

# Amphibian Conservation and Traditional Health Practices: Insights from the Buffer Zone of Bukit Barisan Selatan National Park, Lampung, Indonesia

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## Abstract

Cultural practices surrounding traditional medicine using amphibians in Indonesia are practices that can be found in several regions with diverse contexts. In the buffer zone of Bukit Barisan Selatan National Park, this practice is found with diversity among residents near and far from the buffer zone. With an orientation towards highlighting their significance to community health and social life, this research focuses on the local knowledge system regarding health and healing. Applying qualitative research uses informant s as data source. and the data collecting uses interviews, the findings of this study show that the local knowledge system regarding amphibians is as a food and medicinal material. Knowledge systems are determined by people's knowledge and involvement with the work they do. The impact of the knowledge system about the benefits of amphibians has implications for the attitudes of local residents towards amphibians and the environment in which they live. The implications of this knowledge system among local community are environmental conservation and life sustainability.

Praktik budaya seputar pengobatan tradisional dengan menggunakan amfibi di Indonesia merupakan praktik yang dapat ditemukan di beberapa daerah dengan konteks yang beragam. Di kawasan penyangga Taman Nasional Bukit Barisan Selatan, praktik ini ditemukan dengan keragaman di antara penduduk yang berada di dekat dan jauh dari kawasan penyangga. Dengan orientasi untuk menyoroti signifikansinya terhadap kesehatan masyarakat dan kehidupan sosial, penelitian ini berfokus pada sistem pengetahuan lokal mengenai kesehatan dan penyembuhan. Penelitian ini menggunakan metode penelitian kualitatif dengan menggunakan informan sebagai sumber data dan penggalian data menggunakan wawancara. Temuan dari penelitian ini menunjukkan bahwa sistem pengetahuan lokal mengenai amfibi adalah sebagai bahan pangan dan obat. Sistem pengetahuan ditentukan oleh pengetahuan dan keterlibatan masyarakat dengan pekerjaan yang mereka lakukan. Dampak dari sistem pengetahuan tentang manfaat amfibi berimplikasi pada sikap masyarakat terhadap amfibi dan lingkungan tempat tinggal mereka. Implikasi dari sistem pengetahuan ini di kalangan masyarakat lokal adalah pelestarian lingkungan dan keberlanjutan hidup.

**Keywords:** amphibian; health; healing; local-based knowledge

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## Introduction

Treatment and cure of illnesses using amphibian animals is a common social phenomenon that occurs at various community levels (Stebbins 1995). Animals, especially amphibian animals' body parts, have been used for treatment for generations (Anwar et al. 2023; Dewi et al. 2024). However, over-harvesting amphibians for medicinal use has raised concerns about declining species populations and ecosystem disruption. Amphibians play vital ecological roles, such as controlling insect populations and serving as prey. Their depletion can destabilize ecosystems and signal broader environmental issues like habitat degradation.

According to Indonesia Law Number 5 of 1990, the government directs and drives community participation in conserving biological natural resources and their ecosystems through various valuable and practical activities. In encouraging community participation, the government fosters and increases awareness of the conservation of biological natural resources and ecosystems through education and counseling (Kementerian Kehutanan RI 1990). Amphibians are protected by the state based on Government Regulation Number 106 concerning Plant and Animal Species Protected by the State (Kem-LHK 2018). Amphibians include frogs, toads, salamanders, and caecilians (Stebbins 1995). Irfani (2024) state that as many as 3,305 amphibian species and habitats must be protected or conserved, including wetland areas. Preservation of amphibian habitats will help prevent the extinction.

Despite these regulations and concerns, using amphibians in health treatment remains

widespread. The community has studied, albeit non-clinically, how treatment using amphibians can benefit patients. Empirical discussion about this in scientific journals or other literature has not been comprehensively conducted.

Meanwhile, from the religious perspective, Wahyuni, Maula, and Dewi (2019) refers to several hadiths regarding the prohibition of consuming amphibians for Muslims. On the one hand, a hadith says there is no prohibition on eating amphibian meat. On the other hand, eating the flesh of dead amphibians is still debatable.

In the Bukit Barisan Selatan National Park, South Sumatra, the local community has passed down the practice of using amphibian meat for treatment and healing through generations. Despite the prevalence of this tradition, there has been no formal documentation on the use of amphibians for medicinal purposes. Prasetyo et al. (2024) noted a growing interest in herbal medicine, particularly within modern health-care systems, such as among the Lio community in Ende Flores, Indonesia. Similarly, Febriyanti et al. (2024) highlighted the continued use of traditional medicine among the West Javanese people to treat chronic diseases, while their research also pointed out that the Sundanese community predominantly relies on traditional treatments. Prastikawati (2020) and Husain and Wahidah (2019) further acknowledged the inclusion of animal-based medicinal ingredients, including amphibians, in various traditional healing practices. Given this background, the use of amphibians for treatment in the buffer zone of Bukit Barisan Selatan National Park is a widespread yet understudied phenomenon rooted in local wisdom and deserving of further exploration.

From the perspective of environmental preservation, studies have shown that amphibian habitats and populations are crucial for maintaining the environment. Surbakti et al. (2024) reported that amphibian observers in Selemak Village, Hampan Perak District, Deli Serdang Regency, North Sumatra Province, contributed to reforestation efforts by protecting amphibian habitats from extinction. Similarly, Siahaan, Dewi, and Darmawan (2019) emphasized the importance of continued reforestation at Wan Abdul Rachman Forest Park to conserve amphibian populations. Wulan, Nugroho, and Khabibi (2023) research in Tahura Bukit Sari, Jambi, which has several different forest habitats, shows that differences in habitat characteristics are thought to be one of the drivers of amphibian diversity. Based on data collected during fieldwork, factors such as water temperature, air temperature, air humidity, and water pH have an effect on species richness in each habitat in the Tahura Bukit Sari area.

Convention of Biological Diversity (2014) reported that Indonesia is home to 270 amphibian species, making it the sixth most amphibian-rich country in the world. Amphibians play a crucial role in ecosystems both ecologically and economically. Ecologically, they serve as bio-indicators of environmental changes, while economically, they provide food and medicinal resources. Local communities use various parts of amphibians to treat specific ailments. According to Alves et al. (2013) using amphibians in traditional medicine addresses health needs and helps preserve local cultural practices. Their research documented 47 species of amphibians involved in healing rituals, including some that are protected. The use of amphibians in traditional medicine is not

limited to Indonesia but extends to other Indigenous groups worldwide; notably those still maintaining relatively primitive lifestyles (Ningsih 2020).

Bukit Barisan Selatan National Park is a national conservation area in Lampung Province, Indonesia. Surrounding the park is a buffer zone that comprises 38 villages inhabited by communities living adjacent to the national park. According to Widodo, Soekmadi, and Arifin (2018), the buffer zone protects the national park from disturbances caused by surrounding communities while also safeguarding these communities from potential negative influences emanating from the park. Azizah et al. (2022) noted that the buffer zone surrounding Baluran National Park can facilitate family economic empowerment through initiatives like the Forest Farmer Women Group in Kalimantan. In South Kalimantan, Abdurrahman (2024) highlighted that buffer zones can simplify the assessment of forest sustainability compared to managing residential environments. Furthermore, Kamaluddin, Winarno, and Dewi (2019) reported that the buffer zone of Way Kambas National Park includes villages where applications such as Elephas can be implemented. Dewi et al. (2024) emphasized that the buffer zone of Bukit Barisan Selatan National Park plays a critical role in supporting the national park's existence, necessitating careful attention to species diversity in the surrounding villages.

Amphibians provide numerous benefits to humans, including serving as a source of animal protein and playing an essential role in the food chain. Additionally, skin secretions from various amphibians have been developed into antibiotics and painkillers (Stebbins 1995). Amphibians have long been an important

protein source for many communities, integrated into their cultural and socio-economic practices. For instance, in Dinoyo Village, Malang, at least four amphibian species are used in traditional medicine (Zayadi, Azrianingsih, and Sjakoeer 2016). In Texas, the traditional method to treat fevers is using the head of a ground frog. Meanwhile, coughs are treated using a soup made from nine frogs. The medical potential of frogs, mainly the active ingredients in their skin, has been extensively studied in modern medicine (Davis et al. 2018). Furthermore, beyond these tangible benefits, amphibians help foster a connection between humans and nature. Thus, protecting and preserving amphibians is crucial not only for ecosystem health but also for human well-being. Given their ecological and socio-economic significance, amphibians require dedicated attention and protection from society and government.

The gap analysis of existing studies indicates a lack of specific research focusing on the knowledge systems related to treatment and healing through amphibians. While traditional medicine is widely utilized for treatment and care, herbal remedies often dominate it. According to Pratiwi, Saputri, and Nuwarda (2018) many individuals recognize traditional medicine primarily as herbal medicine. Their study revealed that 20.5% of the community incorporates traditional medicine into their healthcare practices, highlighting the need for further investigation into using amphibians in traditional healing.

Interestingly, despite widespread knowledge of herbal medicine, only about one-fifth of individuals actively utilize it, according to the findings of this study. The Indonesia National Agency of Drug and Food Control (*Badan*

*Pengawas Obat dan Makanan*) (BPOM 2023) defines traditional medicine as a medicinal ingredient or concoction derived from plant or animal materials or a mixture of both, which has been used for treatment following societal norms. This underscores that using animal-derived ingredients in medicine has a long-standing history within the community. However, public knowledge about medicinal practices involving animal ingredients remains low, indicating that awareness is still sporadic. Consequently, there is a need for more comprehensive dissemination of traditional medicine information to the community.

Husain and Wahidah (2019) note that healing can occur through both medical (doctor-assisted) and non-medical (traditional) treatments, allowing individuals to choose their preferred healing method. Herbal plant materials are commonly used in these traditional practices (Kumontoy, Deeng, and Mulianti 2023). Health is an adaptive response to various physical, mental, emotional, and social conditions influenced by internal and external stimuli, which helps maintain stability in life's pleasures. Belief in herbal medicine persists due to deeply rooted cultural practices involving herbal and animal materials (Davis et al. 2018; Stebbins 1995; Zayadi et al. 2016; Zayadi and Hafizallah 2023). Many animals, including amphibians, play a role in health and healing. Furthermore, local wisdom is seen as knowledge passed down through generations, originating from ancestors whose teachings continue to resonate within the community (Adah 2024).

Prastikawati (2020) noted that medicines derived from animals, including amphibians, are consumed by humans for medicinal purposes. Husain and Wahidah (2019) identified 30 species of animals used in traditional medicine,

with amphibians among them. However, public awareness of the use of amphibians for health and treatment remains limited. This knowledge passed down through generations, has become embedded in cultural practices, serving as an alternative approach to managing disease. According to Utami and Ana (2016), indigenous knowledge refers to local or original knowledge specific to a community, shaped by its unique culture. It arises from the experiences of the local population, evolving into traditions that reflect the community's identity. Over time, this knowledge becomes ingrained in the community and is transmitted across generations, forming the foundation of their way of life. Surbakti and Leonak (2020) emphasized the significance of Indigenous knowledge, noting that it often serves as a vital source of livelihood for indigenous communities in specific geographic areas.

Over time, there has been a shift in the transmission of local knowledge due to the increasing openness of information. This openness can lead to the erosion of traditional knowledge, preventing it from being passed down and utilized by future generations (Wiyono and Ramadhan 2021). In response to these challenges, efforts are needed to preserve and document this knowledge. Preservation or conservation aims to safeguard local wisdom, ensuring its continuity and maintaining the diversity of community knowledge (Isnan and Rohmiyati 2015). As a result, local wisdom is increasingly recognized as a valuable asset in sustainability science. Indigenous and local community knowledge is crucial for understanding socio-ecological systems, particularly in coastal areas, and addressing global challenges (Loch and Riechers 2021).

The novelty of this research is that it introduces the theme of treating and healing

diseases using amphibians as local animal wealth. It specifically examines the knowledge of local communities residing in Bukit Barisan Selatan National Park Lampung Province. The study aims to analyze the community's local knowledge system related to health and healing practices and identify the types of amphibians utilized. The research was conducted at Bukit Barisan Selatan National Park in Lampung Province, Indonesia.

This research aims to explore Amphibian Conservation as Local Knowledge on Health and Healing within the buffer zone of Bukit Barisan Selatan National Park, South Sumatra Province, Indonesia. It posits that the community has a locally based knowledge system regarding health and healing practices involving amphibians in the buffer zone.

The study seeks to address the following questions: 1) What local knowledge exists about animals in the buffer zone? 2) What does the community consume amphibians for? 3) How does local knowledge impact efforts for amphibian conservation?

This research uses qualitative method. According to Sugiyono (2015) qualitative research examines the natural conditions of objects, with researchers acting as critical observers. Informants were selected intentionally based on representativeness principles. Data was collected through in-depth interviews, questionnaires, and recording tools. Key informants were chosen based on their knowledge of the use of amphibians in traditional medicine. The interviews followed a guide as suggested by Widodo et al. (2018). As noted by Yunus, Sanjaya, and Jatmiko (2013) interviews are a research technique that involves dialogue, either directly (face-to-face) or through specific media channels, between the

interviewer and interviewee. This method was used to gather in-depth information about the issues being researched.

Conducted over three months, from April to June 2023, this research employs qualitative and case study approaches, with primary data sourced from eight informants which come from four different villages, Margomulyo and Sukaraja as the representatives of village near by buffer zone, and Sedayu and Tugu Papak as the representatives of village relatively away from buffer zone. The list of the informants is Table 1.

### Local Knowledge about Amphibian Animals in the Buffer Zone

Based on the interview results, knowledge of amphibians varies among residents depending on their proximity to the Bukit Barisan Selatan National Park. In Margomulyo village, located within a 500-meter buffer zone, 30% of residents are aware of the various amphibian species in the area. Similarly, 30% of people in Sukaraja (600 meters away) possess this knowledge, while awareness drops to 20% in

Sedayu (2 kilometers) and Tugu Papak (3–5 kilometers). The residents of Margomulyo and Sukaraja are more actively engaged in gardening and farming around the buffer zone, unlike those in Sedayu and Tugu Papak, who primarily rely on farming for their daily needs.

An informant from Margomulyo Village states:

“Frog is a usual animal in these surroundings. I see frogs almost every day; I see various kinds of frog, both the color, size, and the form. I can find frog not only in the fields but also in my yard.” (M1, Interview, May 1, 2023).

Additional explanation of the informant from from Margomulyo:

Yes, I am no stranger to frogs because even though I don't work in the fields, around my house it is easy to find frogs of various kinds. Especially if it's the rainy season. we easily find frogs around our house (M2, interview, May 3, 2023).

In contrast, an informant from Tugu Papak Village remarked:

“There are frogs here, but I only see the small brown ones. I think frog is same.” (TP1 Interview, June 1st, 2023).

Tabel 1  
List of Informants

| No. | Informant Initial | Gender | Village    |
|-----|-------------------|--------|------------|
| 1   | M1                | M      | Margomulyo |
| 2   | M2                | F      |            |
| 3   | SU1               | M      | Sukaraja   |
| 4   | SU2               | M      |            |
| 5   | SE1               | M      | Sedayu     |
| 6   | SE2               | F      |            |
| 7   | TP1               | M      | Tugu Papak |
| 8   | TP2               | F      |            |

Source: Primary data

This statement is confirmed by an informant from Sedayu:

“In this area we rarely see various kinds of frogs. As far as we know, frogs are like that. We also don't pay much attention to the size because we think it's the same.” (Se2, interview, June 2, 2023).

These statements indicate that communities closer to the National Park, like Margomulyo, are more aware and have a wider knowledge about amphibians than those in Sedayu and Tugu Papak. The proximity to the National Park fosters frequent interactions with amphibians, mainly as residents engage in gardening and soil cultivation.

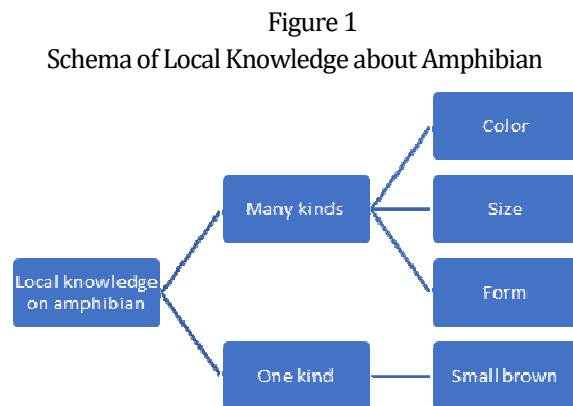
This closer interaction rightly correlates with the community's knowledge and usage of amphibians for treatment and healing. As one informant from Sukaraja Village noted,

'Nowadays, I know that some local people consume frogs for medicine and health, but daily consumption is rare.' (Su2, Interview, April 1, 2023).

Amphibians play a significant role in traditional medicine. This is related to the closeness to the knowledge system of the local community to their surroundings (Husain and

Wahidah 2019) included the frog. The buffer zone areas surrounding the National Park support and protect forest ecosystems. The local community's understanding of the animals inhabiting these buffer zones reflects their ability to observe, care for, and utilize these species sustainably while adhering to ecosystem sustainability principles. Local knowledge related to the rich treasures of living creatures in the buffer zone is an important asset in environmental conservation efforts in the region.

Based on Figure 1, it appears that the knowledge system of community members around the buffer zone of Bukit Barisan Selatan National Park is divided into two groups, namely those who have a wealth of knowledge about amphibians and those who have limited knowledge. This wealth of knowledge is related to proximity to the buffer zone and their work. The proximity to the buffer zone and their work as farmers who are close to agricultural land conditions allow them to develop more detailed knowledge of the surrounding natural conditions, including knowledge about amphibians.



Source: Primary data

This is different from communities that live further from the buffer zone. As stated by Spradley (2016) the knowledge system is an aspect that is formed by the surrounding living conditions and knowledge that is given hereditarily.

### **The use of amphibians by the community members**

The interview results revealed that 60% of the people living in the buffer zone utilize amphibians as traditional medicine to treat itching. One informant from Sukaraja Village noted:

“The big green frog is usually consumed by community members here; it tastes soft like chicken when made into soup and many community members like it.” (SU1, interview, April 1, 2023).

This indicates that some community members consume frog meat as a side dish, particularly in soup. Approximately 50% of respondents agree that frog meat has a soft texture similar to chicken. The types of frogs commonly used belong to the *Fejervarya* and *Limnonectes* families and are called green frogs.

Furthermore, 40% of community members believe eating amphibian meat can alleviate itching and promote overall health. Additionally, around 60% of residents in the Bukit Barisan Selatan buffer zone regard amphibian meat as a potent medicine for men. The perceived benefits of these animals align with the conservation efforts of Bukit Barisan Selatan National Park, ensuring that traditional practices remain within sustainable limits.

While many in the community believe that amphibians can cure itching, there is also a significant perspective rooted in Islamic teachings that prohibits the consumption of

creatures living in two habitats. This viewpoint was expressed by 32.75% of respondents from the buffer zone community.

One informant from Sedayu Village stated:

“Some of our community members say that frogs are forbidden according to our religion (Islam), so people here do not consume frogs as daily food, only as medicine in emergencies.” (SE1, interview, June 1, 2023).

This statement is strengthened by the other informant from Tugu Papak:

“Generally, members of our community do not consume frogs for religious reasons. However, if the reason is for treatment we find some people consuming frogs. That’s because there is no other medicine that can cure it. So the reason is an emergency.” (TP1, interview, June 2, 2023).

This aligns with Wahyuni et al.’s (2019) discussion on hadith regarding the prohibition of amphibians for Muslims. Although certain hadiths indicate no explicit prohibition on eating amphibian meat, the belief that animals inhabiting land and water are forbidden persists. This perspective outweighs the opinions of those who use amphibian meat for medicinal purposes, contributing to the conservation of the amphibian population in the buffer zone. Thus, religious views are a significant factor in maintaining amphibians in the area.

The utilization of amphibians as an itch remedy and a male enhancement drug is primarily adopted by individuals who firmly believe in their efficacy. In contrast, those who hesitate due to religious beliefs—particularly among the Muslim community—often refrain from using amphibians for medicinal purposes. Despite the traditional knowledge of amphibians’ effectiveness passed down through generations, the religious perspective dis-



courages their consumption for treating ailments like itching and male enhancement. This hesitance contributes to the sustainability of amphibian populations around Bukit Barisan Selatan National Park, keeping their numbers stable. In other words, religious perspectives are crucial in preserving habitats and maintaining the environment inside and outside the National Park, which is essential to conservation efforts' goals.

Based on the above data it can be figurized in a simple schema on the use of amphibian in the area of South Bukit Barisan National Park buffer zone as Figure 2.

Based on Figure 2, it is clear that the use of amphibians in the buffer zone area of Bukit Barisan Selatan National Park is to fulfill two needs, namely for daily consumption and for health care and treatment. Even though there are differences in the basis for the use of amphibians in life, namely based on religious values, both groups, whether they believe that consumption of amphibians is prohibited or that it is permitted, both groups use amphibians for medicine. This shows the importance of amphibians in the lives of community members

around the buffer zone of Bukit Barisan Selatan National Park.

**The impact of local knowledge on the effort of amphibian conservation**

This research indicates that local knowledge directly impacts amphibian conservation by increasing community awareness of environmental damage, particularly by avoiding chemical fertilizers in farming that could pollute amphibian habitats.

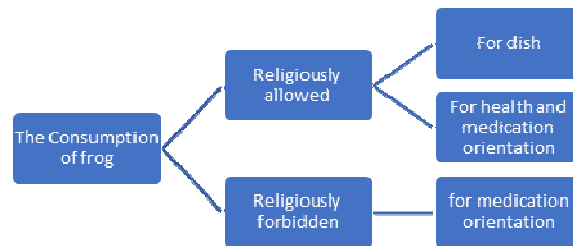
An informant from Tugu Papak shared:

“I have been farming here for decades. I also feel the benefits of this forest. I want this forest to be maintained, including frogs and other animals, so my children and grandchildren can enjoy it too. In my fields, I don't use chemicals to keep it natural and protect the forest.” (TP2, interview, June 1, 2023).

An informan from Sedayu says:

“Even though we don't know the details about frogs because we rarely see them, we know the benefits of frogs, both for consumption and for treatment. Therefore, the life of frogs must be protected because of their benefits for humans.” (SE1, interview, June 2, 2023).

Figure 2  
The Use of Amphibian among Local Community Members



Source: Primary data

This sentiment reflects the community's understanding of amphibians' ecological role and benefits as they strive to use these resources sustainably across generations. The emerging awareness is related to protecting nature in agricultural practices and with disseminating knowledge about conservation to the next generation. Meanwhile, another informant from Sukaraja Village stated:

"We use frogs as medicine because it is a hereditary recipe taught by our parents and has proven effective. Plus, it's affordable; we look for them in the forest, which doesn't cost much." (SU2, interview, April 1, 2024).

Based on the Figure 3, it appears that local knowledge systems are the source of conservation efforts. The local knowledge system itself is knowledge that is also strengthened by a belief system. This knowledge system influences the perspective of community members regarding something, including amphibians. Knowledge and awareness of the benefits of amphibians as well as knowledge about the importance of protecting the environment and the animals that live in it strengthen conservation efforts (Spradley 2016; Zayadi et al. 2016).

This belief system indicates that the community's view of amphibians passed down

through generations has become ingrained in their culture, exemplifying local wisdom as defined by Zayadi et al. (2016). Consequently, 85% of the community resorts to amphibians for treating itchy conditions, with 90% believing that consuming amphibians can enhance health and stamina, especially for men.

This perspective has persisted through generations, with the medicinal use of amphibian meat firmly believed by those living in the buffer zone around the National Park. This knowledge is passed down to younger generations, who initially turn to traditional remedies derived from amphibians for treating itchy diseases despite living in an era dominated by modern medicine. Surbakti and Leonak (2020), Surbakti et al. (2024), Utami and Ana (2016) have ideas related to the existence of local knowledge systems that utilize the richness of local habitats, for example amphibians, which according to them this knowledge has grown from generation to generation, and has been verified based on experience. Therefore, knowledge is very powerful. If these traditional methods do not yield results, they seek modern medical treatments from doctors.

Figure 3  
The Relationship between Knowledge Systems and Conservation Efforts



Source: Primary data

The community's belief in the benefits of amphibians has become a cultural norm passed down through generations. When someone suffers from an itchy disease, the common practice is to seek treatment using amphibians. Additionally, the community holds a long-standing belief in the use of amphibians as a male enhancement drug, which has also been transmitted across generations. In cases where a married couple struggles to conceive, it is often suggested that they consume amphibians as a remedy for fertility issues. This belief is deeply ingrained in the community's views within the buffer zone area.

## Conclusion

This research surprisingly found that local knowledge systems about the environment and the creatures that live in it are shaped by the conditions in which the community lives, including the knowledge system about amphibians. Knowledge systems are also strengthened by certain belief systems, for example religion. The important thing found in this research is that even though community members have different religious views, they share the view that amphibians can be used for medicine. This finding is interesting because local knowledge systems and religion orient the use of amphibians in the context of this research.

However, this study has limitations, i.e., its narrow focus on the local knowledge of communities within the buffer zone of Bukit Barisan Selatan National Park and the brief research duration, which restricted the depth of exploration into amphibian-based treatments. A more extended research period could provide more comprehensive insights.

Future research should explore other villages within the buffer zone not included in this study and investigate the significance of preserving amphibians while promoting their sustainable use. Additionally, examining the halal status of amphibians in medicinal applications would be valuable to ensure alignment with religious guidelines and support ecological sustainability.[]

## Acknowledgments

Sincere thanks are extended to the individuals who assisted in this research: Ismanto for granting permission to enter the Bukit Barisan Selatan National Park (TNBBS), Arief Darmawan for his support from the frog team at TNBBS, and Latifah Khairunnisa for her assistance in facilitating the frog team's consumption.

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