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Folklore to Fact: Understanding the Cultural Perception about Bats in Punjab, Pakistan

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SUMMARY

Fruit bats play a crucial role as pollinators and seed dispersers, making their conservation essential for maintaining crop productivity and natural ecosystems. This study aimed to investigate the knowledge, attitudes, and perceptions of fruit bats among orchard producers and agricultural communities in Pakistan. The survey was conducted in Punjab, chosen for its numerous fruit-growing areas and bat roosting sites. Data were collected from 190 respondents across the region. Each questionnaire consisted of seven sections, covering demographics, knowledge of bats, perceptions, and various myths associated with these animals. Most respondents mistakenly identified bats as birds rather than mammals. Additionally, perceptions of bats were largely negative, with many informants viewing their presence as a bad omen. This study advances our understanding of the sociodemographic elements that influence local people's knowledge, attitudes, and perceptions of bats. We advocate adopting educational interventions targeted at certain community groups to highlight bats' ecosystem functions and the need of their protection. This strategy seeks to expand current knowledge of bats while reducing direct persecution against them.

Keywords: Bats, Folklore, Conservation, Gardens

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INTRODUCTION

Bats have been an important part of Punjab's cultural diversity, arousing feelings of both admiration and horror. These nocturnal creatures are viewed in various ways through local folklore, religious traditions, and ecological perspectives. Traditionally, bats have symbolized superstition, associated with ominous thoughts and frightening tales. They are often seen as harbingers of bad luck or evil spirits, fostering fear and confusion among people. This perception has led to their defamation in many rural areas as well as urban areas, where they are often killed due to unfounded fears (Attaullah et al., 2022).

Bats, belonging to the Order Chiroptera, are a diverse group comprising over 1,400 species found on every continent except Antarctica (Fenton and Simmons, 2020). In Pakistan, there are fifty recognized bat species, categorized into twenty-six genera and eight families. These bats play a crucial ecological and economic role in fruit-growing regions by providing essential facilities such as pollination, pest

control, and seed dispersal (Mahmood-ul-Hassan, 2009; Jones, 2012). They are particularly important for the pollination of economically valuable crops like bananas, and mangoes. Additionally, insect- and fruit-eating species contribute to the pollination and dispersal of wild plants, while their droppings enrich the soil with nutrients (Kunz et al., 2011; Lagomarsino and Muchhala, 2019).

Many gardens producers in Pakistan anticipate that all bats eat fruit and consider them pests. Farmers in other parts of Asia share this perception. Unfortunately, these unfavorable views, together with bat hunting for food and medicine, constitute a long-term threat to bat populations. Bats face additional challenges such as deforestation, global warming, changes to their roosting places, sickness, and excessive use for cultural medicine. Furthermore, the public's negative image of bats as carriers of zoonotic diseases exacerbates these risks. It is important to note that the widespread assumption that bats nourish on blood is incorrect; only 3 species of bat, found solely in Central and South America, ingest blood. The purpose of this study is to look into the information, approaches, and opinions of fruit bats among Punjab fruit producers and neighboring societies (Prokop et al., 2009; Mahmood-ul-Hassan and Salim, 2011; Rocha et al., 2021; Shapiro et al., 2021). The objectives of this study are to look into the knowledge, attitudes, and views of the people of Punjab, Pakistan about bats.

MATERIALS AND METHODS

STUDY AREA

Punjab (Figure 1), with a population exceeding 127 million, is the most populous province in Pakistan and the second most populous subnational entity in the world. Located in the central-eastern region of the country. The name "Punjab" translates to "The Land of Five Rivers," referring to the Jhelum, Chenab, Ravi, Sutlej, and Beas rivers. Punjab experiences extreme weather conditions, characterized by foggy winters often accompanied by rain. By mid-February, temperatures begin to rise, and spring-like weather lasts until mid-April, when the heat of summer sets in. The southwest monsoon typically reaches Punjab by May; however, since the early 1970s, weather patterns have become irregular. The spring monsoon has either bypassed the region or resulted in heavy rainfall that has caused flooding. June and July are marked by oppressive heat. While official estimates rarely record temperatures above 46°C, some newspaper reports indicate that temperatures can reach as high as 51°C, often highlighting instances of heat-related fatalities. A record was set in Multan in June 1993 when temperatures reportedly soared to 54°C. In August, the oppressive heat is alleviated by the rainy season, which signals the end of the harshest summer conditions, although cooler weather does not arrive until late October (Grewal, 2004; Dhavan, 2020; Khan, 2020).

QUESTIONNAIRE

Questionnaire was formatted in English, but it was eventually translated into Punjabi and Saraiki for local convenience. The initial questionnaire consisted of 5 easy parts (i.e. respondent profile, knowledge of people about bats, scientific knowledge of people, conservation attitude of people and superstitious and narratives about bats) that everyone in the local community could understand. These questions measured

not only the participants' perceptions, but also their awareness of bats. The study's authors meticulously evaluated and amended the questionnaire.

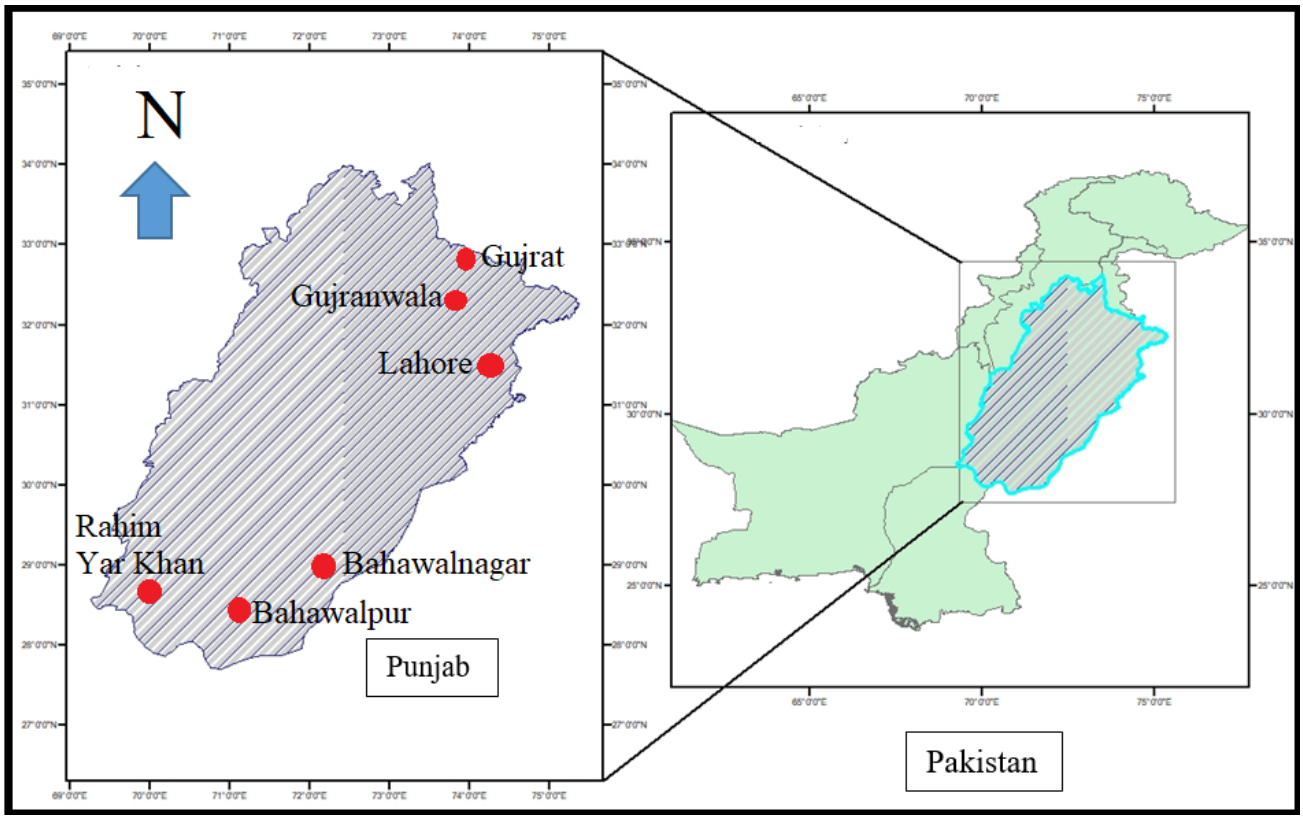

Figure 1: Map of the Punjab, Pakistan.

This questionnaire was separated into five parts. The first part contained seven questions about the respondents' profiles. The second part featured nine questions regarding knowledge of bats. The third part included statements assessing scientific knowledge. The fourth part focused on conservation attitudes. Finally, the fifth part posed four questions about superstitious beliefs and narratives related to bats.

Data for this study were collected from May 2023 to January, 2024. A total of 190 Questionnaires were distributed to people of Punjab. To conduct the surveys, a team of five people—familiar with the local language and location was assembled. Face-to-face interviews with randomly selected participants were used to collect data. Each participant was given an overview of the survey's objective and goal, which was to understand the interactions between bats and humans in the study area.

STATISTICAL ANALYSIS

The data were analyzed with the help of Past (4.16c) statistical Software and MS office 2010.

RESULTS AND DISCUSSION

Bats are a diverse group of animals, and majority of these bats are insectivorous. While, we discovered that many in Punjab wrongly believe that bats only frugivore.

This misperception could be attributed to their inadequate surveillance abilities and deficiency of information regarding bat and the varying eating practices of different bat groups. Previous research undertaken in Argentina and Slovakia has found that local opinions of bat feeding behavior are frequently negative. People have incorrectly thought that bats feed on human and animal blood, destroy crops, and consume fruits, without taking into account the unique bat species and their dietary habits (Prokop et al., 2009; Castilla and Viñas, 2012; Attaullah et al., 2022).

DEMOGRAPHIC INFORMATION

A total of 190 respondents participated in this study. The information was collected through seven questions (Figure 2). All informants were from the regions of Gujranwala, Gujrat and Lahore from central Punjab while Bahawalpur, Bahawalnagar and Rahim Yar khan from south Punjab in Pakistan (Figure 1). The male informants (n=13) were higher as compared to female informants (i.e. 59 in number). In terms of age groups, the largest segment was comprised of respondents aged 37–56 years (n=61) followed by those aged 18-36 years (n=56), 57–70 years (n=48), and above 70 age groups (n=25).

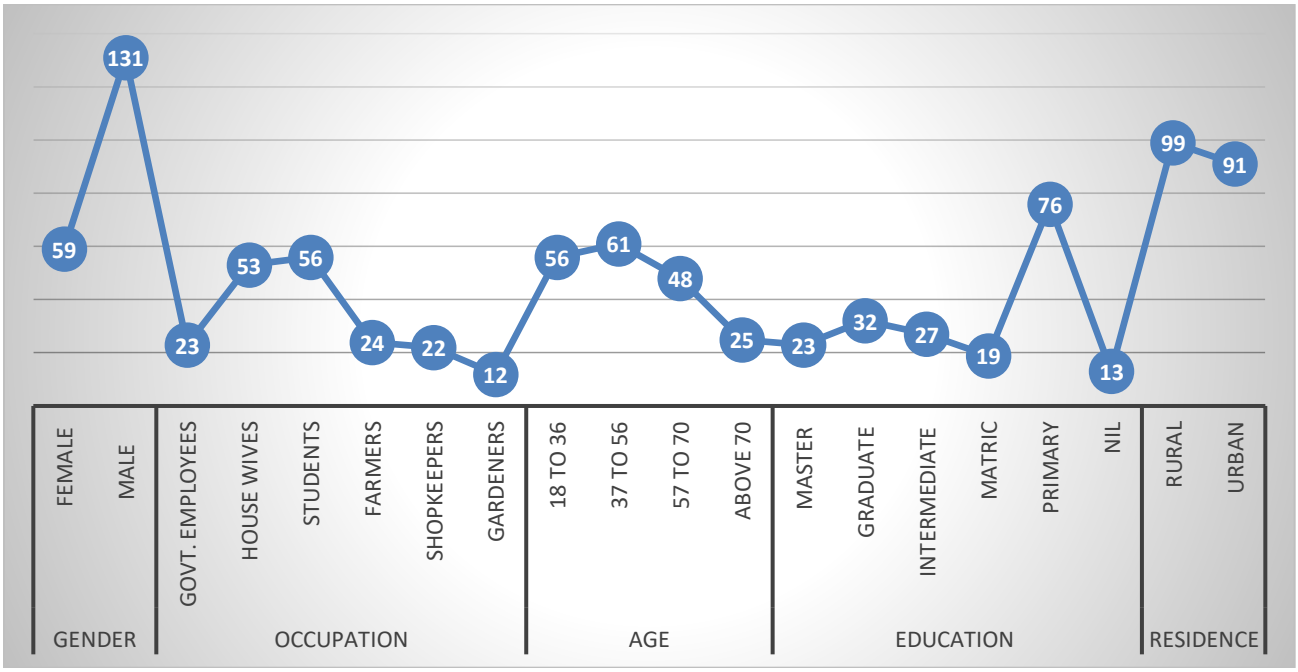

Figure 2: The profile of the respondents.

In terms of residence, there were more rural respondents (n=99) compared to urban respondents (n=9). Regarding education, the majority had completed primary education (n=76), followed by graduate education (n=32), intermediate education (n=27), master education (n=27), and matric education (n=27). Data were collected from Govt. employees, house wives, students, farmers, shopkeepers and gardeners (Figure 2). This study was carried out in rural as well as urban regions of Punjab. Despite the demographic bias, our interviews raised key points for promoting bat conservation and avoiding unfavorable bat-human interactions. Bats can be found in a

variety of human settlements throughout Pakistan, including ancient buildings, orchards, livestock barns, and open tree roosts. However, we noticed that responders had a severe lack of awareness about bats, particularly bat taxonomy. Many people wrongly classified bats as birds rather than animals. This misunderstanding may be due to the respondents' insufficient scientific background, which primarily consisted of primary schools. Furthermore, the way bats fly may have added to the confusion. Our findings are comparable with a recent survey done in Bangladesh, in which 33.7% of participants identified bats as birds (Attaullah et al., 2022).

BASIC KNOWLEDGE OF NATIVE PEOPLE ABOUT BATS

In Principal component analysis (PCA), first two axes are explained 99.9999% of variation sample folklore values (Component 1: 93.564% and Component 2: 6.4359%) (Figure 3). Variables of component 1 includes "Do bats belong to avian class/birds?" (r =76.056), "Are voices of bats charming?" (r=-69.778), "Bats are beautiful?" (r =-84.659), "Have you seen bats?" (r =130.16), "Do you like bats?" (r =-98.792), "Do people eat bats?" (r=-98.792), "Is the population of bats decreasing?" (r =80.43), "Have you seen roost of bats?" (r =4.3792), and "Is the population of bats sustain?" (r =-45.09). Folklore values of component 2 includes "Do bats belong to avian class/birds?" (r =22.726), "Are voices of bats charming?" (r=20.623), "Bats are beautiful?" (r =-19.284), "Have you seen bats?" (r =-27.018), "Do you like bats?" (r =-18.776), "Do people eat bats?" (r=19.074), "Is the population of bats decreasing?" (r =6.6366), "Have you seen roost of bats?" (r =-22.49), and "Is the population of bats sustain?" (r =18.508). Each principal component is not correlated with component 1; similarly, folklore patterns extracted by component 1 are not related to those explained by component 2 (Figure 4).

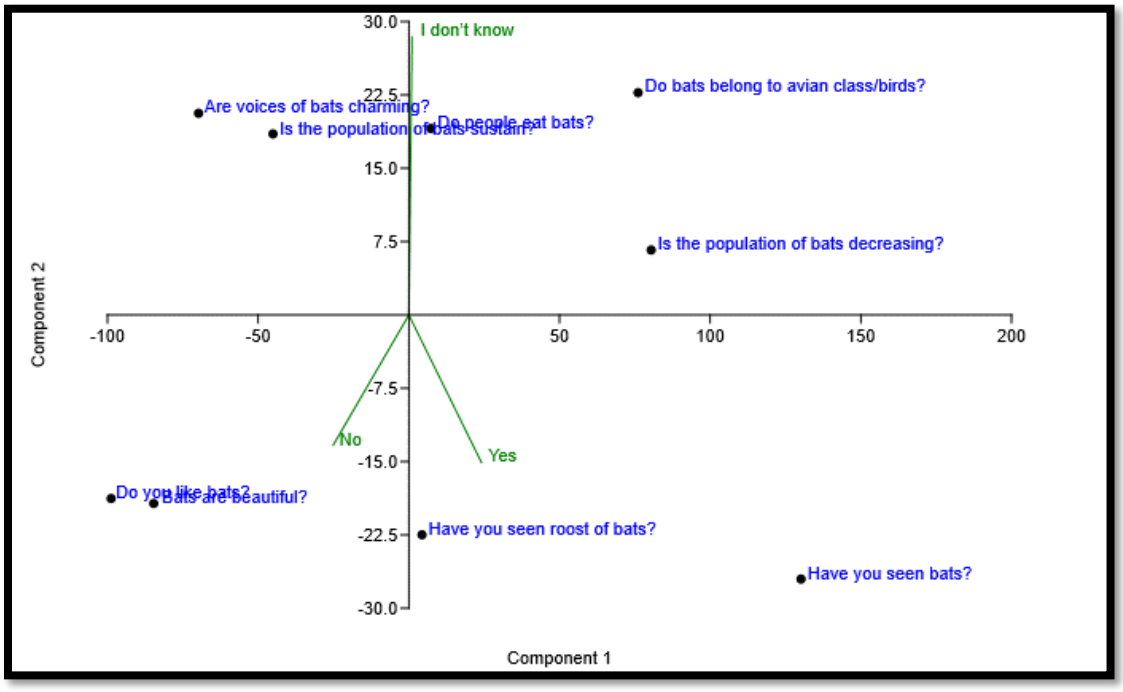

Figure 3: PCA showing the knowledge of Punjabi people about bats.

In Pakistan, bat consumption is rare or non-existent due to religious and ethical concerns. A similar pattern was observed on Tioman Island in Malaysia, where bats are also not consumed for religious reasons. However, twenty years ago, there was a notable increase in the trade of flying foxes in this region, primarily for consumption by the Chinese population (Aziz et al., 2017). In Pakistan, local health practitioners hunt bats for their body fat and blood, which is used in potions to alleviate rheumatic pains and impotency (Altaf et al., 2017; Altaf et al., 2018). The meat and bones of fruit bats are utilized to treat mental illness and hepatitis among the Gamo Gofa people in Ethiopia (Kebebew et al., 2021). In India, the Tangsa tribe roasts bats, to cure liver issues (Jugli et al., 2020).

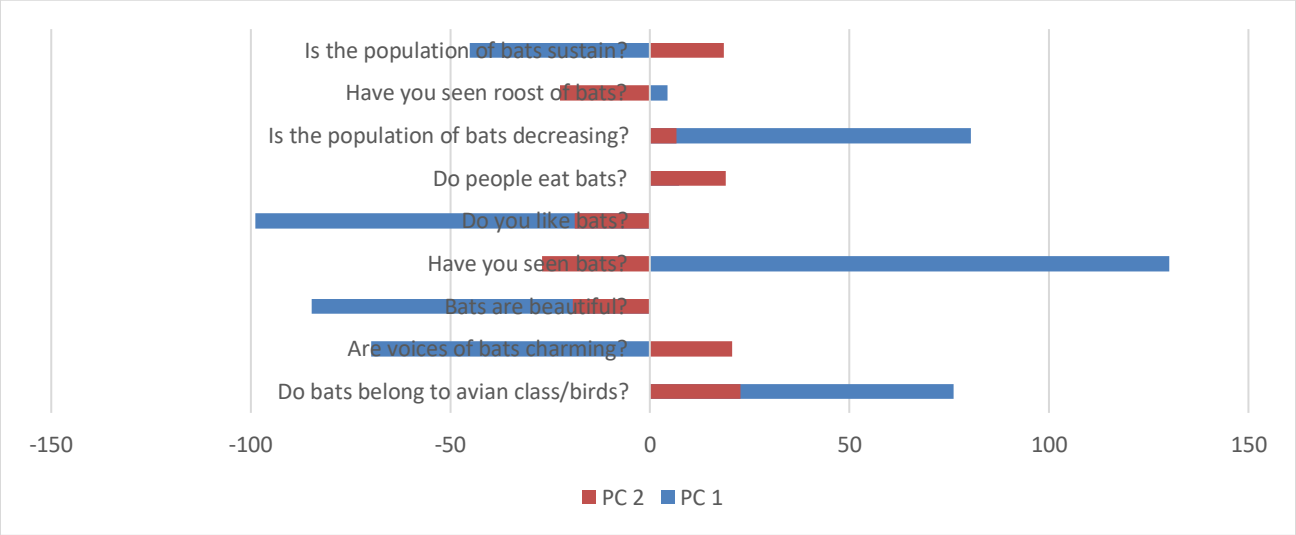

Figure 4: PC1 and PC2 showing the correlation between them.

SCIENTIFIC KNOWLEDGE OF NATIVE PEOPLE ABOUT BATS

In Principal component analysis (PCA), first two axes are explained 100% of variation sample folklore values (Component 1: 75.872% and Component 2: 24.128%) (Figure 5). Variables of component 1 includes "Are bats source of Zoonotic diseases like rabies and COVID-19?" (r =-38.482), "Are bats used in research and laboratory?" (r=-53.636), "Do bats eat fruits?" (r =-13.065), "Do bats damage fruits and plants?" (r =-4.7418), "Are body parts of bats used in ethno-medicine?" (r =14.87), "Have you seen positive impacts in agriculture due to bats?" (r=-22.407), "Are bats destroying orchards/parks?" (r =-2.7212), "Do bats destroy our environment?" (r =49.027), "Do Bats contaminate water?" (r =-18.501), "Do bats help to control insects?" (r =-8.0613), and "Do you know bats feed on pests of crop?" (r =-8.0613), "Do bats helpful for seed-dispersal?" (r =24.765), and "Can we use bats droppings as fertilizer?" (r =36.198). Folklore values of component 2 includes "Are bats source of Zoonotic diseases like rabies and COVID-19?" (r =18.246), "Are bats used in research and laboratory?" (r=-20.797), "Do bats eat fruits?" (r =8.8675), "Do bats damage fruits and plants?" (r =0.82186), "Are body parts of bats used in ethno-medicine?" (r =-6.483), "Have you seen positive impacts in agriculture due to bats?" (r=-13.353), "Are bats destroying orchards/parks?" (r =13.228), "Do bats destroy our environment?" (r =12.941), "Do Bats contaminate water?" (r =-27.083), "Do bats

help to control insects?" (*r* =-19.015), "Do you know bats feed on pests of crop?" (*r* =-19.015), "Do bats helpful for seed-dispersal?" (*r* =--16.88), and "Can we use bats droppings as fertilizer?" (*r* =-7.5385) (Figure 6).

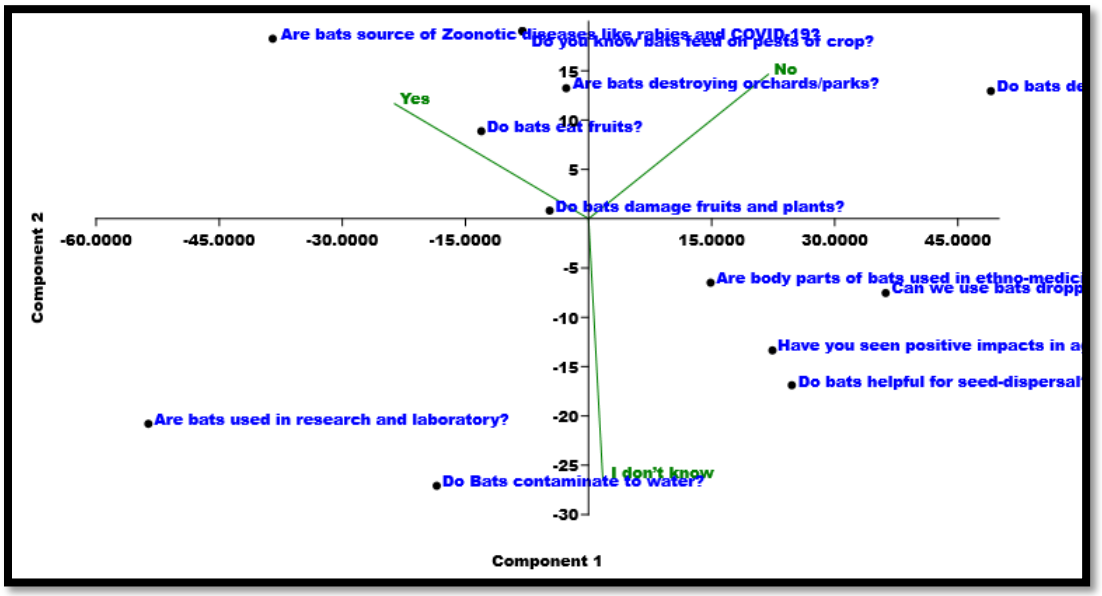

Figure 5: PCA showing the scientific knowledge of people of Punjabi people about bats.

Bats often partially consume fruits, raising public health concerns due to potential contamination from their urine and saliva (Kamins et al., 2015). Research indicated that people lack sufficient knowledge about bats and zoonotic diseases like Nipah virus (Hassan et al., 2020) and SARS virus (Rahman et al., 2010; Altaf et al., 2022). Therefore, it is essential to provide awareness to people on zoonotic diseases (Gurley et al., 2017; Hassan et al., 2020).

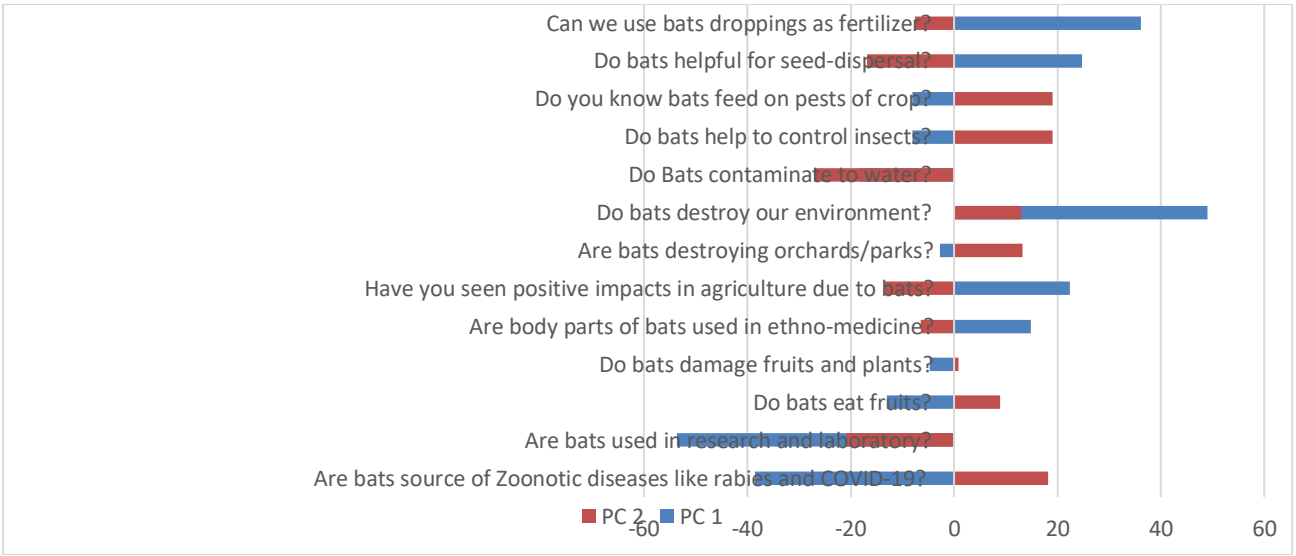

Figure 6: Correlation between PC1 and PC2.

CONSERVATION ATTITUDE OF PEOPLE ABOUT BATS

The survey data on bats' folklore and conservation attitudes reveals diverse perspectives. Regarding the question, "Is killing bats justified?" 110 respondents agreed, 58 opposed, and 22 had no information (Figure 7). When asked, "If you see bats in your house, will you remove the bat?" 158 individuals agreed, 19 disagreed, and 13 were unsure (Figure 8). On conservation efforts, 55 participants agreed on the need to conserve bats, while 91 opposed this idea, and 44 remained undecided. This data highlights a mix of attitudes towards bats, from a focus on their removal to differing views on their conservation (Figure 9).

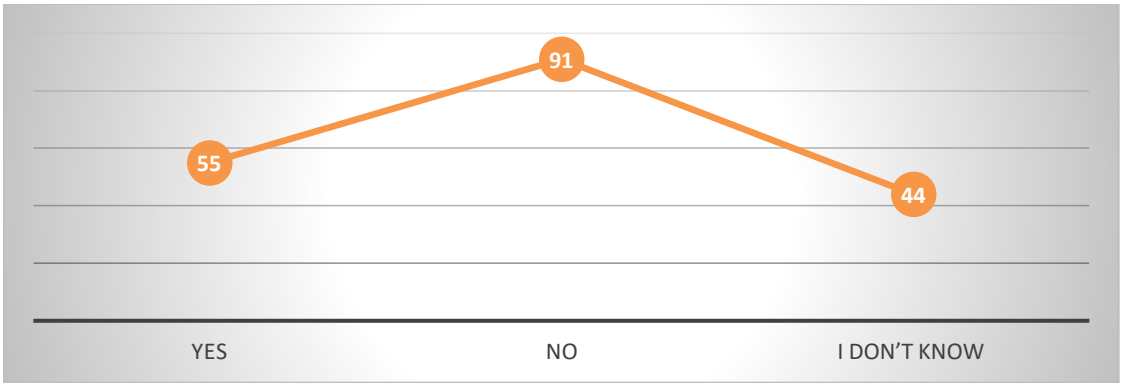

Figure 7: Should we efforts for conservation of bats?

In the present investigation, it was discovered that the majority of respondents had a negative attitude toward bats. They promised to try to kill bats if they encountered any. This tendency is most likely driven by species biases, in which colorful animals and birds are valued while less eye-catching organisms like rats, invertebrates, bats, and herptiles elicit unfavorable reactions (Florens, 2013). Maltreatment and dislike of bats is a global issue, not just confined to Pakistan (Aziz et al., 2016). In Argentina, 14% of people reported killing bats that enter homes, offices, or farms (Castilla et al., 2020).

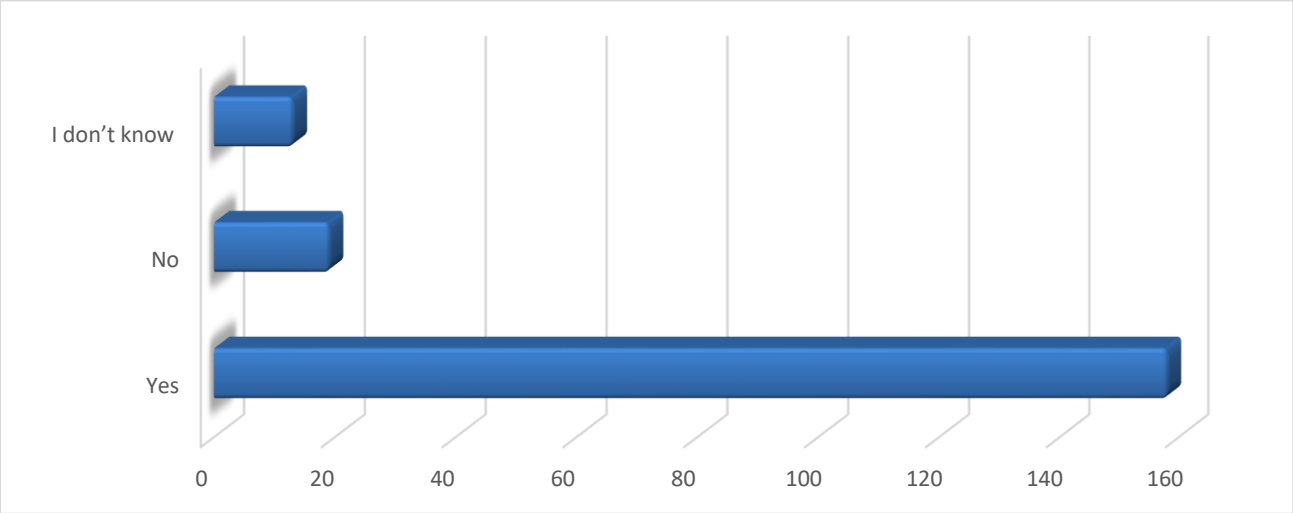

Figure 8: If you see bats in your house, will you remove the bat from your house?

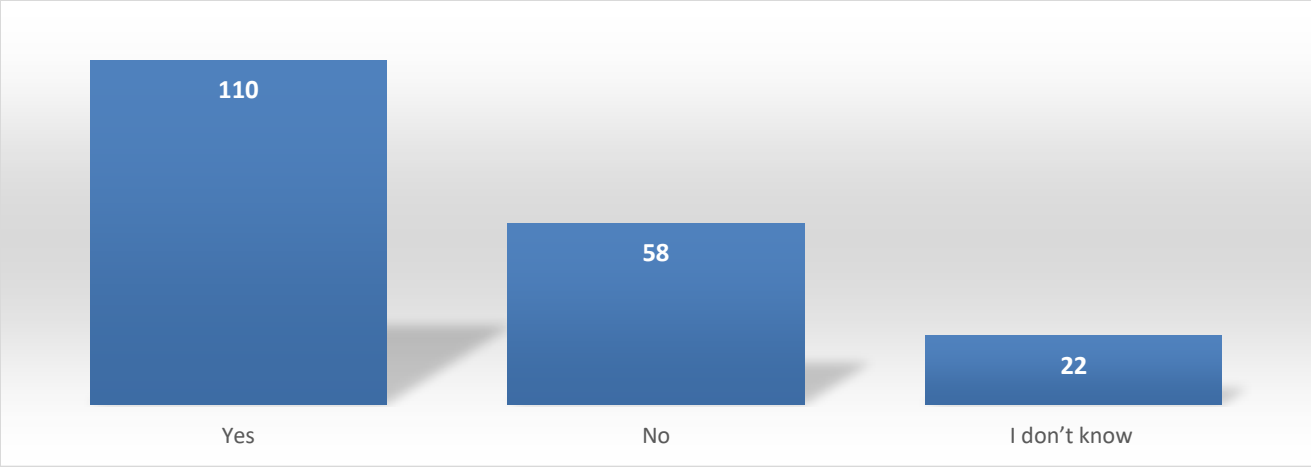

Figure 9: Is killing of bats good?

SUPERSTITIOUS AND NARRATIVES ABOUT BATS

The questionnaire's findings for bat folklore reflect a variety of beliefs. When asked: "Can bats enter human ears?" 114 people agreed, 51 disapproved, and 25 were unsure (Figure 10). Concerning the subject, "Can large bats catch humans and carry them into the air?" Only 19 individuals felt this to be true, while 71 disagreed and 100 expressed ambiguity (Figure 11). The notion that "the presence of a bat at home is bad luck" was endorsed by 105 respondents, 45 disagreed and 40 were undecided. Finally, when asked if "bats can be transformed into vampire Batman," just 31 people agreed, while 104 rejected the concept and 55 were unsure (Figure 12). These findings show a variety of misconceptions, cultural myths, and concerns about bats. Many people associate bats with bad omens, but our study presents a different perspective. Our study indicates a potential for increased support for bat conservation.

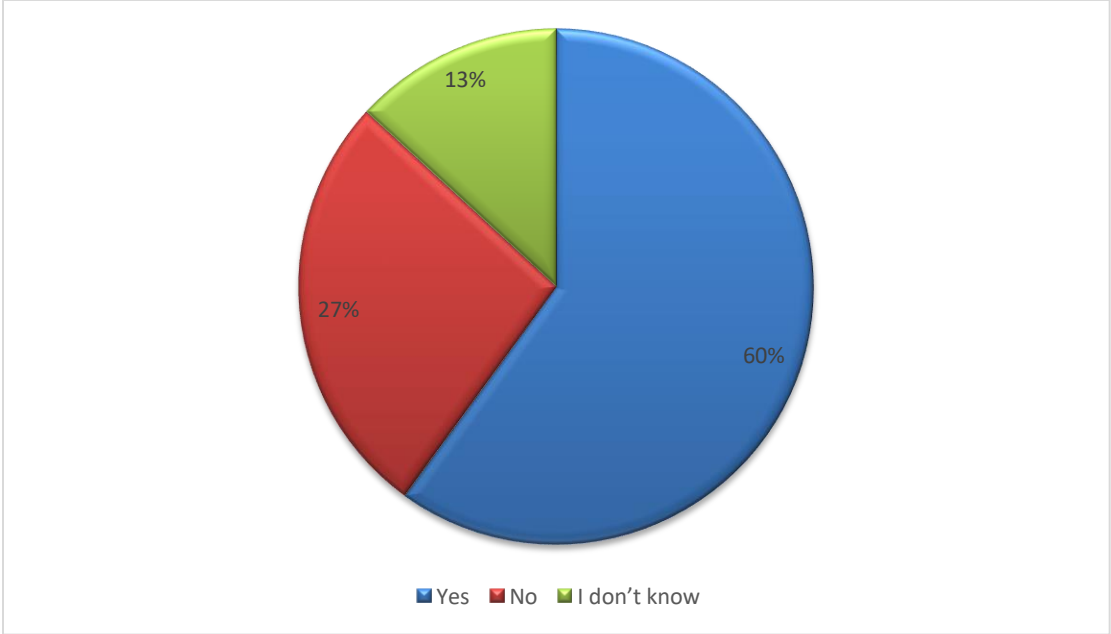

Figure 10: Can bats can enter in human ears?

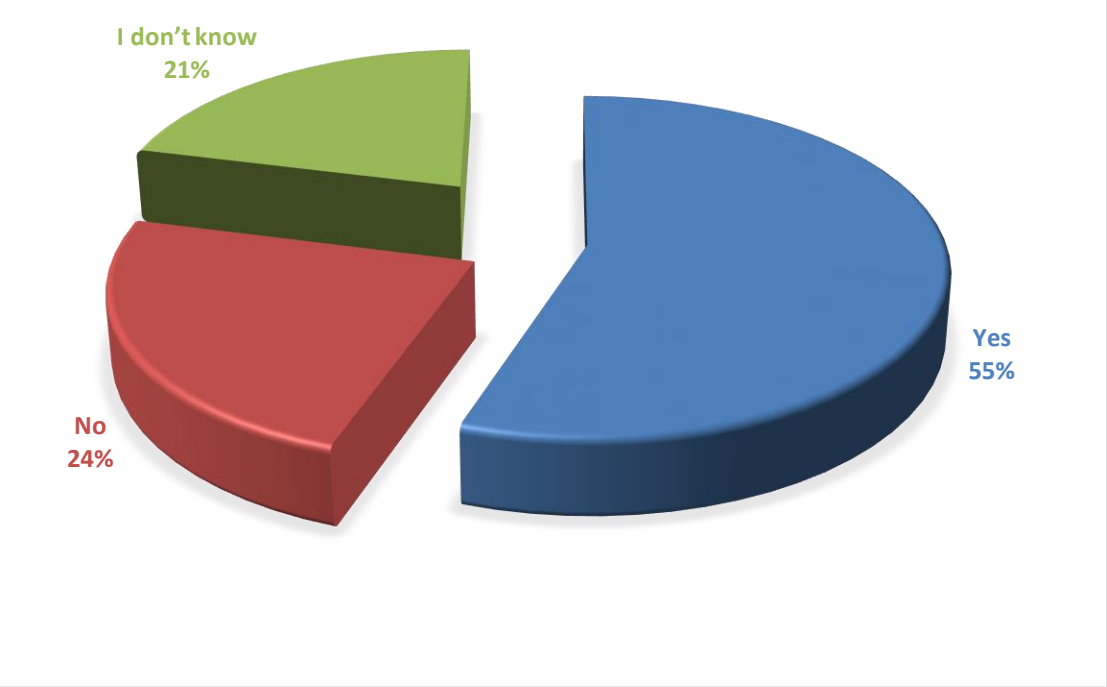

Figure 11: Presence of bat at house is bad-luck.

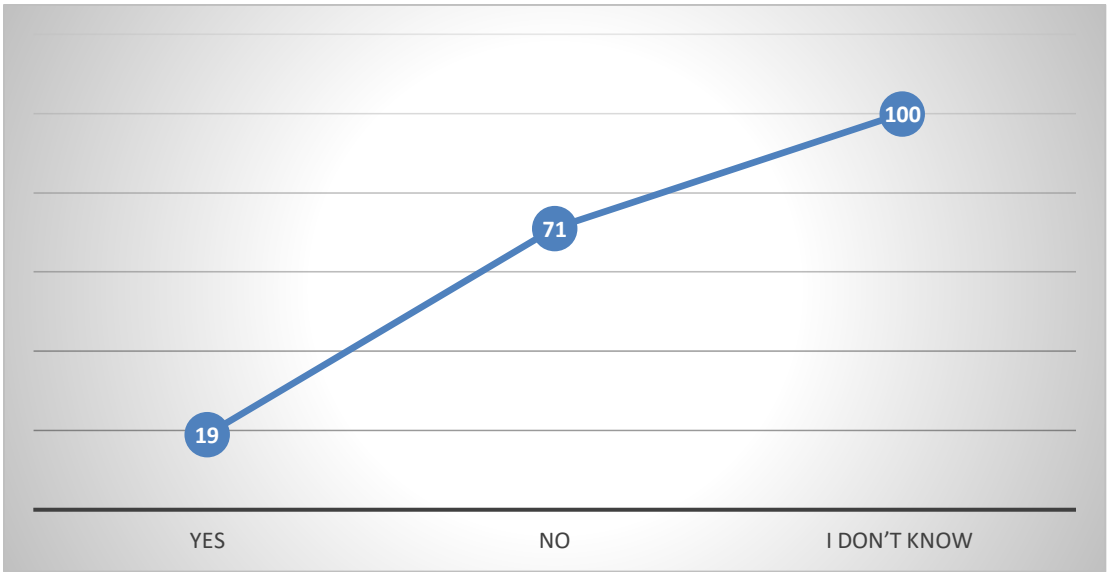

Figure 12: Can bats (large size) catch to humans and take them in air?

CONCLUSION

This survey has provided valuable insights into the knowledge, Punjabi residents, have about bats, as well as their perceptions and attitudes toward these creatures. Respondents' opinions on bats varied based on factors such as gender, age, education level, and occupation. Pakistan is rich in bats diversity, and the findings of this study can help the local people understand bats, their ecological rolefor healthy ecosystem. This understanding may assist to reduce crop damage and the spread of zoonotic diseases. Organizing national workshops and seminars could effectively promote

awareness among local people, particularly garden owners, about how to reduce human-bat conflicts in the region. Furthermore, offering early childhood education modules that address basic bat ecology and biology would increase general knowledge of these vital animals in local communities. Our work provides early data that can be used to support future research and pilot programs focused at conserving local bat species.

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