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ZOO MANAGEMENT AND TOURIST INFLUX IN UNILORIN ZOOLOGICAL GARDEN, ILORIN, NIGERIA

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ABSTRACT
This study assesses the zoo management practices through a visit to the Unilorin zoo with a view to establish its current status. An exploratory survey was conducted through personal observation and in-depth interviewing while records of tourists' patronage were obtained through administrative records. The results showed that more than forty-five (45) different species of animal were stocked between 1978 and 2018. The majority (fourteen species) of the stock were recruited in 2011 while the least was in 1978, 1985, and 2015. The food and feeding pattern of stock revealed carnivorous animals such as lion, leopard, crocodiles, hyena are usually fed 3 to 5 times a week (with exception of Jackal, snakes, and carnivorous birds which are fed once daily) while herbivorous animals eat on daily basis. The result further shows an increasing trend in tourists' population from 5,819 in 2009 to 51,232 in 2015 but a declined patronage was noticed in 2016, 2017, and 2018, where tourists dropped to 47,803; 43,222, and 40,944 respectively. However, the zoo is developing with challenges and complications which arose from, insufficient funding and erroneous design of animal housing, however, they are, dedicating their efforts and resources to maintaining ethical principles of animal welfare and preserving nature.

Keywords: Stock, Captivity, Ethical Principles, Exploratory, Patronage.

INTRODUCTION

Zoo is a place where animals live in a protected state and are made accessible to human observations (Tudge, 1992). Zoos as attractions can be considered to be closely linked to nature-based attractions due to their 'wild' aspect. These include zoological gardens, biological parks, safari parks, public aquariums, bird parks, reptile parks and insectariums (WAZA, 2005). Zoos are important tourist attractions around the world (Frost, 2011) because it has been associated with nature tourism containing a highly selective species collection of the natural world, where visitors' experience the wildlife confinement in a natural setting; the majority of which are never seen by people in nature (Boyd *et al.*, 2014). Animals housed in zoos fulfill the desire of millions of people to know a rich mix of animals and to share this knowledge and experience with their children. Moreover, animals are displayed in ways that cater for cultural demand and public expectations about animals and the world regions for which exhibits are made to emblematically stand. After all, most zoos are businesses seeking to attract fee-paying visitors – and many do, hence some zoos are more successful than others at attracting visitors and human responses to zoos are themselves wide-ranging and profoundly ambiguous. Modern zoos have increased their conservation focus; Animals and animal welfare improved with investment primarily aimed to facilitate employment (Donahue and Trump, 2010) and increased public interest in the environment,

Zoos are often displayed as last refuge for endangered animals, places that breed animals for the sake of future restocking of the wild (Frost, 2011). While early zoos focused on entertainment, zoos have evolved into scientific bodies, places of education and conservation centres. Artists, writers and zoologists have found zoos as rich sources of inspiration and material to study, be it animals, people or the complex interaction between people and animals (Baratay, 2004).

In judging the quality of zoo operations it is easy to single out the thing that most people consider when discussing the quality of a zoo, namely the stocking, feeding and treatment of the animals in the facility. A rough or crude facility where the animals are well fed and treated, will receive more visitors including tourists. In observing the viability of zoo, visitor influx which is mostly determined by presence of attractive animal and its care is an important factor that makes a good and viable zoo. The inflow of visitors can also contribute to a sustainable maintenance of a zoo. However, most zoos have poor management in the care of animals in captivity and a poor record of involvement in conservation of wildlife (Kelly, 1997; Van Linge, 1992 in Catibog-Sinha, 2011).

Ethics in zoos are complex, compounded by the fact that there is no simple response that we can have to thousands of complex, intriguing and valuable species, each with a unique feed, feeding behaviour and interests. This study is an applied management strategy to assess zoo formation, tourist influx, facility evaluation and factors affecting successful operation task of maintaining a collection of animals in ways that best reflect adequate modern practices in University of Ilorin zoo. The core of this exploration is to consider an avenue for proper management which will enhance productivity and protective measures that will directly lead to propagating zoo animals with the future aim of providing animals for release into the wild.

MATERIALS AND METHODS

Study area

The study was carried out at the University of Ilorin Zoological garden. The zoo was first established as biological garden at the mini-campus of the University in 1975 and upgraded to zoological garden in 1985 to complement the University's Biological Sciences Departments in teaching and research. The zoo is located approximately between Latitude $8^0$48'17" N and Longitude 4^0 63'82" E at the main gate of the University as children playgrounds. A major attraction to the zoo is the 150meters long and 45meters high suspended canopy walkway, which has continued to draw visitors to the zoo. The fact that most of the forest vegetation has been left undisturbed and the presence of a stream which flows through the zoo creates a serene and near natural environment which makes the zoo unique.

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The zoo is one of the most important tourist attractions in Kwara State and its environs hence; it has become a key driver of internally generated revenue for the University (Adefalu *et al.*, 2015).

Survey/Observation of the zoo

Since the focus of this research is to explore the subject rather than to explain it, a qualitative approach is best. Moreover, it allows the researcher to engage with her participants and with the subject matter throughout the research. Based on the socially constructed nature of this study, an exploratory qualitative design was determined to be the most appropriate methodology for this study. An exploratory survey was conducted through personal observation since the focus of this research is to explore the subject rather than to explain it, a qualitative approach is best. Moreover, it allows the researcher to engage with her participants and with the subject matter throughout the research; the garden was toured frequently (morning and evening) for four weeks during the study period. Animals sighted aside the caged ones were noted, and feral bird species sighted were observed with the aid of an 8 – x – 42 binoculars and identified using Helm's field guide to birds of Western Africa, while feeding routine of the caged animals was monitored. Additional information was collected when in-depth interview was conducted with five (5) selected staff members who have worked with the garden for a period of ten (10) years and some visitors who visited the zoo periodically. For secondary data, record of tourists' patronage was obtained through administrative records while information was also source from journal publications and other reliable media.

Data Analysis

Information obtained were discussed using exploratory interpretation while data were presented with frequencies, tables, percentages and charts.

RESULTS

Checklist of animal species and their year of recruitment into Unilorin Zoological Garden

Current checklist of animal stocked in the study area show that there are 45 different species of animals. These include mammalian, avian, reptilian and sauropsidian. The recruitment started in 1978, with the introduction of Nile crocodiles and Green Monkeys in 1985. The most abundant animals are aves, which comprises of one hundred and ten (110) Pigeon, twenty (20) Peacock, nine (9) Geese, seven (7) Indian Pea fowl, four (4) each of Pukeko birds and Water Duck, three (3) each of Ostrich, Greylag Geese, Lappet-faced Vulture and Brown Hawk, two (2) each of Emu, White Pea Fowl, African Mongoose, Guinea fowl, White Guinea fowl and Marabou stork as well as one (1) each of Fish eagle, African Hawk eagle, and White stork. Other major animas are Lion, Leopard, Hyena (stripped and spotted), Monkeys (Patas and Green), Baboon, Chimpanzee, Python, Cobra, Tortoise and Crocodile (table 1).

Annual recruitment rate of animals in Unilorin Zoological Garden

The yearly recruitment pattern shows that only one species of animal was recruited in 1978, 1985 and 2015. In the year 2011, major recruitment of animals was witnessed in the zoo, with the arrival of 14 different animal species, which is currently the highest of any recruitment for year. In the year 2014, 2016 and 2017, there was 7, 6 and 5 animal species recruited, respectively.

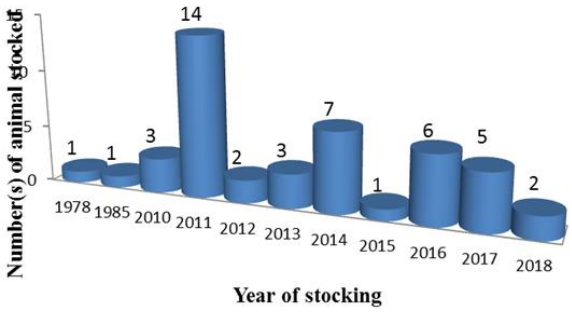

Figure 1: Annual stocking rate of animals in Unilorin Zoological Garden

Food and feeding pattern of captive animals in Unilorin Zoological Garden

The management of the zoo make adequate arrangement for animal food which are kept in the storeroom in the zoo and each animal feeding standard is adhered to. Effective preservation is ensured by cold storage with refrigerators and freezers. At least four (4) cows are usually slaughtered in every four days of the week and this can be replaced with forty-eight goats (average of 12 goats in a day). Grains and vegetables are also preserved for the nutrition of the animals. Carnivorous animals such as lion, leopard, crocodiles, hyena are usually fed 3 to 5 times in a week (with exception of Jackal, snakes and carnivorous birds which are fed once daily), while herbivorous animals eat on daily basis.

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Table 1: Checklist of animal species and their year of recruitment into Unilorin Zoological Garden

S/No	Scientific Name	English Name	Sex		Physical number(s)	Year of arrival
			Male	*Female*		
*1	*Crocodylus niloticus*	Nile crocodile			19	1978
2	*Cercophithecus aethiops*	Green Monkey	3	3	6	1985
*3	*Columba livia*	Pigeon			110	2010
*4	*Haliaeetus vocifer*	Fish Eagle			1	2010
5.	*Aquila spilogaster*	African Hawk Eagle	1	-	1	2010
6	*Panthera leo*	Lion	-	1	1	2011
7	*Civettictis civetta*	Africa Civet	1	2	3	2011
8	*Camelus bactrianus*	Camel	1	-	1	2011
9	*Equus asinus and caballus*	Mule	1	1	2	2011
10	*Equus africanus*	Donkey	2	3	5	2011
11	*Atherurus africanus*	Porcupine	3	4	7	2011
12	*Gazella dorcas*	Dorcas Gazelle	1	-	1	2011
13	*Papio anubis*	Anubis Baboon	-	4	4	2011
*14	*Python sabae*	African python			7	2011
*15	*Batagur baska*	Terrapin tortoise			3	2011
16	*Struthio camelus*	Ostrich	1	2	3	2011
*17	*Chen caerulescens*	White Geese			9	2011
18	*Anser anser*	Greylag goose	1	2	3	2011
*19	*Balearica pavonina*	Crown crane			4	2011
20	*Pavo cristatus*	Peacock	10	10	20	2012
21	*Pan troglodytes*	Chimpanzee	1	1	2	2012
22	*Hyaena hyaena*	Stripped Hyena	2	-	2	2013
*23	*Dromaius novaehollandiae*	Emu			2	2013
24	*Taurotragus derbianus*	Giant Eland	1		1	2013
25	*Crocuta crocuta*	Spotted Hyena	2	2	4	2014
*26	*Canis aureus*	Jackal			1	2014
27	*Equus ferus*	Horse	1	1	2	2014
*28	*Porphyrio porphyria*	Pukeko Bird			4	2014
*29	*Ciconia ciconia*	White stork			1	2014
30	*Pavocristatus*	White Pea fowl	1	1	2	2014
31	*Cercophithecus mona*	Mona monkey	1		1	2014
32	*Panthera pardus*	Leopard	-	1	1	2015
33	*Suricata suricata*	African Mongoose	1	1	2	2016
*34	*Naja nigricollis*	Black Cobra			2	2016
*35	*Plectropterus gambensis*	Spur-winged Geese			4	2016
36	*Numida meleagris*	White Guinea fowl	1	1	2	2016
*37	*Torgos tracheliotus*	Lappet-faced Vulture			3	2016
*38	*Leptoptilos crumeniferus*	Marabou stork			2	2016
39	*Erythrocebus patas*	Patas Monkey	2	1	3	2017
*40	*Python reguis*	Royal python			4	2017
*41	*Bitis arietans*	Puff Adder			1	2017
*42	*Goechelone sulcata*	Spurred tortoise			1	2017
43	*Sylvicapra grimmia*	Crowned Duiker	1	1	2	2017
44	*Ninox scutulata*	Brown Hawk-owl			3	2018
45	*Phacochoerus africanus*	Warthog	1	1	2	2018

*Animal with unidentified sex

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Table 2: Food and Feeding pattern of captive animals in Unilorin Zoological Garden

S/No	Animal species	Housing methods	Food	Feeding frequency
			Carnivorous feeders	
1.	Nile crocodile	Captive in pond with floored basking space	Meat (Cow, goat and sheep)	3-4 times / week
2.	Lion	Captive	Meat (Cow, goat and sheep)	3-4 times / week
3.	Spotted Hyena	Captive	Meat (Cow, goat and sheep)	3-4 times / week
4.	Stripped Hyena	Captive	Meat (Cow, goat and sheep)	3-4 times / week
5.	Common Jackal	Captive	Meat (Cow, goat and sheep)	Daily
6.	Leopard	Captive	Meat (Cow, goat, sheep, dog)	3-4 times / week
7.	Fish Eagle	Caged	Fish and meat	Once daily
8.	White Stork	Caged	Meat	Once daily
9.	Brown Hawk	Caged	Fish and meat	3-5 times / week
10.	Lappet-faced Vulture	Caged	Animal carcasses	3-4 times / week
11.	Marabou Stork	Caged	Meat (Cow, goat and sheep)	3-4 times / week
12.	African Mongoose	Caged	Meat	Daily
13.	Royal python	Caged in glass house	Mice, rats, chicken (Live or dead)	Once in a week
14.	Black cobra	Caged in glass house	Birds, chicken, mice and rats	Once in a week
15.	African python	Caged in glass house	Chicken, birds and rats	Once in a week
16.	Puff Adder	Caged in glass house	Chicken, birds and rats	Once in a week
			Herbivorous feeder	
17.	Camel	Free range	Maize chaff, grasses, beans husk, cassava peel and leaves	ad libitum (Daily)
18.	Horse	Free range	Maize chaff, beans husk, cassava peel and grasses	ad libitum (Daily)
19.	Warthog	Captive	Grasses and cassava pee	Thrice daily
21.	Mule	Captive	Cassava peel, grasses, leaves, grains and maize chaff	ad libitum (Daily)
22.	Donkey	Free range	Cassava peel, grasses, grains and maize chaff	ad libitum (Daily)
23.	Porcupine	Captive	Sweet potatoes, fruits, cooked rice, beans and yam.	Twice daily
24.	Dorcas Gazelle	Free range	Maize chaff, grains, leaves, flowers. Seasonal bush plants	Ad libitum
25.	Chimpanzee	Captive	Fruits, cooked yam, beans and rice. It also sometime eat eggs and drink tea	Twice daily
26.	Green Monkey	Captive	Fruits, Cooked yam, beans and rice	Twice daily
27.	Patas Monkey	Captive	Fruits, banana, maize, cooked yam, rice and beans	Twice daily
28.	Baboon	Captive	Fruits, banana, maize, cooked yam, rice and beans	Twice daily
29.	Spurred tortoise	Captive in Ranch	Grasses, vegetables, fruits, cooked yam, beans and rice	Twice daily
30.	Terrapin tortoise	Captive	Grasses, fruits, weeds and flower	Twice daily
31.	Emu	Captive	Fruits, leaves and grains	
32.	Pukeko birds	Captive in wetland	Fodder shoot, vegetable and small fish	Once daily
33.	Goose	Captive in wetland	Grains and vegetable	Ad libitum
34.	Spur-winged geese	Captive in wetland	Grains, vegetable, fruit seeds	Ad libitum
35.	Pigeon	Caged	Peanuts and grains	Twice daily
36.	Guinea fowl	Free range within zoo	Grains, vegetables	Ad libitum
37.	Water duck	Captive in wetland	Varieties of seed and grains	Ad libitum
38.	Brown hawk-owl	Caged	Meat and fish	3-5 times / week
39.	Crowned duiker	Ranch	Leaves of shrubs and grains	Daily
40.	Peacock	Free range within zoo	Grains and cooked yam	Once daily

Other management practices;

Cage design and general cleaning

Animal cages in the study area are structural designed to suit animal behavioral needs and ensured to present the animals for public view in a safe and fascinating manner, to ensure the safety of such animals, visitors and adjourning settlements. Each animal cage is also designed in a way that will make it easy and safe for daily cleaning. The cages are cleaned and disinfected between 7am to 8am on daily basis before tourist visitation.

Veterinary Services

Veterinary services are a vital component of good captive animal care and this must be available at all times as to attend to any indication of injury, diseases, stress as well autopsy of dead animals. However, Unilorin Zoological Garden has no veterinary clinic sited within the zoo premises despite the presence of department of Veterinary Medicine of the University of Ilorin within the university community, hence, the zoo relies on visiting veterinary personnel which is not adequate for the treatment of the

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stocks.

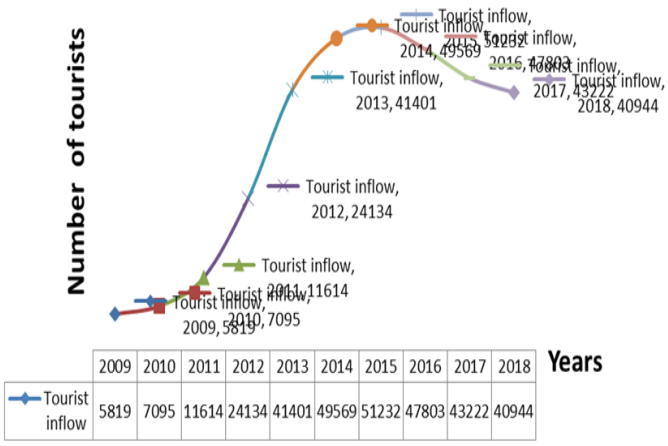
Quarantine cages

There are provisions for isolation of new and sick animals for observation and special care. This is necessary to avert disease transmission from sick or new animal to the healthy ones in the same enclosure in the zoo. The animal under observation in the quarantine cage is usually assumed healthy by zoo officers before return back into the cleaned and disinfected cages.

Tourists' influx to the study area in ten (10) years (2009 to 2018)

The study shows that a total sum of two hundred and eighty-one thousand, four hundred and thirty-two (281,432) tourists visited the zoo within a span of ten years under review.

The result further recorded an increasing trend in tourists' population from 5,819 in 2009 to 51,232 in 2015 but a decline patronage was noticed in 2016, 2017 and 2018 where tourists dropped to 47,803; 43,222 and 40,944, respectively. Records show that entrance fee to the zoo was increased from ₦200 to ₦500 in 2016.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tourist inflow	5819	7095	11614	24134	41401	49569	51232	47803	43222	40944

Figure 2: Rate of tourists' influx to the study area within 2009 to 2018

Source: Administrative records, 2019

Management challenges faced in the study area

The following challenges were observed in the day-to-day management of the zoo:

i. Failure of food contractors to meet with time part of contractors who sometimes failed to supply animal food of consignment supply.
ii. Difficulty in sourcing for new wildlife stock as well as replacing lost (through death) animals.
iii. Poor housing/cage maintenance.
iv. There is no veterinary clinic and staff offices as staffs are notice to be sitting and even changing their clothes under trees.
v. Defective house/habitat construction, which impaired animal display of natural behaviours.

DISCUSSION

According to Shani and Pizam (2008), there are very little effort regarding the ethical dimensions of using animals in hospitality and tourism including zoological gardens. However, it is noteworthy in the study area that average effort is asserted to maintaining a good standard for zoo management subject to available resources. The animals found in the study area are closely related to the species of animal reported in University of Ibadan Zoological Gardens, South-west, Nigeria, due to almost similar environmental conditions (Morenikeji, 2016; Adetola *et al.*, 2016 and Omonona and Ayodele, 2011).

From the exploratory survey, it is noteworthy that some animals are docile probably because of limited available space and hence unable to exhibit their natural behaviour in their various captive cages. This notion that wild animals in zoos might suffer loss of natural behaviour due to captivity was earlier reported; Hall and Brown (2006) revealed that captive animals in zoos suffer from their incarceration and show distress and boredom by displaying abnormal behaviour.

It understandable that zoos often acquire their collections of animals from the wild or those that are bred in captivity (Hanson, 2002), recruitment of wildlife species can be difficult and political hence there are complexity in animal recruitment in the study area. This has been attributed to the loss of natural habitat due to global degradation and over-exploitation of wildlife together with stringent governmental policies which is causing challenges in acquiring and transporting animals from the wild into zoos (Catibog-Sinha, 2011).

The feeding practices in the study area revealed that it is more expensive to manage some highly carnivorous animals, as against the use natural plant and plant products by the herbivorous feeders. The carnivorous mammals are usually fed 3 to 4 times in a week while some are fed once daily. The feeding practices in the study area are similar to feeding regime in the University of Ibadan Zoological Gardens, Southwest, Nigeria (Omonona and Ayodele, 2011). Challenges in the feeding regimes of the captive animal especially, the carnivorous confirmed the opinion of Gray (2015) who is of view that it is really difficult to manage zoo, with the assertion that the route to zoo management is compounded by people understanding of the nature, complexity and capabilities of animals, as well as that of zoo managers.

The rate of tourists' influx in the last ten years is commendable, this may be because zoos have been associated with nature-based tourism, where visitors' experience the wildlife confinement in a natural setting (Boyd *et al.*, 2014). The downward trend of tourist recorded for the last three years (2015-2018) could be connected to the relationship between wildlife stocking trend, loss of animals as a result of lapses in the health management of the animals, which consequently affect tourists preferred animals in the zoo as well as new entrance fee of ₦500 ($1.38). In order to improve patronage, new animals should be introduced, preferred animals must be well cared for, health and feeding strategies must be improved and steps must be taken to meet customer expectations (Wearing and Jobberns, 2011) which aligns with the views expressed by (Adetola and Adedire, 2018; Adetola *et al.*, 2016; Adefalu *et al.*, 2015 and Gray, 2015).

Conclusion

The University of Ilorin Zoo has undergone various degrees of modeling, to improve its aesthetics, more animals are being preserved based on available resources. The habitats are constructed to meet animal physiology and quick adaptation and good feed provided to allow free choice and good nutrition. However, there are challenges and complication which include; insufficient funding and erroneous design of animal housing, failure of animals to survive under captivity and human factors, such as corruption, stealing and bad attitude to work. Patronage could be

improved if all these challenges are adequately addressed.

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