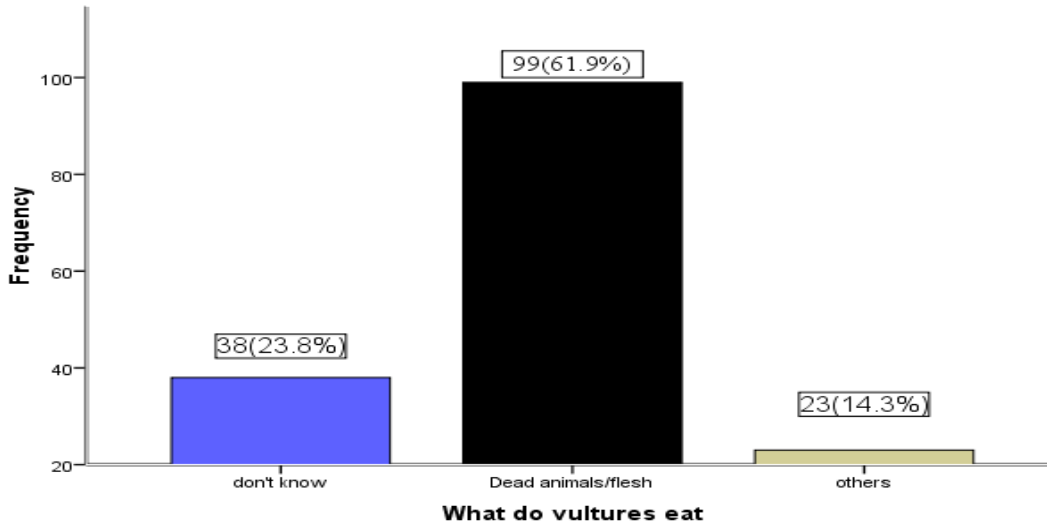

Figure 2: Respondents' Knowledge of Vulture Feeding.

Knowledge of where vulture habitat differed among respondents ($\chi2=125.70$, df=7, P<0.01), most of the respondents 59 (36.8%) thought vultures live in the bush, 46(28.8%) thought vultures live on trees, 12(7.5%) in the zoo, 8(5.0%) on mountains, 4(2.5%) around water, 3(1.9%) everywhere while 28(17.5) did not have any knowledge of vulture habitat.
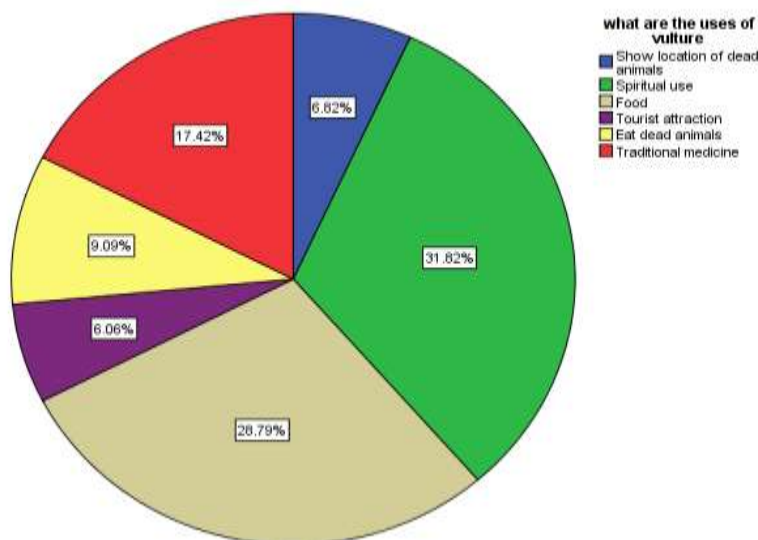

Figure 3: Respondents' Knowledge of Vulture Use

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When respondents were asked how vultures were utilized, 42(31.8%) reported that vultures are used for spiritual activities, followed by 38 (28.8%) respondents who thought they are used as food, while 8(6.1%) respondents thought vultures are used for tourist attraction (Fig 3). These perceptions differed significantly in respondents ($\chi2$= 50.438, df = 6, P<0.01).

People's Perception of Vultures:
Respondents' perception of vultures was generally negative (Fig 4), and was significantly different among respondents ($\chi2$=21.088, df=2, P<0.01). In addition, most respondents 38(23.7%) held negative cultural beliefs about vultures by perceiving them as evil, while the few respondents 10(6.3%) reported the cleaning role of vultures by eating dead animals Most of the respondents, 99(61.9%) reported that they have not been seeing vultures, of this respondents, 32(32.3%) thought they do not live around us, while a further 61(38.1%) reported they still see vultures around, although among that group, 17(27.8%) said they see them only around the Jos Abattoir .

On the valuing of Vultures, our results showed that 77 (48.1%) respondents thought that vultures are not important, 72(45.0%) thought they are, important while 11(6.9%) were indecisive. There was a significant difference in these perceptions of respondents between those who were indecisive and the other two categories ($\chi2$=50.637, df =2, P<0.01). Knowledge about Vultures increased with age, 19 (82.6%) respondents within the age group of 45years-above had seen and could identify vultures, while 24(37.3%) respondents within the age group of 15-25years had not seen vultures and could not identify them, the difference in knowledge by age was significant ($\chi2$=21.184, df=6, P<0.01), knowledge and perceptions also differed significantly with educational level and occupation of respondents. Respondents with only primary education knew Vultures more 20(66.6), followed by those with tertiary education 35(61.4). For occupation, 11(68.8%) of business persons were the highest in recognizing vultures, followed by Farmers 7(63.6%) and then Butchers 35(61.4; n=12).
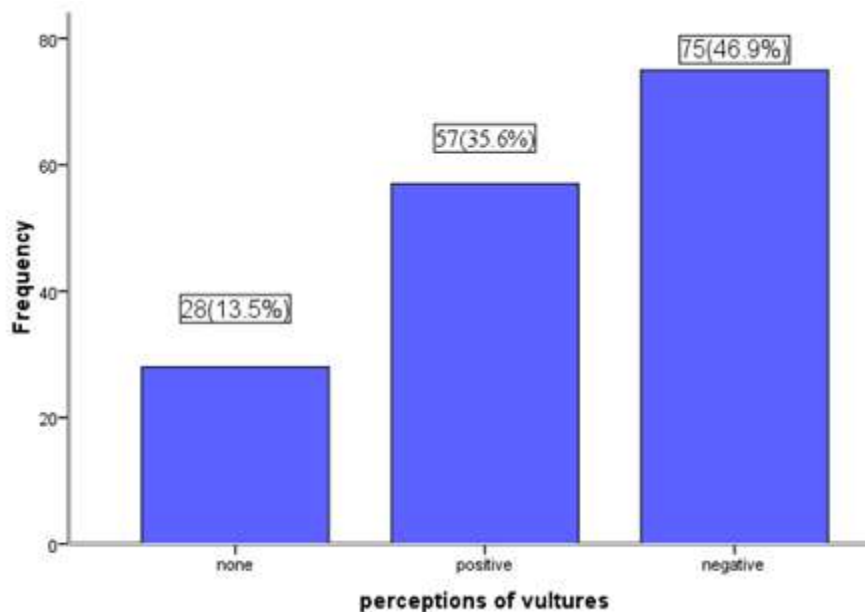

Figure 4: Respondents Perceptions of Vultures
These responses differed significantly ($\chi2$=21.088, df=2, P<0.01).

Effect of Knowledge and Perception on Attitudes toward Vulture Conservation:
Respondents' perceptions of the valuing of vultures was significantly related to the willingness of individuals to protect vultures, of the respondents who perceived vultures as important, 39(54.2%) were willing to protect vultures, while among respondents who perceived vultures as not important, 53(68.8%) did not show willingness to protect them

DISCUSSION
Our results have shown that local perceptions about vultures is negative, and understanding of the ecological role of the species is not widely understood, which might be one major reason for why vulture persecution persists. Another important aspect of this study was the finding that education was not an influence in changing negative beliefs. This is an interesting find, which needs further researching into, to understand why cultural beliefs do not seem to be easily dispelled by people's formal education. It has been shown elsewhere that previous interaction with a species, and perceptions about that species influences outcomes such as attitudes and behaviors towards that species e.g., Pinheiro *et al* (2016) found that negative perceptions towards snakes reduced with ones' level of schooling, and prior interaction with a snake. They also reported that people who held negative perceptions about snakes also perceived snakes as unimportant and were not predisposed to aiding their conservation. Perhaps the less sightings and interactions with vultures is also responsible for the low knowledge and negative perceptions observed in this study. It is even more so, with the finding that butchers, who ordinarily should hold positive perceptions of vultures, as they help them with clean up were also negative towards vultures, which have become really scarce sights in the abattoirs in Jos.

CONCLUSION
We conclude that deliberate efforts need to be intensified in creating more awareness on the decline of vultures and the reasons behind the declines, emphasizing the implications of the decline to man and the environment. Perhaps a look at the strategies being used in conservation education and awareness as it relates to these issues need to be revisited, to check how effective they have been in not only disseminating information broadly,, but specifically reaching the ordinary locals who are involved either directly or indirectly in the decline of vultures.

REFERENCES
Adeola, M. O. (1992). Importance of Wild Animals and Their Parts in the Culture, Religious Festivals, and Traditional Medicine of Nigeria. *Environmental Conservation,* 19(2): 125-134.

Adams, W.M., Aveling R., Brockington, D., Dickson, B., Elliott, J., Hutton, J, Roe, D., Vira, B., Wolmer, W. (2004). *Biodiversity Conservation and the Eradication of Poverty. Science*, 306 (5699):1146-9.

Babbie, E. (1999). The Basics of Social Research. Belmont, Calif: Wadsworth publishing

Baldus, R. O. L. F., Kibonde, B. E. N. S. O. N., and Siege, L. U. D. W. I. G. (2003). Seeking conservation partnerships in the Selous game reserve, Tanzania. *Parks*, *13*(1): 50-61.

Baral, H. S., Giri, J. B., and Virani, M. Z. (2004). On the decline of Oriental White-backed Vultures Gyps bengalensis in lowland Nepal. *Raptors Worldwide. Berlin and Budapest: World Working Group on Birds of Prey and Owls*

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and MME/Birdlife Hungary, 215-219.

Baral, N., & Gautam, R. (2007). Socio-economic perspectives on the conservation of Critically Endangered vultures in South Asia: an empirical study from Nepal. *Bird Conservation International*, *17*(2): 131-139.

Barrows, E. M., Fabricius, C. (2002). Do Local People Really Benefit from Areas: Rhetoric or Reality? *Parks*, 12(2): 67-79.

Bignante, E. (2010). The Use of Photo Elicitation in Field Research. Exploring Massai Representations and Use of Natural Resource. *EchoGeo,* (11)

BirdLife International. 2010. *IUCN* Red List for birds. Available at http://www.birdlife.org.

Buechley, E. R., and Şekercioğlu, Ç. H. (2016). The avian scavenger crisis: Looming extinctions, trophic cascades, and loss of critical ecosystem functions. *Biological Conservation*, *198*: 220-228.

Ebua, V.B., Agwato, T.E., and Fonkwo, S.N. (2011). Attitudes and Perceptions as Threats to Wildlife Conservation in the Bakossi Area, South West Cameroon. *International Journal of Biodiversity and Conservation*, 3(12): 631-636

Epanda, M. A., Fotsing, A. J. M., Bacha, T., Frynta, D., Lens, L., Tchouamo, I. R., & Jef, D. (2019). Linking local people's perception of wildlife and conservation to livelihood and poaching alleviation: A case study of the Dja biosphere reserve, Cameroon. *Acta Oecologica*, *97*: 42-48.

Federal Republic of Nigeria, (2006). Population Census.

Kruetz, A. (2015). Children and the Environment, an Australian Indigenous Community. *A Psychological Approach*. Abingdon: Routledge.

Medin, D. L., Atran, S., and Atran, D. D. R. S. (Eds.). (1999). *Folkbiology*. MIT Press.

Ntuli, H., Jagers, S. C., Linell, A., Sjöstedt, M., and Muchapondwa, E. (2019). Factors influencing local communities' perceptions towards conservation of transboundary wildlife resources: the case of the Great Limpopo Trans-frontier Conservation Area. *Biodiversity and Conservation*, *28*(11): 2977-3003.

Ogada, D., Shaw, P., Beyers, R. L., Buij, R., Murn, C., Thiollay, J. M., and Sinclair, A. R. (2016). Another continental vulture crisis: Africa's vultures collapsing toward extinction. *Conservation Letters*, *9*(2):89-97.

Ormsby, A., Kaplin, B.A., (2005). A Framework for Understanding Community Resident Perceptions of Masoala National Park, Madagascar. *Environmental Conservation,* 32(2):156–164.

Owolabi, B.A., Odewumi, S. O., and Agbelusi, E.A. 2020. Perceptions on Population Decline and Ethno-Cultural Knowledge of Hooded Vulture (*Necrosyrtes monarchus*) in Southwest States of Nigeria. *Vulture News*, *78*(1):11-19

Pam, G., Zeitlyn, D., Gosler, A. (2018). Ethno-Ornithology of the Mushere of Nigeria: Children's Knowledge and Perceptions of Birds. *Ethnobiology letter,* 9(2):48-64.

Pinheiro, L.T., Rodrigues, J. F. M., & Borges-Nojosa, D. M. (2016). Formal education, previous interaction and perception influence the attitudes of people toward the conservation of snakes in a large urban center of northeastern Brazil. *Journal of ethnobiology and ethnomedicine*, *12*(1):1-8.

Rondeau, G., Thiollay, J.M. (2004). West African Vulture Decline. *Vulture News,* 51: 13-33

Ramakrishnan, P.S. (2003). The Sacred Ganga River- Base Cultural landscape. *Museum International*, 55(2): (7-17).

Schacter, D. (2011). Psychology (2nd Edition). New York Worth.

Simmons, R. E., and Jenkins, A. R. (2007). Is climate change influencing the decline of Cape and Bearded Vultures in southern Africa. *Vulture News*, *56*:41-51.

Thiollay, J.M (2007). Raptor Declines in West Africa: Comparisons Between Protected, Buffer and Cultivated Areas. *Oryx,* 41(3): 322-329

Trafzer, C. F., Gilbert, W. S., and Madrigal, A. (2008). 'Integrating Native Science Into a Tribal Environmental Protection Agency (EPA)'. *American Behavioral Scientist*, 51(12):1844-1866.

Virani, M., Kendall, C., Njoroge, P., and Thomsett, S. (2011). Major Declines in the Abundance of Vultures and Other Scavenging Raptors In and Around the Masai Mara Ecosystem, Kenya. *Biological Conservation* 144(2): 746-752

Weladji, R., Moe, S., and Vedeld, P. (2003). Stakeholder Attitudes Wildlife Policy and Bénoué Wildlife Conservation Area, North Cameroon. *Environmental Conservation,* 30(4):334–343

Wyndham, F. S. (2010). Environments of Learning: Rarámuri Children's Plant Knowledge and Experience of Schooling, Family, and Landscapes in the Sierra Tarahumara, Mexico. *Human Ecology,* 38(1):87–99.