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Human Behavior towards Herpetofauna in Azad Jammu and Kashmir, Pakistan

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SUMMARY

Folklore and cultural norms have a significant impact on wildlife conservation. Different societies may have different negative values and legends. Amphibians and reptiles are among the vertebrates that receive the most criticism. Folklore directly influences the terrible persecution these animals endure. The goal of the study was to clarify how these unfavorable beliefs and myths directly impact the conservation of these animals. In the Pakistani state of Azad Jammu and Kashmir, 1000 residents from several districts, including Muzaffarabad, Hattian, Bagh, Haveli, Poonch, Sudhnoti, and Kotli, were given questionnaires. The main aim was to gather data concerning the hypothesis that human-associated maltreatment is directly influenced by the existence of negative values and wrong ideas. Principal component analysis was utilized to confirm the hypothesized relationship between negative values and observations, and anti-conservation attitudes towards reptiles and amphibians. Socio-demographic variables were also included. The research revealed that people in the study area held strong negative values, folklore, and anti-conservation opinions regarding snakes. Principal component analysis results showed a significant correlation between folklore, negative values, and conservation inclinations; the two main factors influencing public behavior toward herpetofauna were persecution tendencies and negative values. Interestingly, there was no correlation found between the apparent harmfulness, lethality, or aggression of a herpetile and its ecological value, but rather with increasing dislike and fear.

Keywords: Ethology; Herpetofauna; Folklore; PCA

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INTRODUCTION

Many animal species are not categorized as threatened by the IUCN because they are conserved by humans. This conservation is often based on the species' cultural (Altaf et al., 2023), food, ethnomedicinal (Ammatussalm, 2022), and commercial value, leading to the neglect of many other species. Consequently, mammals, birds, and fish are often valued more than herpetological species and invertebrates. It is crucial to understand how misperception, folklore, tales, and negative associations contribute to the discrimination and conservation of herpetological fauna (Borzée et al., 2025; Speight et al., 2025).

Herpetofauna are bio-indicators of environmental change (Kurnaz, 2026). Deforestation, fragmentation, urbanization, habitat loss, and pollution are the main threats to the survival of herpetofauna (Tan et al., 2023). A total of 8,400 amphibian species are present throughout the world (Womack et al., 2022), but 1,856 amphibian species are listed as threatened (Johnson and Mendelson, 2022), and approximately 168 amphibian species are extinct (Steigerwald et al., 2022). While 10,450 reptilian species are reported worldwide (Adil et al., 2022), 195 species of reptiles and 24 species of amphibians are present in Pakistan (Khan, 2006). In Azad Kashmir, 56 species of herpetofauna are reported (Khan, 2011). Amphibians and reptiles are mainly hunted for food, medicine, research, or the pet trade (Dufour et al., 2022). The skin and fat of some species, such as *Spalerosophis diadema, Uromastyx asmusii, Varanus bengalensis, Varanus griseus, Python molurus, Uromastyx hardwickii, Trapelus agilis*, and *Ptyas muscocus*, has a high cost. The most exported species from Pakistan are *Naja naja*, *Echis carinatus*, and *Eristicophis macmahonii*. Work done in Balochistan and Sindh provinces are the only reliable sources of information on herpetological species in Pakistan (Khan, 2006). Anthropogenic impacts are also a main cause of population decline in amphibian and reptilian species (Tan et al., 2023; Hayden Bofill and Blom, 2024). Herpetofauna are also affected by dispersal barriers (Tan et al., 2023). Road accidents are one of the main causes of species decline and extinction (Shahidinejad et al., 2024). Grazing and deforestation have increased due to rapid human population growth, affecting conservation strategies (Singh et al., 2025).

Studies of herpetological species are promoted by different well-known journals, societies, and museums. In Pakistan, herpetology is a less valued field due to the absence of literature and institutions and a lack of reward. To fulfill this gap, a field guide on some herpetological species was created, and lists of crocodilians, chelonians, lizards, and snakes of Pakistan are available. Even though most herpetological species are harmless and not responsible for major economic loss, they are unfortunately mistreated and feared. Many of them are beneficial for humans and the environment, yet they are unfortunately perceived as dangerous. The main reasons for disliking herpetofauna are folklores and misconceptions rather than their ecological characteristics (Khan, 2006).

It is observed that while human psychological studies of amphibians and reptiles are lacking in Pakistan, the majority of researchers there concentrate on diversity, status, distribution, habitat preferences, anthropogenic impacts (Altaf et al., 2021) and ethnoherpetology. Therefore, the primary goals of this study were to investigate cultural norms and superstitions regarding herptiles and their potential correlation with the bias that amphibians and reptiles experience in Azad Jammu and Kashmir (AJ&K), Pakistan.

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MATERIAL AND METHODS

The data were collected from 1,000 respondents from Azad Jammu and Kashmir, Pakistan, from 2016-2022.

STUDY AREA

Azad Jammu and Kashmir spans 13,297 square kilometers. It is situated between latitudes 33° and 36° North and longitudes 73° and 75° East (Figure 1). Azad Kashmir is geographically divided among mountains and hills, as well as plains and valleys. The main rivers in this state are the Poonch, Jhelum, and Neelum. The climate is largely subtropical, with an average annual rainfall of roughly 1300mm. According to a demographic survey conducted in 1998, the population of Kashmir was 22.973 million, with an expected increase to 33.4 million by 2004. The entire population (100%) follows Islam. The urban-rural population ratio is 12:88, with a literacy rate of 60%. Most of the population depends on agriculture, forestry, and livestock for its survival. The unemployment rate ranges from 35 to 50 percent.

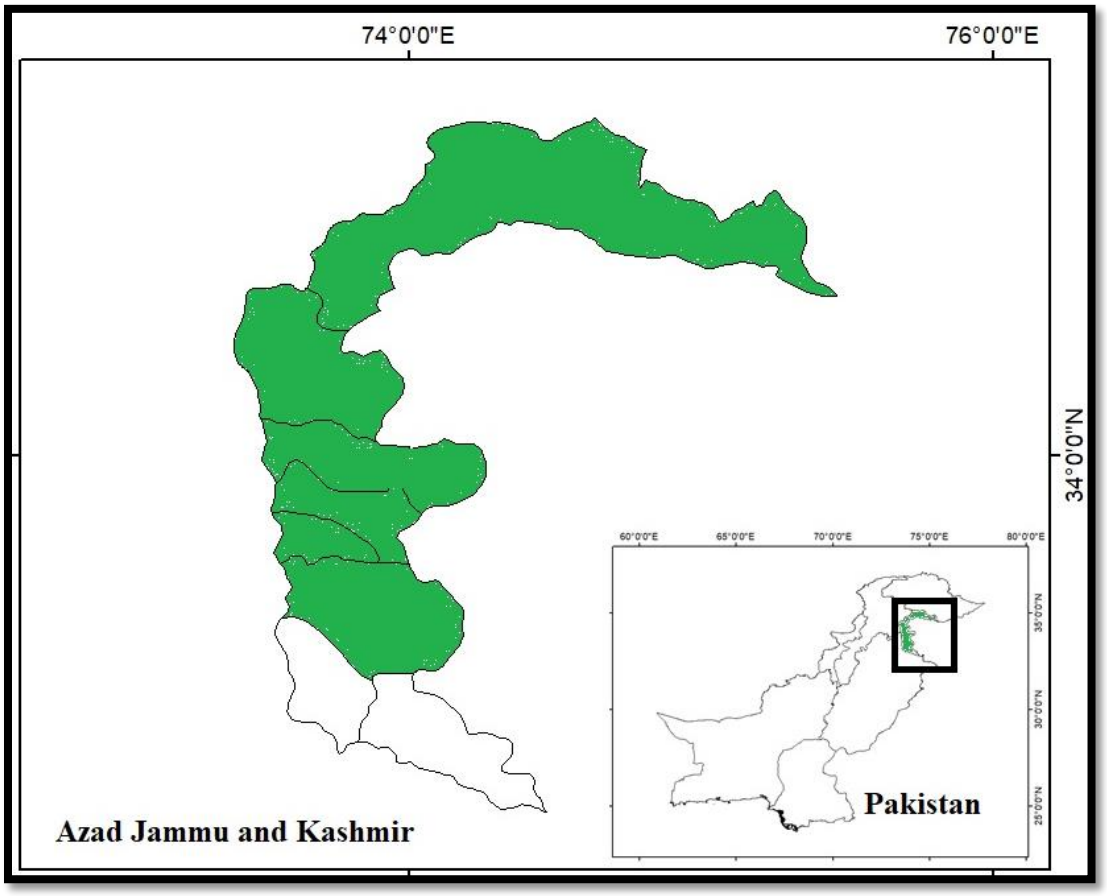

Figure 1: Map of Azad Jammu and Kashmir.

METHODOLOGY

Superstitious and negative values were quantified using semi-structured interviews with 1000 inhabitants of AJ&K (i.e., Muzaffarabad, Hattian, Bagh, Haveli, Poonch, Sudhnoti, and Kotli districts), Pakistan (Figure 1). Out of the total, 480 were men and 520 were women. Participants were randomly selected from various public places such as schools, colleges, universities, cafes, shops, and residences. Informants were apprised of the research objectives and methodology, and it was guaranteed that their identities would remain confidential. Questionnaires with similar clauses were

distributed to respondents to collect data. The survey was conducted between 8:00 and 14:00. Each questionnaire consisted of 22 close-ended questions, requiring a ranking from 1 to 10. Interviews lasted 15 to 45 minutes and were conducted from July 2017 to May 2018.

Questionnaire construction

Three classes were prepared, all having various concealed variables, and changed into a reliable questionnaire. The concealed variables are supposed builds which are not calculated directly but expected from a set of pointer objects (Marocoo, 2001) that may be examined and calculated. As for the development of the three variables, generalized ideas about herpetofauna in AJ&K (Table 1) and population were collected. The level for analyzing the developed "folklore" was produced based on common ideas that local people link with herpetofauna. It was composed of 22 items. Respondents were requested to convey their views on a range of ten values, ranging from "0" ("I totally disagree") to "10" ("I totally agree") as Ceríaco (2012).

STATISTICAL ANALYSIS

The data were analyzed with the help of PAST statistical analysis (Version 3). Principal component analysis values were analyzed. Principal component analysis is a statistical method that changes correlated variables into a number of uncorrelated variables called principal components.

RESULTS

The profile of respondents in the study area indicates that, out of 1000 respondents, 519 were female and 481 were male. Regarding occupation, 17 respondents were private teachers, 27 were health practitioners, 851 were students, 38 were government employees, 32 were housewives, 18 were engaged in agriculture, and 17 were laborers. Based on age groups, 897 respondents were between 18-30 years, 40 were between 31-40 years, 10 were between 41-50 years, and 5 were between 51-60 years. From an educational point of view, 24 respondents held master's degrees, 16 were bachelor's students, 871 were intermediate students, 11 were matriculated students, and 78 were illiterate. Out of the total, 532 respondents were from urban areas, while 468 were from rural areas (Figure 2).

During the survey, most respondents noted that they think toads are not useful, while only very few people believe that they are useful (mean value= 2.934) and important for the ecosystem (3.1). Additionally, very few people believe that toads attack humans (0.181). More than half of the respondents think that toads are poisonous (5.632), toads usually ignore the presence of humans, and they are often seen in houses (9.272), while they remain at some distance from human beings (7.135). The respondents indicated that the population's perception of toads is negatively influenced by instinctual behavior; they don't like toads (0.97) and most of them don't admire their beauty (2.517). They don't want to touch or get close to them (0.7), dislike their voice (0.25), do not want toads living in their houses (0.655), and believe that this taxa is not valuable to the environment (1.446). However, this species is not considered a nightmare (0.778) or a source of fear (2.589) for the people of AJK. When they see this taxon in houses, they don't want to kill it (1.18);

most of the time, they remove it from the house and ask someone to take it away (4.5) (Figure 3).

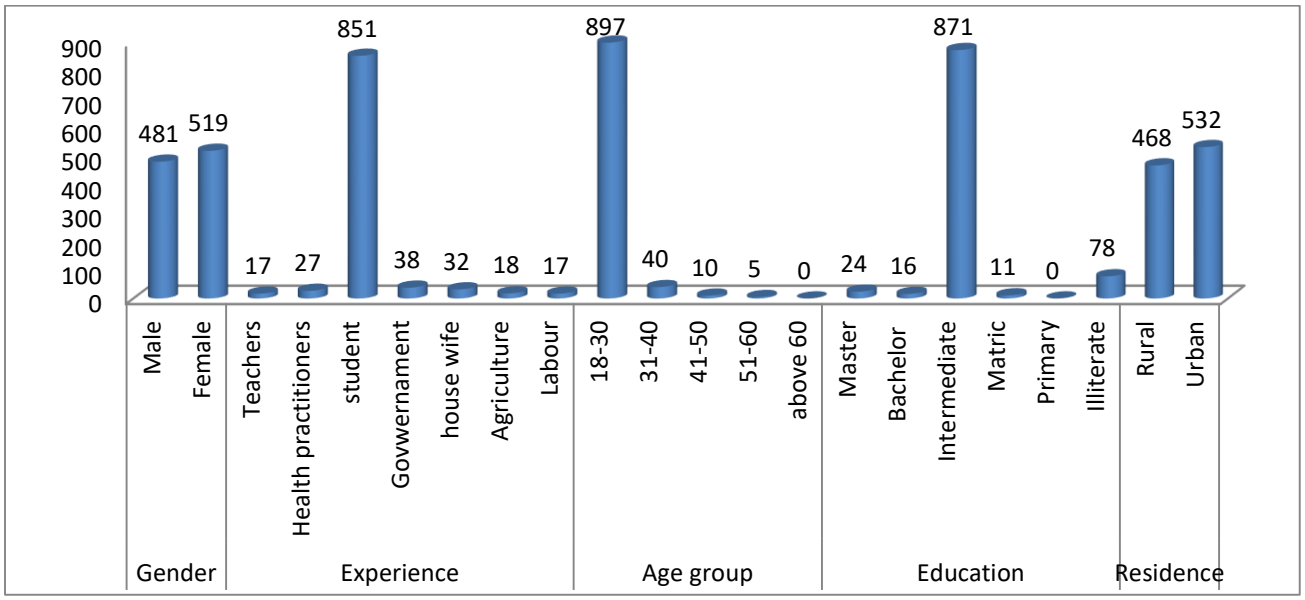

Figure 2: Profile of the respondents.

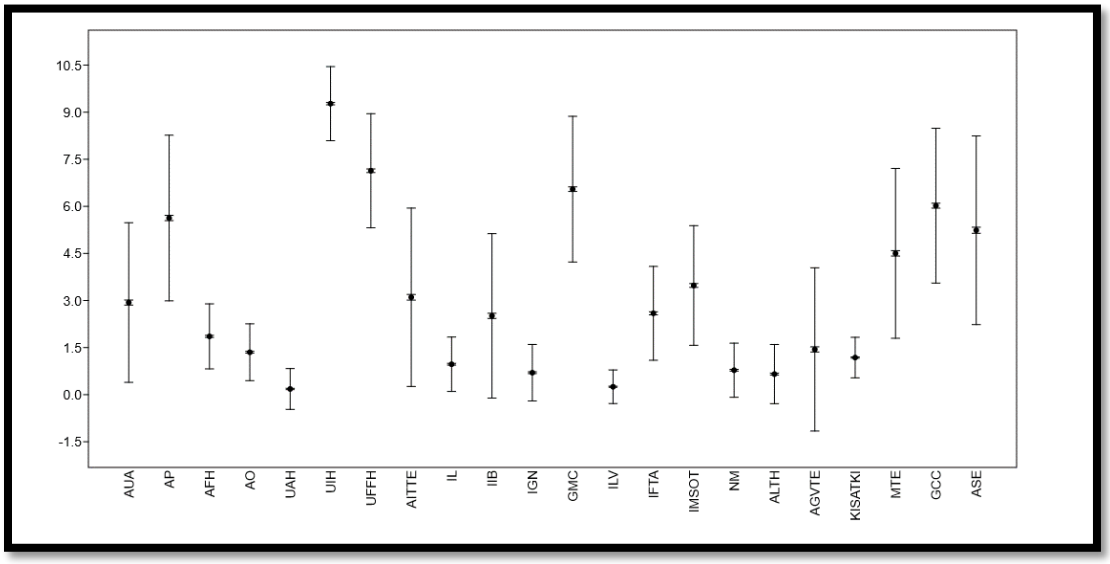

Figure 3: Human behavior toward toad.

Only a very small number of respondents (0.392) said they thought frogs were useful, whereas the majority of respondents said they did not. Frogs are vital to the ecosystem, according to more than half of the community (5.449). Furthermore, just a small percentage of people think that frogs attack people (0.535). Frogs typically disregard human presence (7.221) and stay at a certain distance from humans (8.346), according to many respondents who believe frogs are poisonous (5.186). According to the respondents, innate behavior also has a negative impact on the public's opinion of frogs; they dislike them (1.935), and the majority of them don't find them attractive

(0.887). They despise their voice (0.792), don't want frogs to live in their homes (0.392), don't want to touch or be near them (1.935), and think this taxon is not beneficial to the ecosystem (5.119). However, the residents of AJK do not view this species as a source of fear (1.831) or a nightmare (0.486). The majority of responders are not sick from this taxon (1.928) and do not feel creeped out by it (1.736) since this taxon does not damage or disturb humans. When people see frogs in homes, they typically remove them and ask someone to take this taxa away (4.828657) rather than killing them (0.792) (Figure 4**)**.

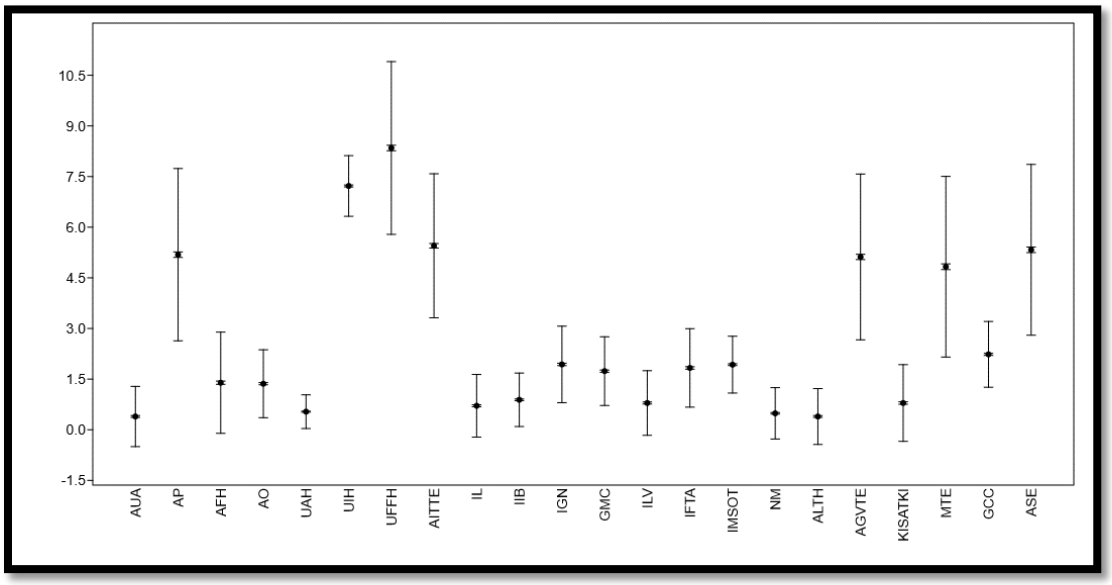

Figure 4: Human behavior toward frog.

Only a small number of respondents to the study said they thought snakes were necessary for the ecology (2.4) and useful (0.24). The majority of respondents said they thought snakes were useless. Furthermore, the majority of responders (9.984) think that snakes attack people. The majority of respondents believe that all snakes are poisonous (8.519), dangerous to humans (8.061), do not ignore human presence (0.17), stay at a certain distance from humans (8.914), and behave offensively when humans attack (8.742). The respondents indicated that innate behavior has a negative influence on the population's impression of snakes; people dislike snakes (0.55) and do not respect their attractiveness (0.021). They do not want to touch or be near them (mean value = 0), despise their sound (mean value = 0), do not want snakes in their homes (mean value = 0), and consider that this taxon is not beneficial to the environment (1). In AJK, however, responders report nightmares (7.256), creeps (9.27), sickness (9.608), and terror (9.454) as reactions to this species. When they see this taxon in houses, they want to kill it (8.152); most of the time, they remove it from the house and ask someone to take it away (9.97) (Figure 5**)**.

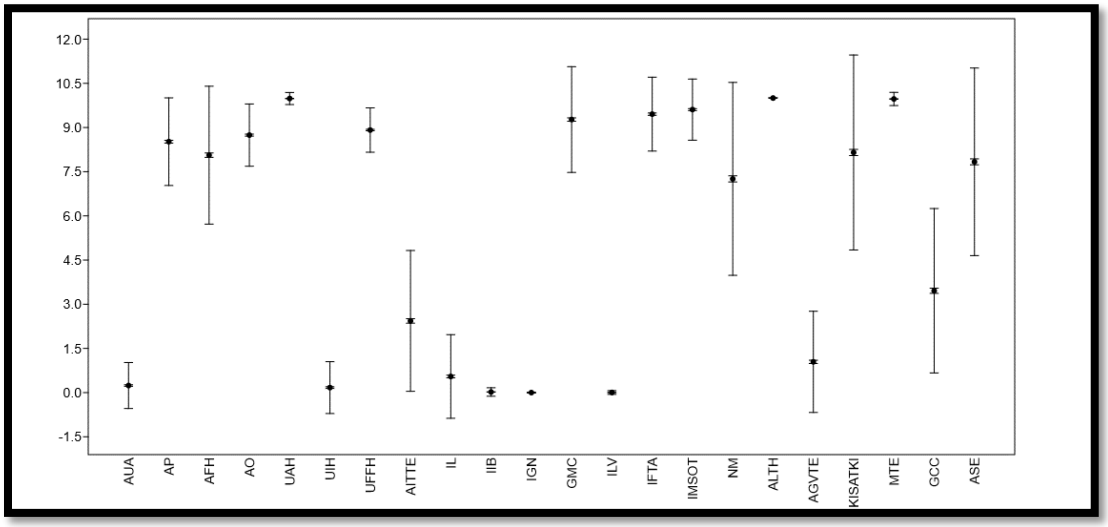

Figure 5: Human behavior toward snake.

During the study, the majority of respondents stated that small lizards are not useful, while only a small percentage believe they are useful (mean value = 0.662) and crucial for the ecology (0.788). Furthermore, few people believe that little lizards attack humans (0.028). Many respondents believe that little lizards are harmful (6.474), that they do not ignore humans (2.196), and that they typically flee from humans (7.386). According to the respondents, instinctive behavior has a negative impact on the population's perception of little lizards; most people don't find them attractive (0.019) and do not like them (0.185). They despise their voice (0.256), do not want little lizards to live in their homes (0.049), do not want to touch or be near them (0.148), and think this taxon is not beneficial to the ecosystem (1.0695). However, the people of AJK do not view this species as a nightmare (2.81), a cause of terror (9.983), or a cause of illness (9.557). The majority of respondents find this species' presence unsettling (9.6). They desire to eliminate this taxon when they see it in homes (9.459); most of the time, they take it out and ask someone to remove it (9.515) (Figure 6).

Only a small percentage of respondents to the study indicated that they thought giant lizards were important for the ecology (mean value = 0.428) and useful (mean value = 0.943). Furthermore, very few people think that big lizards attack people (mv = 0.138). While giant lizards do not ignore human presence (0.968) and flee from humans (mv = 7.361), over half of respondents believe that large lizards are venomous (6.28) and fatal for humans (mv = 8.286).The majority of respondents (9.967) think that this taxon is objectionable. According to the respondents, instinctive behavior has a negative impact on the public's image of giant lizards; most people don't find them attractive (0.011) and dislike them (0.146). They despise their voice (mv = 0), don't want big lizards staying in their homes (mv = 0), don't want to touch or be near them (0.791), and think this taxon is not beneficial to the ecosystem (1.665). However, this species is not regarded as a nightmare (0.006); in AJK, relatively few persons experience illness and fear (mv = 0). They don't want to kill this taxon when they see it in homes (1.304); instead, they usually take it out and ask someone to remove it (9.496) (Figure 7**)**.

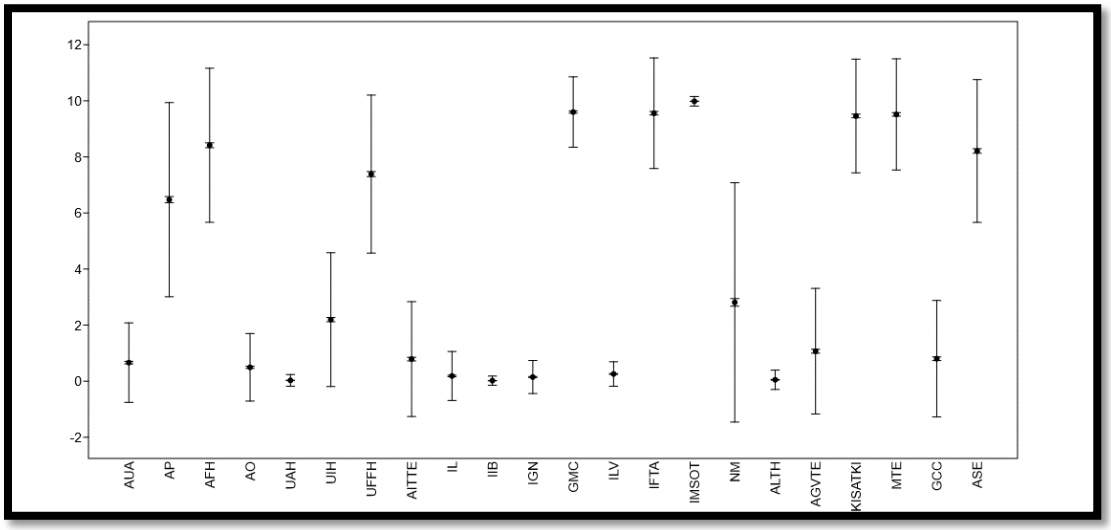

Figure 6: Human behavior toward small lizard.

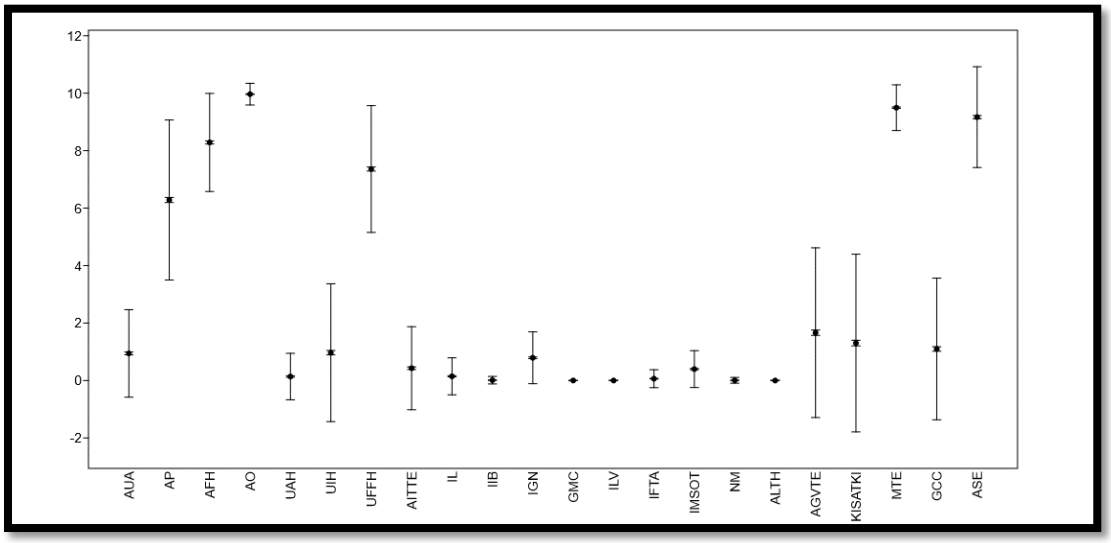

Figure 7: Human behavior toward large lizard.

The first two axes in principal component analysis (PCA) account for 65.72% of the variation in sample folklore values (component 1: 49.831% and component 2: 15.889%). "Taxa are useful" (r = -0.08693), "Taxa are poisonous" (r = 0.18856), "Taxa are fatal to human beings" (r = 0.45801), "Taxa are offensive" (r = -0.5198), "Taxa usually attack humans" (r = 0.39145), "Taxa usually ignore humans" (r = -0.53756), "Taxa are important to the ecosystem" (r = -0.050189). Component two variables include "Taxa are useful" (r = -0.01364), "Taxa are poisonous" (r = 0.11918), "Taxa are fatal to human beings" (r = -0.42553), "Taxa are offensive" (r = 0.15836), "Taxa usually attack humans" (r = 0.70422), "Taxa usually ignore humans" (r = 0.21313), "Taxa usually flee from humans" (r = 0.18142), and "Taxa are important to the ecosystem" (r = 0.45298). Strong correlations between the variables characterizing human behavior toward herptiles were indicated by the extremely significant Bartlett's test of sphericity (χ^2 = 101,000, df = 35, $p < 0.001$) (Figure 8).

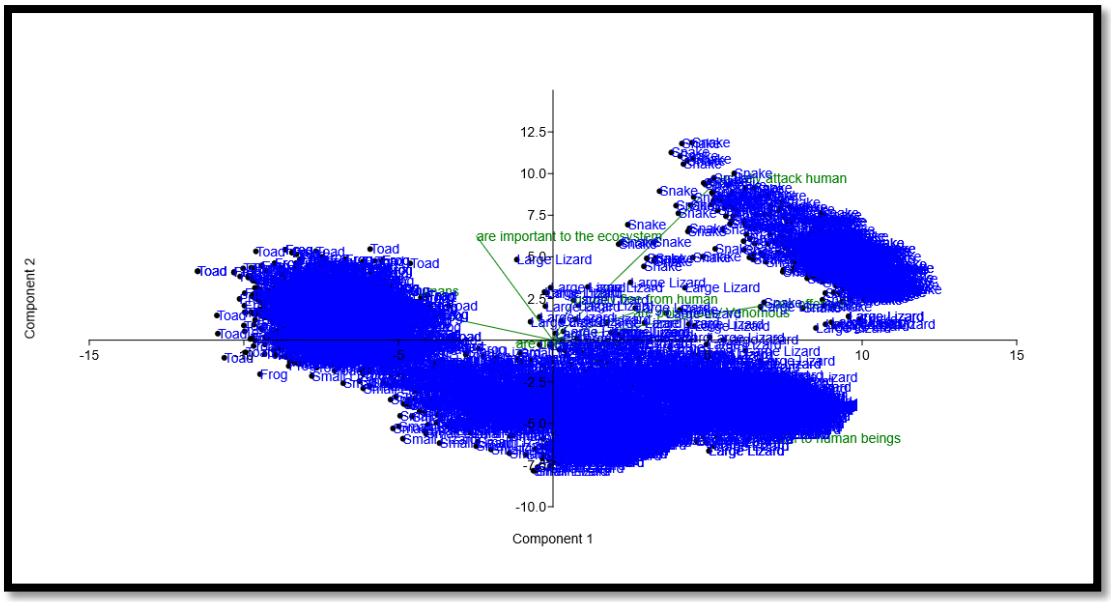

Figure 8: PCA shows the human attitude toward herpetofauna along with different folklores.

In Principal Component Analysis (PCA), the first two axes explained 68.819% of the variation in the sample's negative values (Component one: 56.008%; Component two: 12.811%). Variables loading onto Component 1 included "I like taxa" (r = -0.00597), "Taxa is beautiful" (r = -0.05317), "I go near taxa" (r = -0.07645), "The way taxa moves gives me creep" (r = 0.49336), "I like the voice of taxa" (r = -0.02239), "I fear this taxa" (r = 0.5449), "I'm sick of taxa" (r = 0.30916), "Taxa gives me nightmares" (r = 0.40222), "I like it if the taxa lives in my house or property" (r = 0.41373), and "I think that the presence of taxa gives value to the environment" (r = -0.14809). Variables loading onto Component 2 included "I like taxa" (r =0.076818), "Taxa is beautiful" (r = 0.14068), "I go near taxa" (r = 0.078558), "The way taxa moves gives me creep" (r = 0.035686), "I like the voice of taxa" (r =0.037077), "I fear this taxa" (r = -0.10082), "I'm sick of taxa" (r = -0.68704), "Taxa gives me nightmares" (r = 0.31316), "I like it if the taxa lives in my house or property" (r = 0.47702), and "I think that the presence of taxa gives value to the environment" (r =0.3971). Strong correlations between the variables characterizing human behavior toward herptiles were indicated by the extremely significant Bartlett's test of sphericity (χ^2 = 166,000, df = 54, $p < 0.001$) (Figure 9**)**.

In Principal Component Analysis (PCA), the first two axes explain 75.698% of the variation in sample persecution/anti-conservation (component one: 53.7%; component two: 21.998%). Variables loading onto component one comprise the following statements: "When I find one of that Taxa, I usually kill it or ask someone to kill it" (r =0.75242), "If there was a population of this taxain my property, I would take measures to eliminate it" (r =0.45449), "I think there should be a greater concern for the conservation of this taxa" (r = -0.38267), and "I think that this Taxa should be exterminated" (r =0.28436). Variables loading onto component two comprise the following statements: "When I find one of that Taxa, I usually kill it or ask someone

to kill it" (r =0.63138), "If there was a population of this taxain my property, I would take measures to eliminate it" (r = -0.29141), "I think there should be a greater concern for the conservation of this taxa" (r = 0.57548), and "I think that this Taxa should be exterminated" (r = -0.43044). Strong correlations between the variables characterizing human behavior toward herptiles were indicated by the extremely significant Bartlett's test of sphericity (χ^2 = 31,996, df = 9, $p < 0.001$) (Figure 10**)**.

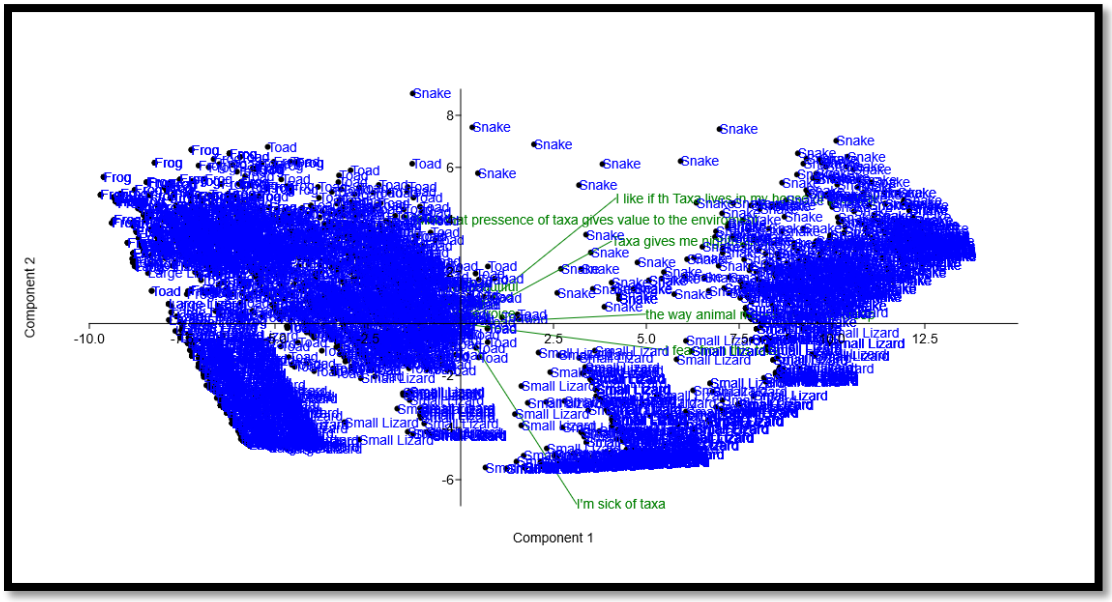

Figure 9: PCA shows the human attitude toward herpetofauna along with different negative values.

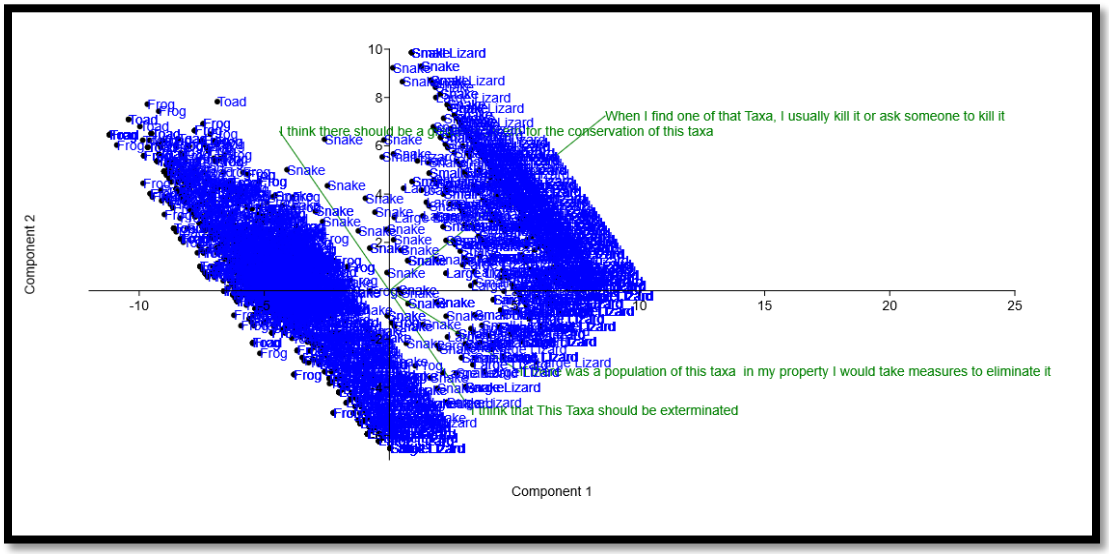

Figure 10: PCA shows the human attitude toward herpetofauna along with different anti-conservation statements.

DISCUSSION

Humans' views about the environment are greatly influenced by their perceptions of it. This influence can be linked to sociodemographic factors, folklore, and negative beliefs that support anti-conservation sentiments regarding herpetofauna. According to research, folklore is strongly linked to negative attitudes about herpetofauna and specific insect, bird, and animal species. The conservation of other wildlife is preferred over that of herptiles, with less support anticipated for herptiles, according to earlier research (Altaf et al., 2020; Altaf et al., 2023).

Taxa that include invertebrates (crabs and snails) and vertebrates (turtles and lizards) are valued less than higher vertebrates and fishes. Humans evolve negative opinions, folklore, and misconceptions based on animal behavior, e.g., aggressive behavior, lethality, danger, and loyalty, as well as limited or no knowledge (Ceríaco, 2012). It has been reported that snakes are consciously killed throughout Asia and Europe, and that venomous snakes belonging to the genus *Vipera* have become extinct. Species of herpetofauna are killed due to superstition in Pakistan, leading towards extinction (Valkonen and Mappes, 2014). We need alternative methods after the failure of protective laws for these animals, such as emphasizing environmental education (Phaka et al., 2023). Educational programs should focus on explaining life history, ecological problems, and conservation issues due to negative perceptions of animals. Multidisciplinary approaches are needed to safeguard animals that are significant to cultural heritage and are the subject of numerous folktales (Almeida et al., 2017). The study of folklore should be a part of this approach since it is essential to comprehend the existence of negative values and how they affect these creatures' ability to survive. If an animal is associated with traditional beliefs, it must have a substantial socio-cultural legacy and should not be overlooked. Studies are needed to gain deeper knowledge of human-animal relationships. This study provides solid evidence that the presence of false superstitions can harm conservationist beliefs regarding herpetofauna (Ali et al., 2023).

According to PCA, people's perceptions of the taxa in Azad Jammu and Kashmir are greatly influenced by folk beliefs, cultural perceptions, emotional attitudes, and personal safety concerns. Due to these creatures' long-standing negative associations, some taxonomist are typically linked with danger, terrible deeds, and potential human threats. When individuals encounter the taxa, these beliefs often make them feel afraid, uneasy, or avoidant, giving the impression that they are neither safe nor wanted. Even those who have little to no direct interaction with the animals can develop negative attitudes as a result of their emotional reactions to these unfavorable impressions. However, some people are aware that the taxa are important parts of ecological stability and nature's systems (Pasmans et al., 2017). A growing understanding of biodiversity protection is reflected in these respondents' recognition of the value of animals in conservation and their general avoidance of human engagement (Phaka et al., 2023). A clear division between old and modern ways of thinking, mistrust, and ecology is revealed by the combination of these polar statements (Azevedo et al., 2022). This indicates that opinions regarding the conservation and protection of the taxa are likewise divided, with some people favoring their removal or eradication when they are discovered near their homes, farms, or other areas where people live.

The existence of such superstitions regarding herpetofauna differs between sites of habitation, with people in rural areas holding more superstitions compared to urban citizens, and also differing between uneducated and educated individuals (Mansha and Nawaz, 2023; Phaka et al., 2023). For herpetofauna, the presence of superstitions as well as folklore directly impacts conservation approaches. The existence of superstitions was also connected to the prevalence of negative opinions and thoughts; those who have superstitions also tend to hold negative opinions and thoughts towards herptiles. Sex also impacts the existence of negative opinions and thoughts, with females having more negative opinions towards herpetofauna compared to males (Ali et al., 2023).

CONCLUSION

The current study shows that strong folk beliefs, misunderstandings, and negative emotional perceptions (which are deeply ingrained and encourage anti-conservation behavior) have a greater influence on human attitudes toward herpetofauna in Azad Jammu and Kashmir than ecological knowledge. The respondents repeatedly connected reptiles and amphibians with danger, poison, dread, disease, and death, despite the fact that many of these connections lacked an ecological basis. Folklore, negative values, and conservation tendencies were significantly correlated, according to the PCA results, and the two primary factors impacting public behavior toward herpetofauna were negative values and persecution tendencies. It's interesting to note that taxa's perceived toxicity, lethality, or aggressiveness was linked to increased distaste, fear, removal, and deliberate killing, but not to their ecological significance. These findings highlight a variety of herpetofauna conservation concerns that are not only biological but also have a significant societal and psychological component in interactions between people and wildlife. Therefore, for effective conservation measures, ethnobiological approaches should be combined with environmental education initiatives that address misconceptions, the lack of ecological literacy, and human–herpetofauna relationships. In order to lessen persecution and promote long-term coexistence, it is necessary to address the myths and narratives that explain the fear of these ecologically significant species. Thus, if herpetofaunal variety is to be maintained in the area, the study offers compelling evidence of the significance of altering public beliefs in addition to habitat protection.

REFERENCES

Adil, S., M. Altaf, T. Hussain, M. Umair, J. Ni, A. M. Abbasi, R. W. Bussmann, and S. Ashraf. 2022. Cultural and medicinal use of amphibians and reptiles by indigenous people in Punjab, Pakistan with comments on conservation implications for herpetofauna. Animals. 12: 2062.

Adil, S., S. Ijaz, H. Aslam, R. Kanwal, and S. Afsheen. 2020. Diversity of amphibians and reptiles in Daphar Forest Sanctuary, district Mandi Bahauddin, Pakistan. Journal of Wildlife and Ecology. 4: 15-26.

Ali, U., M. Altaf, H. Ayoub, S. Batool, M. Khan, Z. Shaheen, T. Laraib, I. Nawaz, F. Lodhi, and J. Noor. 2023. From Myths to reality: Understanding the interplay of folklore and herpetofauna conservation in Punjab. Pakistan. J Wildl Ecol. 7: 44-56.

Almeida, A., B. G. Fernández, and T. Silva. 2017. Changing Negative Perceptions of Animals through Teaching Practice: A Research in Primary Education. Journal of Baltic Science Education. 16: 446-458.

Altaf, M., A. G. M. Abbasi, and S. Adil. 2021. Anthropogenic impacts on the diversity and distribution of amphibian and reptiles of Dhirkot, Azad Jammu and Kashmir, Pakistan. Journal of Wildlife and Ecology. 5: 38-46.

Altaf, M., A. M. Abbasi, M. Umair, M. S. Amjad, K. Irshad, and A. M. Khan. 2020. The use of fish and herptiles in traditional folk therapies in three districts of Chenab riverine area in Punjab, Pakistan. Journal of Ethnobiology and Ethnomedicine. 16: 38.

Altaf, M., M. Altaf, and T. A. A. Khichi. 2023. Cultural Significance and Medicinal Applications of Herpetofauna in Bagh, Azad Jammu and Kashmir, Pakistan. Journal of Wildlife and Ecology. 7.

Ammatussalm, H. 2022. Ethnopharmacological uses of amphibians and reptiles in district Bahawalpur, Pakistan. Journal of Wildlife and Ecology. 6.

Azevedo, A., L. Guimarães, J. Ferraz, M. Whiting, and M. Magalhães-Sant'Ana. 2022. Understanding the human–reptile bond: An exploratory mixed-methods study. Anthrozoös. 35: 755-772.

Batool, S., M. Altaf, M. Junaid, and M. Khan. 2025. Distribution, status, and threats to reptile and amphibian species in the vicinity of Pakistan's Ramsar. Journal of Wildlife and Ecology. 9: 310-332.

Borzée, A., V. K. Prasad, K. Neam, J. Tarrant, T. A. Kosch, I. M. Barata, M. Rais, D. Bickford, L. F. M. da Fonte, and J. Wilcken. 2025. Conservation priorities for global amphibian biodiversity. Nature Reviews Biodiversity. 1: 754-771.

Ceríaco, L. M. 2012. Human attitudes towards herpetofauna: The influence of folklore and negative values on the conservation of amphibians and reptiles in Portugal. Journal of Ethnobiology and Ethnomedicine. 8: 8.

Dufour, P. C., E. F. Miot, T. C. So, S. L. Tang, E. E. Jones, T. C. Kong, F. L. Yuan, Y.-H. Sung, C. Dingle, and T. C. Bonebrake. 2022. Home and hub: pet trade and traditional medicine impact reptile populations in source locations and destinations. Proceedings of the Royal Society B: Biological Sciences. 289: 20221011.

Haidar, R., M. Altaf, M. Faiz, S. T. u. Shukurova, O. Shukurov, and A. M. Abbasi. 2026. Ethnomedicinal uses of fauna in the Lesser Himalayan Region of Pakistan. Ethnobotany Research and Applications. 34: 1-23.

Hayden Bofill, S. I., and M. P. Blom. 2024. Climate change from an ectotherm perspective: evolutionary consequences and demographic change in amphibian and reptilian populations. Biodiversity and Conservation. 33: 905-927.

Jahangeer, M., M. Altaf, N. Irshad, M. Tariq, S. Chowhan, T. Hussain, A. H. Narejo, M. Ali, M. Muhamad, and S. Ashraf. 2026. Cultural and ethnopharmacological uses of wildlife in the himalayan region of Azad Jammu and Kashmir, Pakistan. Journal of Ethnobiology and Ethnomedicine. 22: 13.

Johnson, K., and J. R. Mendelson. 2022. Status of global amphibian declines and the prioritisation of species for captive breeding.

Kamal, I., and M. Faiz. 2022. A Study of distribution of herptiles among disturbed and undisturbed habitats of Haveli, Azad Jammu And Kashmir, Pakistan. Journal of Wildlife and Ecology.

Khan, A. M., M. Altaf, T. Hussain, A. Ayub, Z.-n. Memon, A. Hafiz, S. Ashraf, U. Safdar, M. S. Amjad, and M. M. Majeed. 2024. Ethnopharmacological uses of fauna among the people of central Punjab, Pakistan. Frontiers in Veterinary Science. 11: 1351693.

Khan, M. S. 2006. Amphibians and reptiles of Pakistan. Krieger Publishing Company Malabar, Florida, USA.

Khan, M. S. 2011. Herpetology of Pakistan. ZSP, Pakistan.

Kurnaz, M. 2026. Amphibians and Reptiles as Bioindicator Organisms: An Ecotoxicological and Ecological Review. Environmental Toxicology and Ecology. 6: 1-15.

Mansha, S., and A. Nawaz. 2023. Human-wildlife interaction: the superstitious, narratives and dreams about wildlife. J Wildl Ecol. 7: 223-226.

Pasmans, F., S. Bogaerts, J. Braeckman, A. A. Cunningham, T. Hellebuyck, R. A. Griffiths, M. Sparreboom, B. R. Schmidt, and A. Martel. 2017. Future of keeping pet reptiles and amphibians: towards integrating animal welfare, human health and environmental sustainability. Veterinary Record. 181: 450-450.

Phaka, F. M., J. Hugé, M. P. Vanhove, and L. H. du Preez. 2023. Frog and reptile conservation through the lens of South Africa's nature-based cultural practices. African Journal of Herpetology. 72: 190-206.

Saleem, R., M. Altaf, M. Umair, M. S. Amjad, and A. M. Abbasi. 2021. Ethnopharmacological applications of the amphibians and reptiles among the people in the vicinity of Margalla Hill National Park, Islamabad, Pakistan. Journal of Wildlife and Ecology. 5.

Shahidinejad, F., A. Danehkar, A. Alizadeh Shabani, and P. Sobhani. 2024. Investigation of road accidents on the loss of wildlife species in the different provinces of Iran. J Natural Environ. 77: 199-211.

Singh, R., P. K. Singh, and R. C. Vishwakarma. 2025. Habitat Destruction and Deforestation. Vanishing Biodiversity: Global Threats to Flora and Fauna, 1st ed.; Khalid, MA, Kumar, S., Yadav, E., Pankaj, PP, Kharwar, RK, Eds. 23-58.

Speight, O., W. H. Morgan, T. B. White, K. A. Sainsbury, A. Bouskila, G. Rotem, R. K. Smith, W. J. Sutherland, M. J. Watson, and A. P. Christie. 2025. Exploring gaps, biases, and research priorities in the evidence for reptile conservation actions. Conservation Biology. 39: e70073.

Steigerwald, E. C., J. Oshiro, J. Chen, V. Vredenburg, A. Catenazzi, and M. Koo. 2022. Small is big: A new conservation paradigm for amphibians.

Tan, W., A. Herrel, and D. Rödder. 2023. A global analysis of habitat fragmentation research in reptiles and amphibians: what have we done so far? Biodiversity and Conservation. 32: 439-468.

Usaid, M., A. Rahman, M. Junaid, H. Khushbakhat, M. Tanveer, H. Ayoub, U. Shahzad, and M. Altaf. 2025. Ecological adaptations, diversity and threats to amphibians and reptiles in the Cholistan Desert, Pakistan. Journal of Wildlife and Ecology. 9: 372-385.

Valkonen, J. K., and J. Mappes. 2014. Resembling a viper: implications of mimicry for conservation of the endangered smooth snake. Conservation Biology. 28: 1568-1574.

Womack, M. C., E. Steigerwald, D. C. Blackburn, D. C. Cannatella, A. Catenazzi, J. Che, M. S. Koo, J. A. McGuire, S. R. Ron, and C. L. Spencer. 2022. State of the Amphibia 2020: A review of five years of amphibian research and existing resources. Ichthyology & Herpetology. 110: 638-661.

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Table 1: Species of herpetofauna in Azad Jammu and Kashmir, Pakistan (Khan, 2006).

Sr.	Scientific name	Species Authority	Common name	Urdu name
1	*Bufo himalayanus*	Gunther, 1864	Himalayan Toad	Hamalayai gauk
2	*Bufo Latastii*	Boulenger, 1882	Ladakh Toad	Ladakhi gauk
3	*Bufo melanostictus*	Schneider, 1799	Black-spectacled Toad	Hazara gauk
4	*Bufo Stomaticus*	Lutkin, 1862	Indus Valley toad	Maidani gauk
5	*Scutiger ryingchiensis*	Fei, 1977	Tibetan lazy toad	Tibti sust ghauk
6	*Microhyla ornate*	Dumerila and Bibron, 1828	Ant Frog	Bauna Maindak
7	*Fejervarya limnocharis*	Gravenhorst, 1829	Asian Grass Frog	Pahari tidda maindak
8	*Uperodon systoma*	Schneider, 1799	Marbled Ballon Frog	Marmareen maindak
9	*Hoplobatrachus Tigerinus*	Daudin, 1802	Indian Bullfrog	Basanti maindak
10	*Paa hazarensis*	Dbois and Khan, 1979	Hazara-Fast Flowing Frog	Hazara nadi mandak
11	*paa Vicinia*	Stoliczka, 1872	Muree Hills Frog	Maree Maindak
12	*Sphaerotheca Breviceps*	Schneider, 1799	Indian Burrowing Frog	Gauk maindak
13	*Lissemys punctata andersoni*	Webb, 1980	Indian Flap-shelled Turtle	Moonji kuchhuwa
14	*Japalura kamaonesis*	Annandale, 1907	Kamaon Agma	Kamoan kirail
15	*Laudakia agrorensis*	Stoliczka, 1872	Agror Agama	Agror wadi kirla
16	*Laudakia badakhshana*	Anderson and Leviton, 1969	Badkhashan Rock Agma	Badkhashan Kirla
17	*Laudakia himayalayana*	Steindachner, 1869	Himalayan Agma	Himalayaie Kirla
18	*Laudakia melanura melanura*	Blyth, 1854	Black Agama	Siaah Kirla
19	*Laudakia pakistanica pakistanica*	Baig, 1989	North-Pakistan Agma	Pakistan Kirla
20	*Laudakia pakistanica auffenbergi*	Baig and Bohme, 1996	North-Pakistan Agma	Pakistan Kirla
21	*Laudakia pakistanica khani*	Baig and Bohme, 1996	North-Pakistan Agma	Pakistan Kirla
22	*Laudakia tuberculatata*	Hardwicke and Gray, 1827	Blue Rock Agma	Neela kirla

23	*Traplus agilis pakistanensis*	Rastegar-Pouyani, 1999	Brilliant Ground Agama	Maidani korrh kirla
24	*Eublepharis macularius*	Blyth, 1854	Fat tail Gecko	Korrh kirli
25	*Cyrtopodion potoharensis*	Khan, 2001	Potohar Gecko	Potohar Chapkali
26	*Hemidactylus Brookii*	Gray, 1845	Brooke's House Gecko	Barani chapkali
27	*Indogecko rohtasfortai*	Khan and tasnim, 1990	Rohtas Gecko	Rohtas reg-sang chapkali
28	*Siwaligekko battalensis*	Khan, 1993	Reticulate Plump-bodied Gecko	Jal-dar Gol Jasm
29	*Acanthodactylus cantoris*	Gunther, 1864	Blue Tailed Sand Lizard	Neeli dum chalpaya
30	*Ophisops jerdonii*	Blyth, 1853	Roguse Spectacled Lacerta	Khurda chashma chalpaya
31	*Eurylepis taeniolatus taeniolatus*	Blyth, 1854	Common Mole Skink	Madani reg-mahi
32	*Scincella himalayana*	Gunther, 1864	Himalayan Skink	Hamalayai baahmani
33	*Lygosoma punctata*	Linnaeus, 1766	Spotted Garden Skink	Chitri baghban baamani
34	*Uromastyx hardwickii*	Strauch, 1863	Indus Valley Spiny-tail Ground Lizard	Maidani sanda
35	*Varanus flavescens*	Hardwicke and Gray, 1827	Yellow Monitor	Peeli goh
36	*Varanus bengalesis*	Daudin, 1802	Bengal Monitor	Bengali goh
37	*Varanus griseus koniecznyi*	Mertens, 1954	Indo-Pak Desert Monitor	Hindo-pak goh
38	*Typhlops ductuliformes*	Khan, 1999	Slender Blind Snake	Patla kainchwa saamp
39	*Typhlops madgemintonae madgemintone*	Khan, 1999	Kashmiri Blind Slender Snake	Kashmiri patla kainchwa saamp
40	*Eryx johni*	Russell, 1801	Common SAND Boa	Du-mohi
41	*Python molurus*	Linnaeus, 1758	Rock Python	Sindhi Azh-daha
42	*Amphiesma stolatum*	Linnaeus, 1758	Striped Keelback	Lakeer dar khar push
43	*Amphiesma platyceps*	Blyth, 1854	Himalayan Keelback	Chitra khar Pusht
44	*Boiga trigonata*	Schneider, 1802	Common Cat Snake	Maidani Billi-chisham
45	*Oligodon arnensis arnensis*	Shaw, 1802	Banded Kukri Snake	Patta kukri saamp
46	*Oligodon taeniolatus taeniolatus*	Jerdon, 1853	Streaked Kukri Snake	Dahari dar kukri saamp
47	*Platyceps rhodorachis rhodorachis*	Jan, 1865	Cliff Racer	Chattani kolbur saamp
48	*Psammophis leithii leithii*	Gunther, 1869	Steppe Ribbon Snake	Patta Teer-maar
49	*Ptyas mucosus mucosus*	Linnaeus, 1758	Rope-Snake	Dhaman
50	*Spalerosophis diadema diadema*	Schelegel, 1837	Red Spotted Diadem Snake	Rajstani surakh saamp
51	*Xenochrophis piscator piscator*	Schneider, 1802	Chekered Keelback	Chittra choobi saamp
52	*Bungarus caeruleus caeruleus*	Schneider, 1801	Common Krait	Sangchoor samp
53	*Naja oxiana*	Eichwald, 1837	Brown Cobra	Bhora nag
54	*Naja naja naja*	Linnaeus, 1768	Black Cobra	Shesh nag
55	*Daboia russelii russelii*	Shaw and Nodder, 1797	Russell's Chain Viper	Koriala afi
56	*Echis carinatus sochureki*	Stemmler, 1964	Sind Valley Saw Snake Viper	Sindi khapra saamp