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Evaluating the Decline of Vultures in Selected Regions of Katsina State, Nigeria

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SUMMARY

This study examined the decline of the vulture population and its implications in Katsina State. A multistage sampling technique was employed to determine a sample size of 160 participants. Primary data were collected using structured questionnaires and field observations, while secondary information was gathered from journals, textbooks, proceedings, and internet sources. The data were analyzed using descriptive statistics. The results revealed that 25% of respondents identified a scarcity of water and food as factors contributing to the decline in the vulture population in the area. Additionally, 53.1% of respondents indicated that *Acacia* spp. was the preferred habitat for vultures. All respondents acknowledged that environmental pollution (both air and water) was a consequence of the decline in the vulture population. Finally, the findings suggested that the community recognizes the need to conserve vulture species and is willing to support efforts in this direction. The study concluded that vultures are critically endangered in Katsina State and recommended the dissemination of information on the importance of vultures to the community in the study area.

Keywords: Appraisal, Population, Vultures, Decline

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INTRODUCTION

Vultures are nature's most successful scavengers, offering a variety of ecological, economic, and cultural benefits. Vultures are the only known obligatory scavengers, and they are uniquely specialized to scavenging. Vultures' distinct adaptations include soaring flight, sharp eyesight, and extremely low pH levels in their stomachs (Markandya et al., 2008). Vultures are keystone species that provide an important environmental service by disposing of carrion. They are also culturally significant, as they are crucial to the Buddhist funerary tradition known as' sky burial,' in which human corpses are left in the open to be devoured by scavenging animals. Vultures play a crucial role in maintaining the sanitation of our villages and towns. A healthy

population of vultures is essential for preventing epidemics and ensuring a clean environment in our communities (Gautam et al., 2003).

Vultures, particularly the Himalayan Griffon, gain advantages from the sky burial of human remains conducted by the local Buddhist community in Mustang. Vultures have consistently held significant ecological, traditional, and aesthetic roles (Lu et al., 2009). The essential functions vultures serve in the ecosystem render their gradual population decrease over the years a significant global biodiversity issue. Despite the critical ecosystem services they offer, vultures rank among the most endangered bird groups globally (Ogada et al., 2012). Presently, 69% of vulture populations are categorized as threatened or near threatened by the International Union for Conservation of Nature (IUCN), whereas the remainder are classified as endangered or critically endangered species (Ogada et al., 2016).

There are twenty-three species of vultures worldwide (Ravikanth and Baskaran, 2023). There are more than fifteen species that are found on one continent (the African continent). Four species; the Griffon vulture (*Gyps fulvus*), Bearded vulture (*Gypaetus barbatus*), Egyptian vulture (*Neophron percnopterus*), and Cinereous vulture (*Aegypius monachus*), historically had large ranges that span three continents (Africa, Asia and Europe) (Boshoff and Vernon, 1980). Nigeria formally host seven species of vultures, namely; Egyptian vulture (*Neophro percnopterus*), hooded vulture (*Necrosyrtes monachus*), White-backed vulture (*Gyps africanus*), White-headed vultures *(Trigonocep soccipitalis*), Ruppells Griffon vulture (*Gyps rueppellii*), Palm nut vulture (*Gypophiera xanglensis*) and Lappet faced vulture (*Torgos tracheliotus*). The conservation status of five of these species in Nigeria is highly vulnerable and has even gone locally extinct in some parts of the country (Akagu and Adeleke, 2012).

There are several explanations for the reduction in worldwide vultures. However, poisoning, human harassment, or both are the leading causes of vulture population declines. Vultures on the African continent are under significant threat from a variety of sources, and populations of several species have decreases in the last 30 years. This trend is also observed in East Africa, where certain species, such as the Lappet-faced Vulture (*Aegypus tracheliotus*), are now largely confined to large protected areas. Other species, such as the Egyptian Vulture (*Neophron percnopterus*) and the African White-backed Vulture (*Gyps africanus*), have experienced significant population declines (Baral et al., 2004). In 2011, the Hooded Vulture (*Necrosyrtes monachus*) was reclassified from Least Concern to Endangered by the International Union for Conservation of Nature (IUCN) due to substantial population declines across its range in East and West Africa (Ogada et al., 2012).

The objective of this study are to identify the specie of vulture found in the study area, to assess the factors responsible for decline in the area, to assess the community awareness about vulture conservation, to examine the effect of vulture population decline in the study areas, to identify possible ways for conserving vultures population decline In the study area, and to identify the vegetation where vultures breeds in some selected Local Government Areas of Katsina State, Nigeria, Also, the study aimed to assess the role of environmental factors such as food and water scarcity, habitat destruction, persecution, and pollution in the reduction of vulture populations.

MATERIAL AND METHODS

STUDY AREA

This study was carried out in Katsina State, Nigeria (Figure 1). The state was formed in September 1989 from Old Kaduna State and covers three biological zones: Sahel savanna to the north, Sudan savanna in the center, and northern Guinea savanna to the south. Katsina State is bordered to the north by the Niger Republic, to the east by Jigawa and Kano States, to the south by Kaduna State, and the west by Zamfara State (Muhammad and Mustapha, 2020). Geographically, it is situated between latitudes 11° 7'N and 13° 22'N, and longitudes 6° 52'E and 9° 2'E. The total land area of the state is 23,850 km², with a projected population of 5,801,584, updated six years after the 2011 census (Murtala et al., 2020).

Figure 1: Map of the study area (Kankara et al., 2015).

DATA COLLECTION AND ANALYSIS

A well-structured questionnaire and field observations were used to collect primary data for this study. The questionnaire was administered to respondents using an interview schedule, with the assistance of trained enumerators. Data collection through observations took place in the second phase. Secondary information was obtained from journals, textbooks, conference proceedings, and internet sources. The data collected for the study were analyzed using descriptive statistics, including frequency, percentage, and mean.

Sampling Procedure

The data was collected from January 2017 to December 2017 from the study area. Two Agricultural Development Project zones in the state were deliberately chosen for this study due to a decline in the vulture population in the Local Government Areas (LGAs) within these zones. The selected Agricultural Zones are Zone I, which comprises 15 LGAs, and Zone III, which includes 10 LGAs. A multi-stage sampling technique was employed to determine the sample size for the study. In the first stage, two LGAs from each selected agricultural zone were purposively chosen because of the threats to the vulture population in those areas. Ultimately, from the sixteen villages selected, ten heads of households were randomly chosen, resulting in a total sample size of 160 respondents.

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF THE HOUSEHOLD HEADS

The demographic characteristics of the respondents in this study, including gender and age, are presented in Table 2. The majority of respondents (85.5%) were male, while females represented 14.4%. According to the age distribution shown in Table 1, 48.1% of respondents were over 58 years old, followed by 20.0% who were between 46 and 51 years old, and 17.5% who were between 40 and 45 years old (Table 1).

Table 1: Demographic Characteristic of the Household Heads

Variables	Frequency	Percentage
Gender		
Male	137	85.6
Female	23	14.4
Total	160	100
Age (years)		
40-45	28	17.5
46-51	32	20.0
52-57	23	14.4
> 58 years	77	48.1
Total	160	100

FACTORS RESPONSIBLE FOR THE DECLINE OF VULTURES' POPULATION IN THE STUDY AREA

The study assessed the factors responsible for the decline in the vulture population in the study area. The result in Figure 1indicated that the majority (25.0%) of the respondents were of the opinion that the combination of low food availability and water scarcity was responsible for the decline in the vulture population in the study area, followed by 17.5% of the respondents who believedthat habitat destruction caused the decline in the vulture population. Additionally, 15.6% of the respondents opined that low food availability and persecution were responsible for the decline in the vulture population in the study area. Furthermore, 15% of the respondents were of

the view that the combination of persecution and water scarcity were responsible factors that led to the decline in the vulture population (Figure 2).

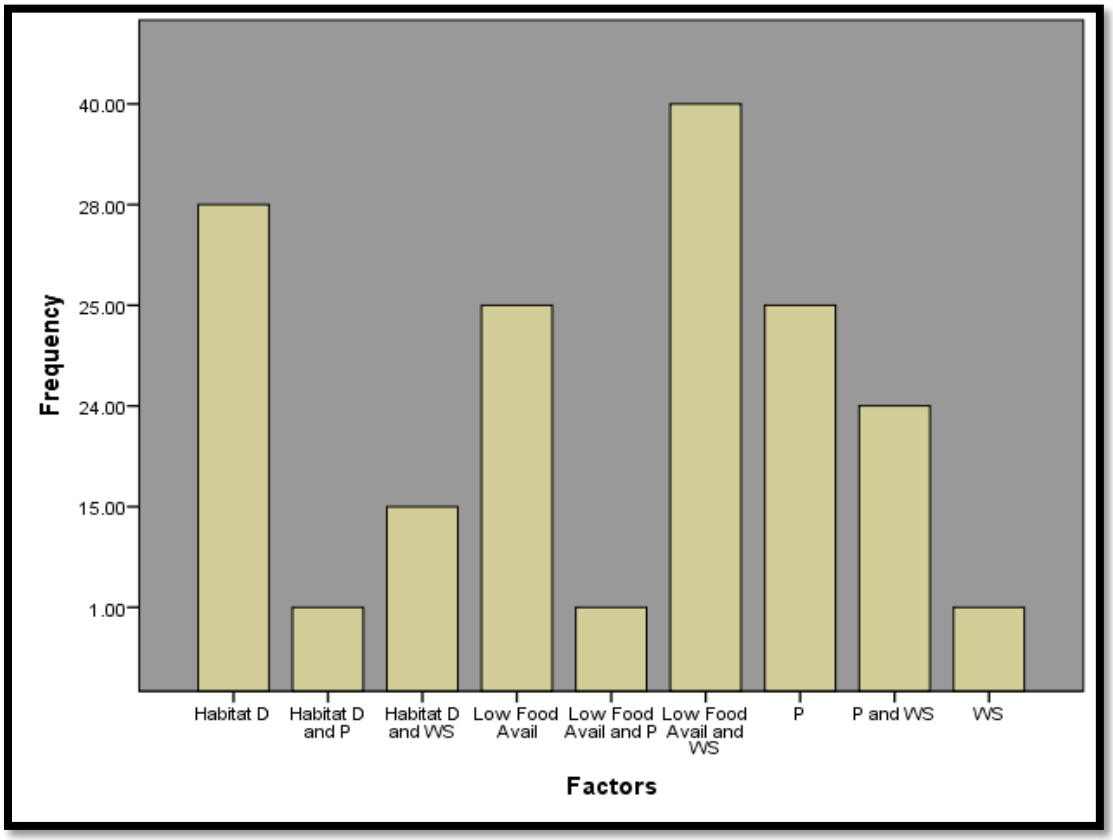

Figure 2: Factors Responsible for the Decline of Vultures Population in the Study Area.

TIME OF SIGHTING VULTURES IN THE COMMUNITY

The results in Figure 2 indicate that 43.8% of respondents reported last seeing vultures between 16 and 20 years ago. This was followed by 17.5% who indicated they last saw vultures between 10 and 15 years ago, and 16.9% who reported seeing them between 21 and 25 years ago. A smaller percentage, 14.4%, believed they last saw vultures between 26 and 30 years ago, while only 7.5% reported having seen them more than 31 years ago. On average, respondents last saw vultures 22 years ago (Figure 3).

SERVICES VULTURES RENDERED TO THE COMMUNITY

The results in Figure 4 indicate that the majority of respondents (80.6%) believed that vultures play a role in disposing of dead carcasses. In contrast, only 16.9% of respondents thought that vultures serve both as scavengers and as a source of traditional medicine. A very small percentage (2.7%) believed that vultures help reduce the spread of diseases in the community.

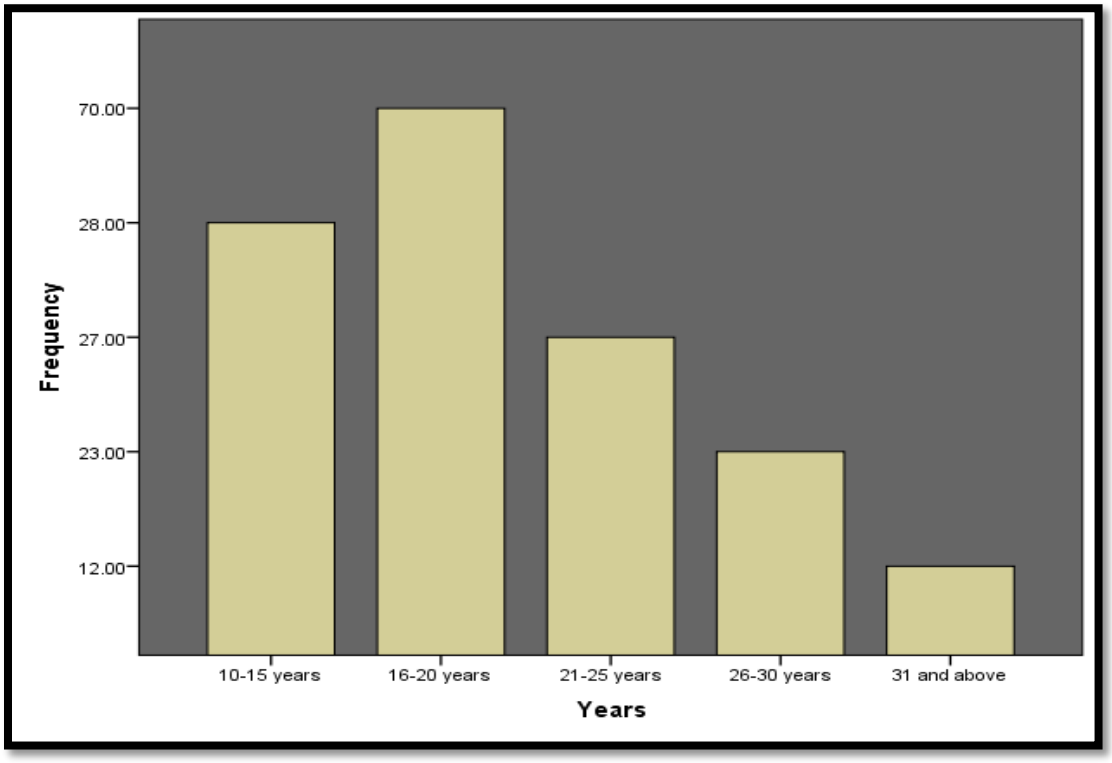

Figure 3: Time Vultures were sighted in the Communities.

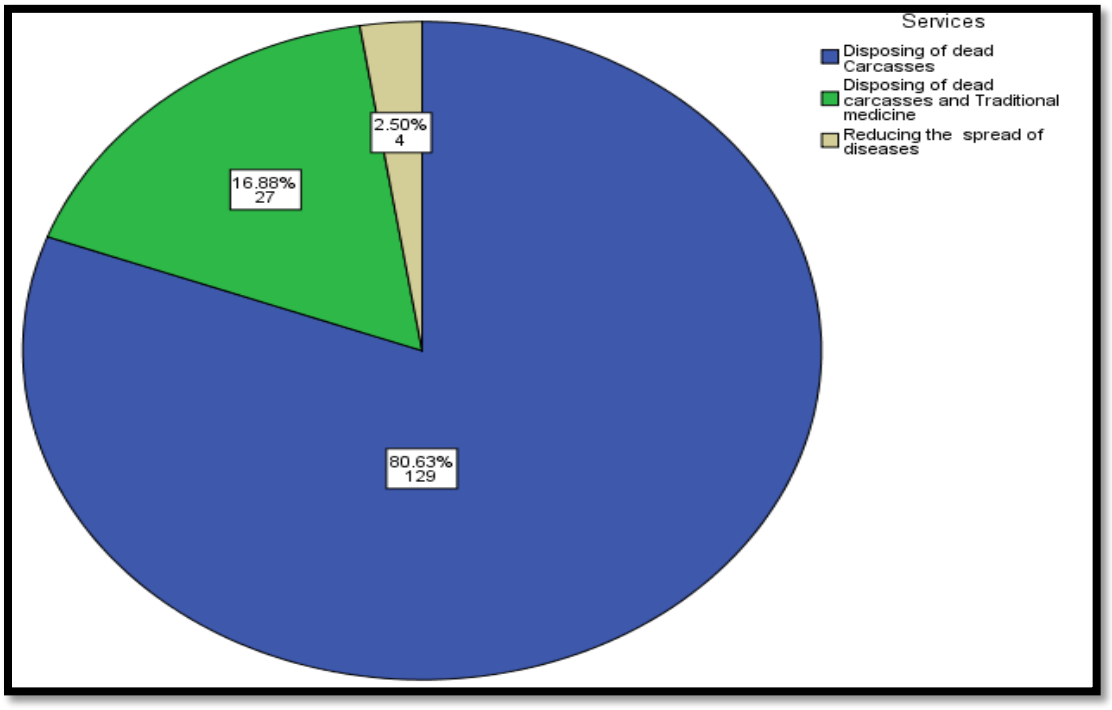

Figure 4: Services Vultures Rendered to the Community.

WILLINGNESS TO CONTRIBUTE MONEY FOR REINTRODUCTION OF VULTURES

The respondents were asked if they were interested in contributing money to reintroduce vultures to their communities. The results in Table 2 showed that all (100%) of the respondents were willing to contribute annually to this effort. In terms of the amounts they were willing to pay, 16.9% of the respondents indicated they would contribute between 1 and 40. This was followed by 23.1% who were willing to contribute between 41 and 81. Additionally, 31.9% of the respondents agreed to contribute between 81 and 120, while those willing to pay 121 and above were categorized separately (Table 2).

Table 2: Amount Respondents are willing to Contribute for the Reintroduction of Vultures in the Study Area

Variables Willing to contribute	Frequency	Percentage
Yes	160	100
No	0.00	0.00
Amount willing to Contribute		
1-40	27	16.9
41-80	37	23.1
81-120	51	31.9
>121	45	28.1
Total	160	100

DISCUSSION

Wildlife is the best indicator of environment health (Altaf, 2016; Ali et al., 2017; Altaf et al., 2018; Rahman et al., 2021; Rahman et al., 2023). Vultures are nature's most successful scavengers, offering a variety of ecological, economic, and cultural benefits. As the only known obligate scavengers, they have evolved unusual adaptations for their scavenging lifestyle, including soaring flight, sharp eyesight, and extremely low pH levels in their stomachs. Currently, 14 out of 23 (61%) vulture species are on the verge of extinction, with Asia and Africa experiencing the fastest reductions. The causes of these population decreases vary, but poisoning, human persecution, or both play an important part in nearly every declining species. Vultures are the earth's best-known scavengers, offering a variety of ecological, economic, and cultural benefits. As the only known obligate scavengers, they have evolved unusual adaptations for their scavenging lifestyle, including soaring flight, sharp eyesight, and extremely low pH levels in their stomachs. Currently, 14 out of 23 (61%) vulture species are on the verge of extinction, with Asia and Africa experiencing the fastest reductions. The causes of these population decreases vary, but poisoning, human persecution, or both play an important part in nearly all diminishing species (Ogada et al., 2012).

The cultural and economic ramifications of the decrease in vulture populations are substantial, especially in Asia. In reaction to the disastrous reduction of vultures in the area, governments, the global scientific community, funding organizations, and the press have dedicated significant focus to the issue. Nonetheless, although the Asian vulture crisis has underscored the challenges faced by vultures globally, the

circumstances of African vultures have garnered comparatively less focus, even with comparable rates of population decrease (Pain et al., 2003).

Regardless of the fact that diclofenac poisoning is the main cause of the Asian crisis, there are many other reasons concerning the vulture population changes in Africa which makes conservation challenging. Furthermore, there is scant support for the conservation of vultures in Africa by various governments even in the face of overwhelming evidence indicating tremendous risks to these birds. Where there has been success in the conservation of vultures, a unifying factor is the high expenditure of money, advanced trained people, strong political motivation, and active involvement of communities (Gilbert et al., 2007).

CONCLUSION

The study concluded that the vulture population faced a serious threat in Katsina State. This is connected with widespread food shortages, water scarcity, and persecution of the species through hunting and deliberate poisoning at slaughterhouses. In addition, the study revealed a reduction/overuse of tree species on which vultures breed and nest. The construction of modern slaughterhouses led to a reduced availability of carcasses for the vultures. However, the community members, upon realizing the environmental services provided by this species, are willing to support efforts towards reintroduction and conservation of the vulture population. The release of rehabilitated and captive-bred vultures to re-establish their population in the wild is important. Use the attractiveness of large vultures to promote ecotourism and for conservation, awareness creation, and education. Protection by law of tree species on which vultures nest and breed, and within their protected areas, should be encouraged.

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