Features and Challenges of Capisaan Cave System for the Development of Tourist Infographic Guide

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ABSTRACT

This study titled "Features and Challenges of Capisaan Cave System for the Development of Tourist Infographic Guide" aimed to explore the unique characteristics and challenges of the Capisaan Cave System to create an informative infographic guide for tourists. This study used a descriptive research design, and the research location was Barangay Capisaan in Nueva Vizcaya. The research design entailed the identification of a representative sample of informants, which included 10 DOT Accredited cave guides, 10 recent tourists, 1 tourism officer, and 1 barangay captain, using a self-constructed interview guide to get in-depth information. The findings showed that the huge length of the cave, various entrances, and stunning underground formations drew geologists and tourists, with informants citing that there was a need for ample funding to preserve the site. Specifically, the research affirmed that the existing safety precautions were not adequate, with informants noting that additional safety equipment and communication systems were needed. The research concluded that the Capisaan Cave System needed more funding and assistance from government agencies to develop infrastructure and safety equipment. It also indicated that there was a need for continuous training of tour guides to improve their emergency response. Recommendations were given to give more funds for maintenance and development, hold training seminars for guides, invest in safety equipment, and impose stricter regulations to preserve the natural beauty of the cave.

Keywords: community-based tourism, cultural heritage tourism, ecotourism, environmental stewardship, Geotourism, Quality Education, Decent Work and Economic Growth, Responsible Consumption and Production, Climate Action, Life on Land, Sustainable Development.

INTRODUCTION

Modern tourism which is intimately related to development continues to include an increasing number of new places. With this, tourism has been transformed into a vital driver of socioeconomic advancement (UNWTO, 2019). In one of their research, the United Nations (2023) found that tourism is one of the world's fastest expanding businesses, providing a significant source of foreign cash and jobs while also being strongly tied to the social, economic, and environmental well-being of many countries, particularly developing countries. Tourism provides excellent potential for emerging economies and developing countries. It generates jobs, enhances the local economy, contributes to the development of local infrastructure, and can assist to preserve the natural environment, cultural assets, and traditions, as well as lessen poverty and inequality.

However, tourism also places significant strain on local land use, potentially leading to soil erosion, increased pollution, natural habitat loss, and greater pressure on endangered species.

One example is effect of tourism on caves. While many just see caves as holes in the ground, they are actually vital for bats. The study by Maulany et al. (2023), presents an examination of community

perceptions regarding a cave, bats, and conservation efforts. It aims to formulate strategies by evaluating the potential of the cave and bat species as an ecotourism destination based on local perceptions, and to offer recommendations to the local government for supporting both ecotourism and conservation in the area.

In relation to this, this study aimed to explore the features and challenges of the areas for improvement for Capisaan caves. Doing so, it can contribute to the conservation of natural treasures and enhancement of visitor experience. As a group working on something that has an impact on preservation, the researchers were ready to explore and find out more about the features and challenges in Capisaan cave and to assess what can be done and contributed to the development of this area.

The Capisaan Cave System (CCS) is known for its remarkable features and notable challenges, making it an interesting subject for study. The cave system has formations such as stalactites, stalagmites, and flowstones, which attract tourists and researchers. Its diverse ecosystem supports many species of plants and animals, contributing to its ecological importance. However, the cave system also presents challenges, including safety concerns due to its complicated passages such as very low ceiling and potential hazards, limited accessibility, and the need for conservation efforts to protect its fragile environment. As Aly et al. (2023) stated, tourism activities pose possible damage in caves. Moreover, this problem has not been evaluated in Indonesia; therefore, stakeholders must carry out evaluation and good management to prevent something that can cause harm to the natural beauty of cave.

Conducting a study on the features and challenges of the Capisaan Cave System is important for several reasons. Firstly, it allows for a better understanding of the cave's geological, biological, and cultural aspects, which can inform conservation and management strategies. Secondly, addressing the challenges faced within the cave system, such as safety and accessibility issues, is important for ensuring responsible tourism and preserving the cave's natural beauty.

Also, studying the Capisaan Cave System provides opportunities for community engagement and economic development, as local involvement in tourism initiatives can generate revenue and promote sustainable livelihoods. In Ulaankhuu et al.'s study (2021) on Khoid Tsenkher Cave, he emphasized the significance of preservation and conservation. He stated that while many tourists visit the cave, many of them are not aware of its great value, so this presents a great opportunity for the government to develop tourism. This can be done by involving the local community in the cave's conservation process to preserve its historical and cultural attractiveness.

In a similar context, conducting a study on the features and challenges of the Capisaan Cave System is important for promoting conservation, responsible tourism, and community well-being in Capisaan. With this, the study aligns with SDG 12, that is, ensuring sustainable consumption and production by advocating for practices that balance economic growth with environmental conservation. This means that tourism activities in Capisaan Cave should contribute positively to both local livelihoods and global sustainability efforts. It also aligns with SDG 8 which provides decent work and economic growth and SDG 4 which focuses on quality education and emphasizing the importance of ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, as it serves as a foundation for individual empowerment and societal progress. Furthermore, it aligns with SDG 15 or life on land as it focuses on the sustainable use, conservation, and restoration of terrestrial ecosystems and biodiversity, aiming to protect and restore life on land for future generations. This study also helps visitors to learn about the cave's unique features while being careful with the environment which aligns SDG 13 integrating climate action. It also highlights issues like safety and accessibility to keep the cave safe.

Moreover, it supports the enhancement of economic opportunities through tourism. Specifically, it supports sustainable practices that balance economic growth with protecting the cave's natural beauty. By filling gaps in knowledge, the study provides useful information for the development of a clear, engaging guide that can enhance visitors' experience and preserve the cave system.

Based on results from previous researchers, features and problems of CCS related to producing tourist graphical guides have yet to be incorporated into studies regarding the site. While some studies may have

focused on evaluating its qualities, they may not have thoroughly evaluated both its features and issues within a tourism context. Despite increased interest in visiting CCS, there is scarce data about Capisaan Cave System's unique geological, biological aspects as well as limitations that may inform infographic guide content. In this regard, our research seeks to address this gap by conducting a comprehensive evaluation of Capisaan Cave System's distinguishing features alongside associated challenges with aims at providing valuable insights for developing an informative engaging tourist infographic guide tailored specifically to CCS that previous studies may have overlooked.

This study explored distinct features along with obstacles encountered within Capisaan Cave System resulting in an easy-to-understand visual guide for tourists. Understanding unique characteristics allows us to provide a guide that attracts guests while being environmentally responsible. By solving challenges such as safety accessibility protects long-term safety of caves themselves, local communities benefit economically feeling more invested when involved throughout process too. The guide not only instructs guests but expands our understanding regarding caverns/tourism overall. Our handbook also encourages ethical travel habits demonstrating how they benefit local economy/food security.

Sustainable Tourism

Sustainable tourism can be broken down into different areas: environmental, economic, socio-cultural, science and technology, human resources, and government policy (Lee et al., 2021). It focuses on making sure that tourism is good for the environment, helps local communities and economies, protects nature, creates jobs, and respects local cultures. It also uses science and technology to improve tourism and ensures that people working in the industry are well-trained. Governments help by making fair and responsible rules. Overall, sustainable tourism aims to benefit everyone while protecting the planet.

The study by Aina and Cintamulya (2022) on Ngerong Cave in Indonesia highlights the challenge of its declining environmental sustainability. It stresses the need to balance the use of natural resources with conservation efforts. By addressing problems, involving the community, and focusing on environmental protection, the study concludes that integrating local cultural values can influence a cave's ecological health. Caves should showcase their unique features while educating tourists about local culture and preserving the environment.

Sustainable Tourism Europe

According to the study of Santos and Agosto (2013), cave tourism began to grow in Europe during the 18th century, with many caves becoming popular tourist spots, attracting large numbers of visitors every year. As these caves gained attention, tourism organizations were created to manage them, and today, several of these caves continue to draw hundreds of thousands of visitors annually.

It is possible to open caves to tourists while still preserving their natural beauty and scientific value, but this requires following strict rules throughout the entire development process. These rules help ensure the caves' delicate features are protected for the future. Sustainable management practices are key to keeping the caves in good condition and preventing damage caused by tourism.

In addition, tourist caves play an important role in educating local communities. By involving them in the management and care of these caves, they become more aware of the caves' importance and contribute to their protection.

Caves that are open to the public also encourage more scientific studies, leading to greater appreciation of their geological and environmental value. In Europe, sustainable cave tourism focuses on balancing the enjoyment of visitors with the protection of the caves. Their goal is to provide a positive experience for tourists while ensuring the caves' natural beauty and scientific significance are preserved for future generations.

Sustainable Tourism in the Philippines

In the Philippines, over 3,000 caves have been recorded, and many more are expected to be discovered and

mapped. These caves are important because they are unique, natural, and non-renewable resources with scientific, economic, educational, cultural, historical, and aesthetic significance (NEDA 2011). However, despite this understanding, the protection and care of cave resources remain weak. Caves face threats from development, population growth, lack of environmental protection, and external factors like climate change (NEDA 2011).

The Philippines is also focusing on developing and promoting eco-friendly travel spots. These destinations are expected to offer both adventure and opportunities for local communities to connect with nature and wildlife.

Tourism plays a big part in the country's growing economy, which was further boosted when Puerto Princesa Subterranean River National Park (PPSRNP) became one of the New Seven Wonders of Nature in 2012 (Rosero, 2012). This recognition led to an increase in both local and international visitors. Environmental experts also took notice and shared ideas to promote sustainable tourism (Asael, 2023). Many local governments in the Philippines are now considering sustainable tourism as part of their plans to boost their economies (Manalo, 2017). This means ensuring that tourism, such as visiting beaches or forests, does not harm the environment but instead helps protect it. Rather than building large hotels that may damage the land, they are opting for smaller, eco-friendly resorts that use less energy and produce less waste. By doing this, local governments aim to attract tourists while preserving their environment for the future.

One of the most famous caves in the Philippines is Callao Cave, which is the top tourist attraction in Cagayan Province. It is located in Barangays Magdalo and Quibal in the town of Peñablanca, about 30 minutes from Tuguegarao. Callao Cave is one of more than 300 caves in the Peñablanca Protected Landscape and Seascape area (Lakwatsero, 2017).

Hinagdanan Cave, found in Dauis, is another notable cave. It is a naturally lit cavern with a deep lagoon and large stalactites and stalagmites. Made of limestone, sunlight enters through holes in the ceiling, providing natural light inside the cave (Hinagdanan Cave, n.d.).

Sustainable Tourism in Nueva Vizcaya Nueva Vizcaya, a province in the Philippines, is also known for its diverse landscapes, indigenous cultures, and natural beauty. As such, one of the province's goals is preserving its unique heritage while promoting responsible tourism practices. One of these tourist destinations is Capisaan Cave System found in Kasibu.

It is a unique and ecologically fragile destination that attracts a growing number of tourists. According to the study of Addesso et al. (2022), thousands of visitors every year can create modifications in the environmental conditions, affecting (sometimes irreversibly) such confined ecosystems and compromising their integrity and conservation. Therefore, probing the human impacts in such places is necessary to safeguard the heritage sites and to properly manage their use.

In this study, the focus is on Capisaan Cave System which is a famous cave system in the province fascinating a lot of tourists because of its natural and cultural significance. However, like what happens in other places, tourist activity can adversely affect the caves because of their fragility. This occurs because of the presence of tourists in places like caves, catacombs, and mines that can disturb their natural balance, and can potentially harm and endanger preservation. In connection, our study aims to explore the features and challenges of CCS for the development of tourist infographic guide after a thorough understanding of how tourist activity affects caves.

Antić et. al. (2020) mentioned that an adequate theoretical starting point is the application of geoethical values related to the conservation and protection of the caves to be used for touristic purposes. Hence, this study emphasizes the application of geoethics for the development of sustainable speleotourism. The importance of understanding the positive and negative human behaviors towards caves or other speleotourism sites can be helpful in crafting an informative infographics guide. By integrating insights from this study such as applying geoethical values, our study can ensure that the development of infographics guide for CCS does

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not just benefit economically but also sustainably.

It is critical to raise awareness of such practices, particularly among tourism establishments. Furthermore, such practices must be put into action. Knowledge of the awareness of sustainable tourism practices and the extent to which they are applied could give the needed information for some recommended intervention programs and policy creation to improve awareness and implementation in the province of Nueva Vizcaya. Moreover, this study can assist in offering data for future studies on sustainable tourism in the province of Nueva Vizcaya, as well as raise awareness among tourist stakeholders about their roles in responsible and sustainable tourism.

Caving as a Recreation Activity

According to Wiegand's (2022) study, the difference in spatial dimensions in national cave definitions significantly affects the number of caves recorded in a country, and therefore the scope of attention. But generally, caving refers to the pastime of exploring caves. In Ireland and Great Britain, this activity is called caving, but in Canada and the United States it is called spelunking. Ayad and Hafez (2023) argues that the value of caving extends beyond the benefits for cavers themselves.

Instead, understanding the unique landscape characteristics of an area can inform careful planning for its use, ultimately fostering the landscape's growth. This approach can play a significant role in strengthening national development and increasing income sources.

According to Chiarini et al. (2022), many caves attract tourists because of beautiful formations such as the unique natural features of stalagmites, stalactites, reeds, panels and flowstones and other interesting cave walls. However, some cave are not suitable for tourists. These include caves with large bat colonies, simple cave chambers and caves that suffer from seasonal floods that pose a threat to tourism. In exhibition caves, visitors are encouraged to see the beauty of the caves through the creation of walking trails, guided tours, artificial lighting systems and regular opening hours (Cigna & Burri, 2000). These facilities are designed to increase the accessibility and safety of the cave environment, and provide educational and recreational opportunities for visitors. Constructed paths and guided tours help guide visitors into the cave, ensuring their safety and minimizing the impact on the environment.

Artificial lighting systems are used to illuminate the cave's structures and features, allowing visitors to enjoy the unique landforms and ecosystems within the cave. Mumbengegwi et al. (2023) further stated that the caves are a tourism resource and have the potential to generate income for the government and local communities. The idea today is that the caves are visited not only by local tourists but also by international people. In the context of this study, this resource and income from tourism can help the communities of Kasibo and the management team of the Capisaan cave system.

Capisaan Cave System

The Capisaan Cave System (CCS) is considered the fifth longest cave system in the Philippines with a length of 4.2 km (Cortes 2022). It is a system because it has many entrances and exits and an ecosystem to protect. The main inlets and outlets are pressure points and pressure points, so the flow is called tap to tap or tap to tap. There are other entry or exit points such as Alayan 2, Sang-at Salug (Ilocano word meaning "ascent, descent"), Gaia, Malukbo 1, Malukbo 2 and Malukbo 3. The account of Sang-at Salug is said to be half its length.

Along most of Capisaan cave, there are many rocks covered. Like other caves in Luzon such as Libtek Crystal Cave, Sibud-Sibud Cave, Aran Cave, Sagada Cave, etc., this cave also has many beautiful mineral deposits in the form of stalagmites, stalactites, reeds, clothes and fast rocks. There are also many rock formations like banana flower, veil, snake, dog, dragon and many more. The existing guide contains many information about the caves but needs improvement (Milan, 2019).

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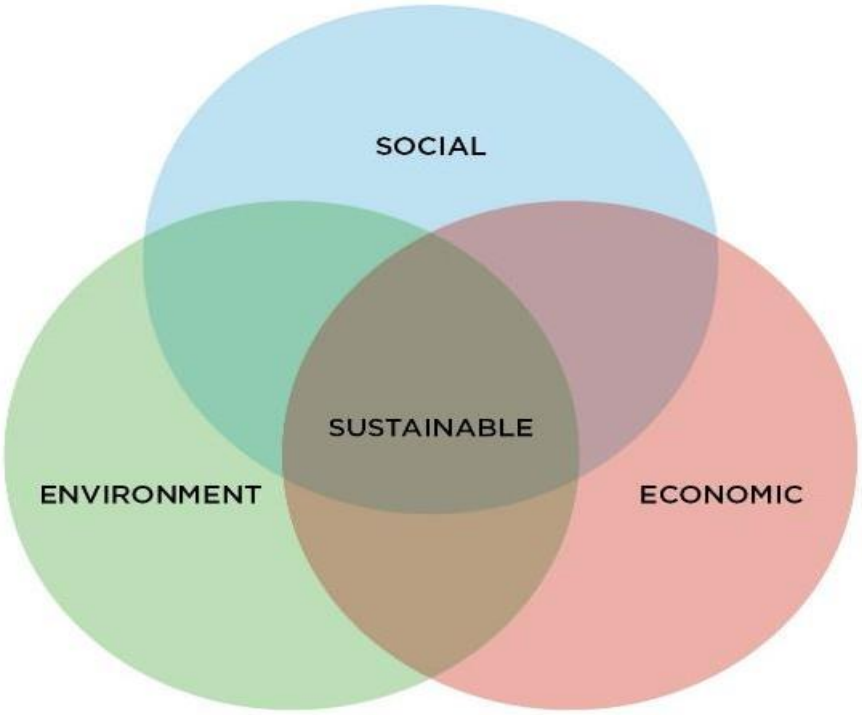
Theoretical Framework

Figure 1 Triple Bottom Line



Source: PakTech. (2019). The Pillars of Sustainability. PakTech.

John Elkington (1997) introduced the idea of the "triple bottom line" (TBL) in 1994 to encourage sustainability. This concept suggests that for development to be sustainable, we need to focus on three main goals at the same time: economic growth, environmental protection, and social fairness. Elkington emphasized that businesses and societies should not just aim for profit but also think about their impact on the environment and the people around them.

According to Slaper and Hall (2011), applying TBL can be difficult, especially when it comes to measuring the social and environmental effects of a project. They highlighted the challenge of finding the right data and understanding how a particular project or policy supports sustainability. This is mainly because social and ecological systems are complex, and there are not clear, standard ways to measure success in these areas. Nonetheless, the TBL framework helps create a balanced approach to sustainability by giving equal importance to economic, environmental, and social factors.

Conceptual Framework

In the context of caves, "features" refer to specific natural characteristics found inside, such as stalactites, stalagmites, and pools, all formed through geological processes over time. The Capisaan Cave System has many fascinating features like tunnels and chambers filled with unique formations. To ensure environmental sustainability, any activities or research conducted in the cave should avoid harming its natural state, including protecting the water quality and preserving geological formations. Waste reduction and proper disposal practices are also key to maintaining the cave's environment. All these can be achieved through an understanding of social responsibility which means engaging with the local community, listening to their concerns, and working together to make sure the study respects their culture and way of life. Economically, the study will look at how sustainable tourism could benefit the local economy while still protecting the cave's natural beauty and cultural significance.

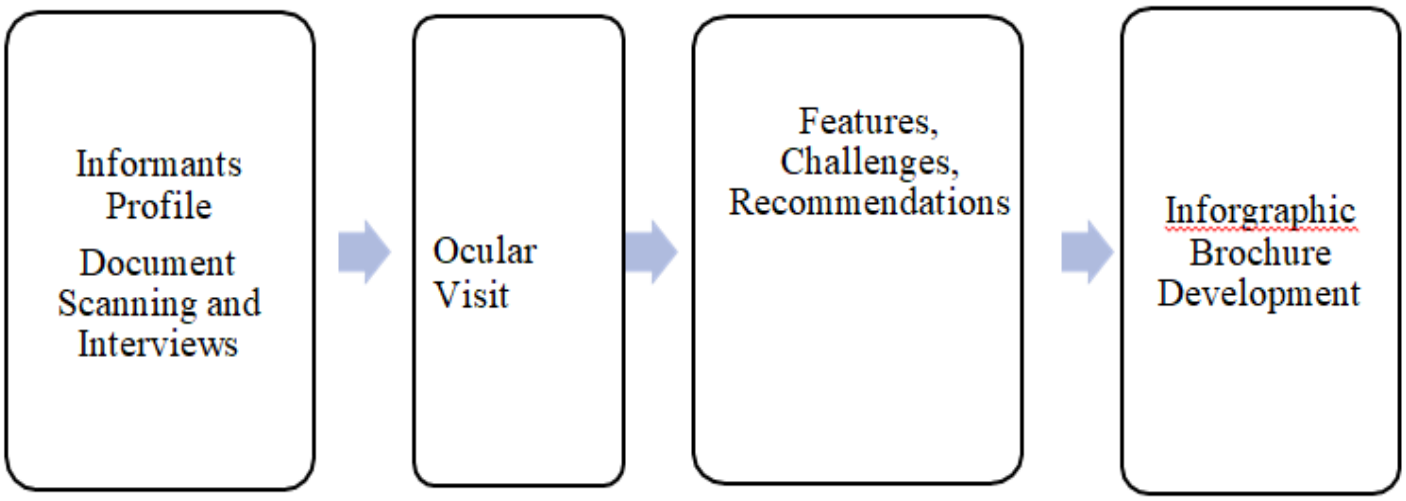
Caves and cavers are fragile. Most caving accidents happen to beginners who lack the right knowledge, equipment, or disregard basic safety rules. For this reason, organized caving groups like the National Speleological Society (NSS) limit information about cave locations to prevent inexperienced individuals

from getting into dangerous situations (Beck et al., n.d.). Also, with proper preparation and care, caving can be as safe as other outdoor activities. Proper preparation is essential to avoid accidents. Caving can be dangerous if cavers are not prepared, especially if they get lost or have an accident deep inside the cave. Although a reliable, waterproof flashlight that can be worn around the neck is highly recommended as a backup (Beck et al., n.d.), there are many challenges of caving that should concern tourists. This highlights the natural risks of caving, like getting lost, and the need for proper equipment to stay safe.

In this study, "challenges" are the obstacles and difficulties encountered during the exploration and potential development of the Capisaan Cave System as a tourist destination. "Capisaan Cave System" is the specific geological formation under study, emphasizing the unique features and characteristics of this natural phenomenon. "Exploring" is an active investigation and examination of the cave system to understand its potential and limitations for tourism development. "Features" is the distinct and remarkable aspects of the Capisaan Cave System that contribute to its appeal as a potential tourist destination. "Improvements" are the strategic actions and measures taken to enhance and optimize the identified features, addressing challenges for the sustainable development of the cave system.

"Sustainable tourism" is the importance of aligning the Capisaan Cave System's development with principles that ensure long-term benefits for the environment, local communities, and the tourism industry.

Figure 2 Research Paradigm



The research paradigm for this study begins with the inputs of the study, which encompass gathering demographic and experiential information from individuals knowledgeable about the Capisaan Cave System. This process involves conducting interviews with informants and reviewing relevant documents to gain insights into the cave's features, challenges, and recommendations for sustainable tourism development.

Following this, an ocular visit to the Capisaan Cave System was conducted, allowing researchers to engage directly with the site. During this visit, interviews were held with informants, and document scanning took place to collect additional data. This hands-on approach aimed to enhance understanding of the cave's characteristics and the challenges it faces.

The next focus was identifying the features and challenges associated with the Capisaan Cave System. This section compiled findings related to its unique geological, biological, and cultural aspects while also addressing practical issues in its management, such as safety concerns and accessibility. Based on these findings, actionable strategies for sustainable tourism development were proposed.

Finally, the study intended to develop an infographic brochure that raises awareness of the cave's unique features while addressing practical challenges in its management. This resource would provide clear information and recommendations to promote responsible tourism practices in the Capisaan Cave System, ultimately contributing to its preservation and sustainable use.

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Statement of the Objectives

The primary purpose of this study was to determine the features and challenges of the Capisaan Cave System encountered during its exploration, which was conducted in the second semester of AY 2023-2024.

Specifically, the objectives of this research are as follows:

1. What features does the Capisaan Cave System possess?
2. What challenges were encountered in exploring the Capisaan Cave System?
3. What recommendations could be drawn to address the problems encountered?
4. What materials could be crafted to assist in addressing the problems encountered?

METHODOLOGY

This chapter outlines the qualitative approach used to gather the necessary data for addressing the research problems or objectives. The research design, research locale, research informants, research instrument, data collection procedure, treatment of data, and ethical considerations are discussed in detail.

Research Design

This research utilized descriptive research design to explore and document the features and challenges of the Capisaan Cave System (CCS) for the development of tourist infographic guide. The aim of this research was to provide an in-depth data of the cave's features and potential challenges and experiences of tourists and other stakeholders to uncover insights that contribute to the creation of a comprehensive and engaging infographic guide for potential tourists.

To collect data, the researchers used descriptive method for gathering information by conducting on site observation of the Capisaan Cave System (CCS) wherein the researchers visited Capisaan Cave to observe its physical feature, and to experience the cave firsthand. The researchers also conducted interviews with the tourist and local tour guides and other stakeholders to obtain their firsthand experiences and thoughts about the Capisaan Cave System to identify key information for developing a comprehensive and engaging tourist infographic.

According to (Creswell, 2014), qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds visible, clear picture, analyzes words, reports detailed views of information, and conducts the study in a natural setting. This study utilized qualitative method since the focus of this study was to uncover the features and potential challenges of (CCS) Capisaan Cave System which is a natural setting enabling the researchers to directly observe and allow them to gather data and information through an interview with people who had firsthand experience with the cave. This approach aimed to capture the qualitative data needed to create a valuable and informative infographic guide for tourists.

Research Locale

Barangay Capisaan is a rural village located in the southeastern part of Kasibu, a municipality in Nueva Vizcaya province, within Region 2 (Cagayan Valley) of the Philippines. Kasibu is composed of 30 barangays, with Capisaan being one of the communities that plays a significant role in the local culture and natural resource management.

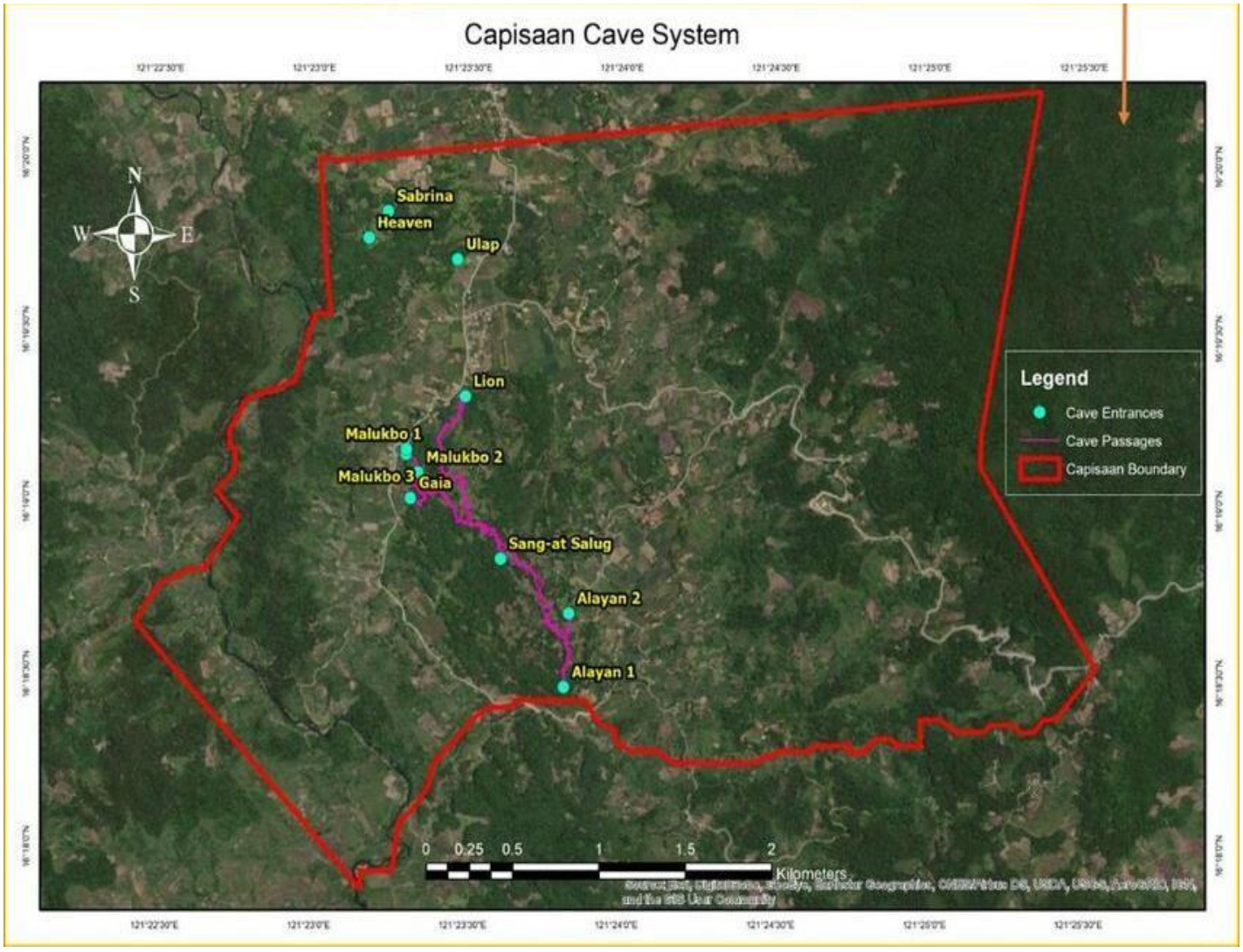
The Capisaan Cave System (CCS), located within Barangay Capisaan, is considered the fifth longest cave system in the Philippines, stretching approximately 4.2 kilometers in length (Cortes, 2022). The cave has

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

nine known entrance and exit points. Most of the natural vegetation of the cave is confined to the sharp walls of the cave openings, whereas the adjacent vegetation has been replaced by cultivated plants. The entrances of Lion, Alayan, Sang-at Salug, and Malukbo caves are interconnected into a single cave system. While the cave has an active subterranean river to support life, it is also prone to flooding and threats from various human activities. According to Caranza (2022), agricultural development around the cave system, particularly tropical betel farming, must be controlled or it will continue to worsen and cause permanent damage to the cave and threaten its diverse animal and plant wildlife. He added that significant disturbance in areas where tourism is allowed is evident, with damage to rock formations and harm to some parts inside the cave. Worse, with garbage found inside the cave, he recommended proper solid waste management.

In 2012, the DENR assessed and classified three systems of this cave system. Segments A and B were classified as Class I, and Segment C as Class II (DENR-BMB, 2020). However, this cave system is threatened by human activities such as the collecting of speleothems, extraction or breaking and touching of formations, surface deforestation, and cultivation that may destroy the cave's geological formations. The provincial government has also instituted measures and programs to address the growing issues of land use changes and land cover conversions atop the cave system, particularly the clearing of forests to expose limestone outcrops for Piper betel plantations, threatening the integrity of the cave. Measures instituted include the hiring of three cave guards, training cave guides, and the development of ecotourism infrastructures. These measures are being funded by the provincial government.Despite these programs, there are still many human activities that pose a threat to the sustainability of the cave.

Figure 3 Capisaan Cave System view and Map



Source: https://www.researchgate.net/figure/Map-of-Capisaan-Cave-System_fig1_371809456

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Figure 3 provides a detailed representation of the involved underground network of caves located in this picturesque region of the Philippines. This comprehensive map showcases the various chambers, tunnels, and passages that make up the Capisaan Cave system. It serves as a helpful resource for spelunkers, scientists, and adventure seekers, offering a glimpse into the mesmerizing surface that lies beneath the surface of Kasibu.

Research Informants

Capisaan is a barangay in the municipality of Kasibu, located in the province of Nueva Vizcaya. According to the 2020 Census, its population was recorded at 1,319, representing 3.16% of the total population of Kasibu. In this research, a thoughtful selection process was employed through the implementation of inclusion/exclusion criteria to ensure the relevance and diversity of perspectives.

The target population for this research consisted of 20-30 informants, that included 10-15 DOT accredited cave guides, 10-15 visitors who had explored the cave within the last six months, one tourism officer, and one barangay captain. The 10-15 DOT accredited cave guides were selected for their expertise and insights into the cave system and tourism experience. The following table provides an organized overview of the different participant groups involved in the research along with their corresponding sample sizes.

Table 1 Participants in the Study

Participant group	**Sample size**	**Percentage %**
DOT Accredited Cave Guides	10	45. 5 %
Visitors	10	45.5 %
Tourism Officers	1	4.45%
Barangay Captain	1	4.45 %
TOTAL (Target Population)	22	100 %

The study involved a voluntary exclusion of other individuals such as administrative staff, maintenance personnel, and other support staff working in Capisaan Cave. Thus, purposive and quota sampling were employed to select the informants. The researchers engaged three distinct categories of research informants: cave guides who offered guided tours to visitors, administrators responsible for overseeing the cave's management, and visitors who provided diverse perspectives on the tourism experience. This purposive and quota sampling approach aimed to present a comprehensive and well-rounded analysis of the dynamics surrounding the cave tourism industry.

Research Instrument

The research instrument that was used in this qualitative study was an interview guide is self-made and is designed to gather in-depth information from informants who have knowledge or experience related to the features and challenges of Capisaan Cave System (CCS) as a tourist destination.

It includes questions that cover various aspects of sustainability, including environmental environmentally sustainable, socially acceptable, economically profitable. By conducting interviews with informants, researchers gained insights into the complex features and challenges surrounding in Capisaan Cave System and identify potential strategies for enhancing sustainable tourism practices in the area.

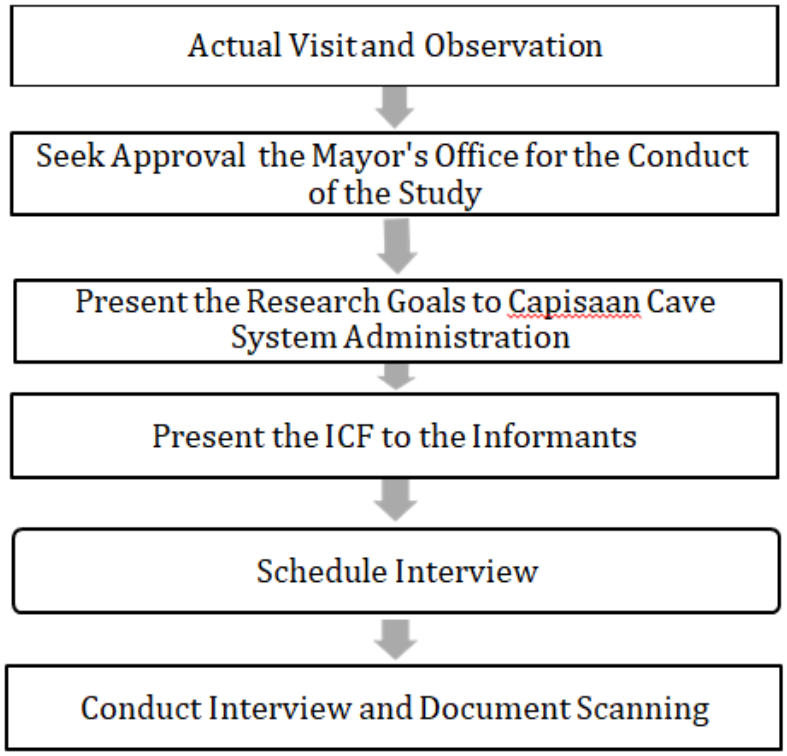
The research instrument is divided into four distinct parts (See Appendix B).

This division allows for a thematic approach to data collection and analysis. Part One focuses on exploring the unique or rare formations within the Capisaan Cave System (CCS) that attract tourists and solicits opinions on which features, or geological formations stand out the most. Part Two analyzes safety concerns encountered during exploration of the cave system and assesses the perceived safety and security for tourists. Part Three looks for recommendations for addressing any identified problems or challenges experienced during exploration. Part Four requests for suggestions to assist in addressing the problems encountered within the Capisaan Cave System.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Data Gathering Procedure

Figure 4 Data Gathering Flowchart



The researchers visited Capisaan Cave for the scheduled ocular visit on September 13, 2023. During the visit, researchers conducted observations of the surrounding area and facilities to gather additional information. Researchers also obtain official approval from the mayor's office to conduct the study, ensuring compliance with local regulations. They then discussed and shared the research details with the administrative body overseeing the Capisaan Cave System for collaboration and input. The researchers assured that they would prioritize their privacy and security concerns during this process. Once the researchers had obtained permission, the researchers presented to them the Informed Consent Form (ICF) prepared. The form serves as a tool for collecting relevant data on the sustainable practices in the cave. With their approval, the researchers proceeded with the interview, where the researchers posed questions to gain a deeper understanding of the informants' efforts towards sustainability. The researchers clearly explained the study's purpose to potential informants, to obtain informed consent from informants explaining the purpose of data collection and how their information would be use while ensuring their participation is voluntary. If the informants agreed to participate, the researchers requested their consent to record some information.

Throughout the session, it was imperative to maintain respectful and professional conduct while adhering to any privacy and security guidelines they may have. They collected data without identifying individual informants whenever possible. Researchers distributed and collected the interview questionnaires to gather targeted information from the selected informants. Researchers then reviewed and transcribed recorded information to determine if additional insights or feedbac from informants after the sessions would be needed. Finally, researchers analyze the qualitative data using thematic analysis.

Treatment of Data

In this study, descriptive analysis was employed as a method for analyzing the data collected from participant interviews. This approach allowed for a clear description of the experiences, behaviors, and perspectives shared by participants, focusing on providing an accurate account of the data. By concentrating on the descriptions of the participants' responses, the aim was to identify patterns and categories that emerged without heavily interpreting or theorizing beyond the data itself.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

To gather descriptive data, semi-structured interviews were conducted with participants. This format provided participants with the flexibility to elaborate on their experiences while also guiding the conversation with specific prompts and questions. The goal was to capture participants' perspectives as naturally as possible highlighting the key elements of their experiences.

Once the interviews were completed, the next step involved transcribing the recorded conversations. The transcription process focused on accurately documenting the words spoken by the participants, ensuring that all relevant details were captured for analysis. This included recording pauses, filler words, and emotional expressions, which were significant in understanding the context and depth of the narratives shared.

Ethical Considerations

The study was submitted for ethics review to the Saint Mary's University Research Ethics Board (SMUREB), located at 2nd Floor, Rev. John Van Bauwel Hall, SMU Main Campus, Ponce Street, Don Mariano Marcos, Bayombong, 3700 Nueva Vizcaya, Philippines (email: reb@smu.edu.ph; cellphone: 09177053041). The type of review conducted on the paper and a reference to the certification provided by UREB will be included in the appendices.

In this research, it was declared that there was no conflict of interest that could compromise the integrity, objectivity, or impartiality of the study. There were no financial or personal interests from the research team that might affect the findings or recommendations regarding the features and challenges of the Capisaan Cave System in Kasibu. The primary goal was to create an informative infographic guide on the Capisaan Cave System, enhance safety and accessibility, promote responsible tourism, and contribute to broader knowledge on sustainable tourism practices.

To obtain informed consent from informants, the purpose of data collection was explained, detailing how their information would be used while ensuring that participation was voluntary. Data collection aimed to avoid identifying individual informants whenever possible. Collected data were stored on secure, password- protected systems with restricted access granted only to authorized personnel. Data encryption during transmission and storage was implemented to protect against unauthorized access. A clear data retention policy was defined, keeping data only as long as necessary for research purposes. Once the retention period ended, data would be securely disposed of using methods such as shredding or overwriting.

The informants for this study included the management of the Capisaan Cave System, who were considered reliable sources due to their knowledge and responsibility regarding the current condition of the cave, particularly active tour guides in their 20s and 30s. A deliberate exclusion of other individuals such as administrative staff, maintenance personnel, and other support staff working in Capisaan Cave was made. The study was conducted in a timely and appropriate manner that suited the informants' convenience. Those who agreed to participate provided all requested information, indicating that they were not at risk by participating in the study since data were handled appropriately and securely. All copies and documents held by researchers would be destroyed after the study was completed and published in hard copy. The confidentiality and security of data were assured to informants by researchers. Informants' information was treated with confidentiality, accessible only to researchers. Data were stored in a separate folder on researchers' laptops, cellphones, and flash drives and would not be shared with anyone else. Codes were substituted for names to secure informants' identities and personal data. To protect confidentiality further, documents would be shredded, and recordings deleted from devices after use.

During interviews, one potential risk that arose was discomfort among informants when answering specific questions. To mitigate this risk, researchers ensured that informants were informed about the purpose and procedures of the study and briefed them about the questions before beginning interviews. Researchers also offered informants the option to skip or modify questions they found uncomfortable. After interviews, assurance was given that confidentiality would be maintained to help reassure informants that their responses would be handled carefully and would directly benefit them since this study aimed to contribute to the development of Capisaan Cave. Informants contributed to creating new knowledge about the challenges and strategies related to the cave system as a result of this study.

The informed consent process for informants was conducted prior to the study, allowing sufficient time for them to comprehend all details involved. Researchers guided this process by explaining the study's purpose, procedures, and potential impacts. Informants were provided with a copy of the informed consent form along with opportunities for questions and clarifications before obtaining their signatures. The entire process adhered to ethical standards, ensuring a comprehensive and respectful approach to obtaining informed consent for managing the Capisaan Cave System.

The research output is owned by Saint Mary's University; however, researchers remained acknowledged as authors. The results of this study may be disseminated within Saint Mary's University through student research fora and may also be submitted for publication in national or international journals.

RESULTS AND DISCUSSIONS

Section 1. Features of the Capisaan Cave System

Capisaan has nine known entrances, including the main entrances Lion, Alayan, and Sabrina, as well as three others in Barangay Malukbo. Capisaan Cave covers a total area of 1,515.96 hectares and is classified as a limestone cave, which is part of a karst landscape where the dissolution of bedrock creates sinkholes, sinking streams, springs, and other characteristic features. Visitors can expect unique cave interiors upon beginning their guided tour. These various cave openings teem with wildlife, including native and endemic species of plants and animals. A total of 91 plant species have been identified in the area, with 10 being endemic to the Philippines. Inside the cave, one can find spiders, insects, small crabs, snakes, frogs, lizards, as well as fish such as carp, orange carp, catfish, mudfish, and wild guppies.

Notably, the blind shrimp—a small crustacean adapted to thrive in the cave's underground rivers and pools—plays an important role in the cave's ecosystem as a food source for other species. Additionally, at least four different bat species inhabit various sections of the cave. A total of 931 birds from 61 species have been recorded in the area, with 36 being endemic and eight classified as threatened. These species serve as natural pollinators crucial for maintaining the cave's ecosystem.

One of the most captivating aspects of the Capisaan Cave System is its intricate rock formations known as speleothems. These formations are created by the slow accumulation of minerals over time and include a variety of shapes and sizes. Visitors can marvel at towering stalagmites rising from the cave floor, hanging stalactites descending from the ceiling, and delicate soda straws resembling thin hollow tubes.

Another striking feature is the presence of rare helictites—rock formations that defy gravity by growing in irregular curved patterns. Capisaan Cave is truly a spelunker's haven, showcasing a wide array of these captivating formations that attract adventurers.

The installation of a steel bridge between 2018 and 2019 has significantly enhanced the exploration experience within the Capisaan Cave System. This bridge not only provides ease for cavers by allowing them to traverse over water-filled sections safely but also preserves the natural beauty of the cave by minimizing human impact on sensitive areas. The importance of such infrastructure in caves is highlighted in other cave systems as well. For example, Sentinel Cave in Lava Beds National Monument, California, features a steel catwalk over a 15-foot chasm, improving accessibility and visitor safety within the cave's unique environment (Live and Let Hike, 2017). This enhancement has improved accessibility while preserving the natural beauty of the cave.

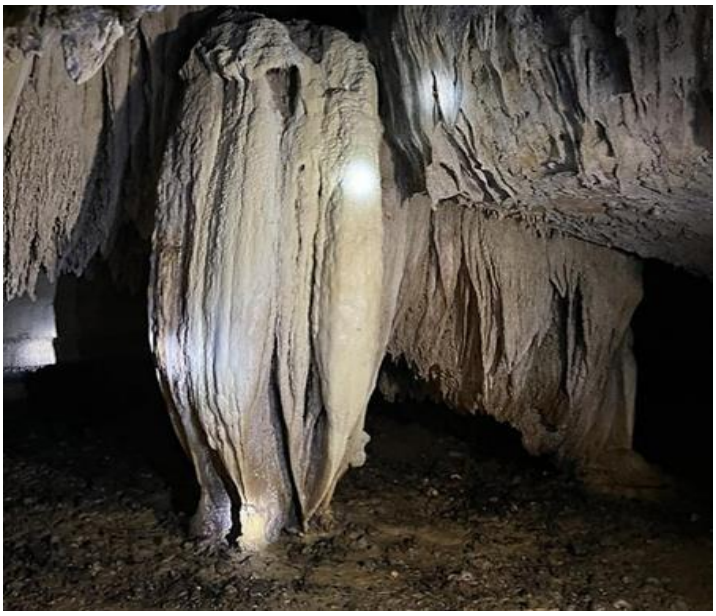
The Capisaan Cave System is recognized as the fifth-longest cave system in the Philippines at 4.2 kilometers long and is one of Nueva Vizcaya's top attractions. The system comprises eight interconnected caves; among these, the route from Alayan to Lion is easily accessible for tourists. Visitors should prepare to navigate small gaps, climb steep sections, crawl through narrow cavities, bow under low ceilings, wade through deep pools, jump over trenches, scramble on rocks, clamp onto narrow ledges, and slide down slopes to fully experience this unique environment. The trail is approximately 70% filled with water, while most areas are knee-deep and cold, some sections require swimming when water levels rise to waist or neck height.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Inside the cave are various geological formations resembling curtains, solid waterfalls, pillars, columns, islands, castles, and even human figures. One chamber features immaculate living calcite and glowing crystals that can only be described as heavenly. The darkness within the caverns necessitates flashlights or headlamps to appreciate all the beautiful rock formations.

The Capisaan Cave System surpasses many caves like Sumaguing Cave in Sagada in terms of both beauty and rarity. While both caves offer unique underground landscapes, Capisaan stands out for its diverse array of speleothems and imaginative features. According to Mayuga (2020), it is home to an extensive variety of speleothems including stalactites, stalagmites, and draperies that enhance its visual appeal and showcase its rich geological history. Overall, Capisaan Cave offers visitors a captivating glimpse into nature's wonders as a critical habitat with vast eco-tourism potential. Its unique geological features not only attract tourists but also provide opportunities for scientific exploration and appreciation of natural beauty.

Figure 5 Towering Stalagmites



Towering stalagmites rising from the cave floor, showcasing the impressive scale and beauty of the speleothems within the Capisaan Cave System.

Figure 6 Hanging Stalactites

Delicate stalactites hanging from the cave ceiling, illustrating the intricate details and shapes formed by mineral accumulation over time.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Figure 7 Geological Formations Resembling Curtains

Geological formations resembling curtains, highlighting the diverse array of speleothems.

Figure 8 Helictites

Rare helictites found in the Capisaan Cave, characterized by their irregular curved patterns that defy gravity.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Figure 9 Capisaan Cave Steel Bridge

Source: https://liveandlethike.com/2017/11/05/sentinel-cave-lava-beds-national- monument-ca/

A sturdy steel bridge within the Capisaan Cave System, providing safe passage over the underground river and enhancing accessibility for visitors while exploring the cave's remarkable geological formations.

Section 2. Challenges Encountered in Exploring the Capisaan Cave System

Cigna and Burri (2000) state that in terms of development and management of caves, "the most significant forces may be running water, persistent wind, or even the activities of animals." Moreover, the amount of energy present within caves varies significantly. In low-energy caves, which are typically small, the most significant event might be as minor as a water droplet falling. Conversely, high-energy caves are characterized by powerful natural forces like rockfalls and floods, leading to rapid changes within a year. Consequently, tourist activities are unlikely to have a long- term effect on these dynamic environments. Moderate-energy caves, however, present a different scenario. Often showcasing the most stunning speleothems, these caves are vulnerable because the energy introduced by visitors over short periods – such as touching formations or air movement – can rival the natural forces at play.

This delicate balance means that tourist activity has the potential to cause permanent damage. In this section, the possible challenges encountered in exploring the Capisaan Cave System are discussed, focused not only on the external issues but also the possible damages that might cause harm to the cave.

Insufficient Funds

Informants have noted that while there is some financial support, it is insufficient for proper maintenance of the cave. Informant 2 suggested that more funding and support are needed to preserve the cave effectively. Informant 3 also said that additional financial assistance would help address maintenance issues and enhance the visitor experience. While some informants believe there is enough funding for minimal exploration, increased support would be necessary to ensure the cave remains a safe and enjoyable attraction in Kasibu.

Accessibility

Another significant challenge is the lack of transportation. Currently, there are only two available daily trips to and fro Kasibu from Solano. One day trip from Solano to Kasibu and one night trip from Kasibu to Solano. For tourists coming from the southern part of the province, they can go to Kasibu thru modernized jeepneys from Baldovi station in Bambang.

Tour Guide Seminars

The need for more tour guide seminars has also been highlighted.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Protecting the Cave System

The Capisaan Cave System is home to unique geological formations, so it needs protection. To keep it environmentally sustainable, there are rules set for the visitors. This includes limiting how many people can visit, only allowing guided tours to reduce damage, and making sure all activities follow environmental guidelines. Efforts are made to protect nearby areas like forests that support different species. Promoting eco-friendly practices like proper waste management and protecting natural habitats can help preserve the cave's ecosystem while letting visitors enjoy its beauty. The cave can also serve as a learning place to teach tourists and locals about biodiversity and the importance of conservation.

Involvement of the Local Community

To make the Capisaan Cave System socially acceptable, it is important to involve the local community in its management. This could include hiring local guides who can share their knowledge and experiences about the caves, making the visit more enjoyable while providing income to the community. Promoting responsible tourism will also help visitors respect local cultures and the environment. Developing the Capisaan Cave System as a tourist spot has created jobs, especially for cave guides. Local residents can earn money by guiding tourists, which also encourages them to protect the cave because their income depends on responsible tourism. The cave earns money through entrance fees and guide services.

According to Informant 8, one of Capisaan Cave's pioneer guides, the funding details for the CCS are as follows: the environmental fee is ₱10.00, entrance fee is ₱90.00, and guide fees is ₱500.00 per person for the through and through route and ₱300.00 per person for the halfway route. Gadget rentals include helmets, spotlights, and life vests, each costing ₱30.00, which adds to the local economy and ensures tourists are well-prepared for their cave exploration. Water is also available on-site and handrails and pathways are funded by the PLGU. He also said that the briefing or orientation costs depend on the route: ₱460.00 for the halfway route and ₱600.00 for the through and through route. Clearly, the Capisaan Cave System is profitable by creating jobs and having a fee structure that supports the local community while preserving its natural and cultural value.

Regarding the safety of caving in the Capisaan Cave Systems, it is assured to be safe for exploration with proper precautions. Tourists are provided with safety gear, including helmets and protective equipment, and railings are installed in slippery and wet parts of the cave to prevent accidents. Accredited tour guides, who are well-trained and skilled, assist tourists throughout the tour. This aligns with the article by Aly et al. (2021) which highlights the importance of local guides in ensuring safet and providing a positive experience through careful preparation and equipment provision.

Caving is generally suitable for physically fit adults, and seniors may participate if they are in good health and physically capable. However, it can be challenging for very tall individuals and those with larger body builds due to narrow passages. It is not recommended for individuals with hypertension or severe anxiety about encountering cave species. Visitors may encounter bats, cave crickets, and various small insects, which are natural parts of the cave ecosystem. Those with a fear of cave-dwelling species may find the experience uncomfortable.

Section 3. Recommendations Drawn to Address the Problems Encountered

Geo-tourism emerged as an important instrument in both disseminating awareness about geological sites and safeguarding their integrity. Beyond its educational and cultural contributions to visitors, geo-tourism plays a vital role in advocating the principles of sustainable development. Adhering to these principles strengthens their real-world application, ultimately benefiting local communities and safeguarding natural ecosystems. Designating a site as a geological tourist destination requires a thorough evaluation of its geological importance, ecological health, and suitability for tourism. This suggestion aims to increase community awareness, particularly among visitors (Ayad & Hafez, 2023).

To overcome the problems encountered during the exploration of the cave, several recommendations were made by the informants.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Trainings and Seminars for Tour Guides

Most of the responses from the tour guide informants were similar, recommending that more training and seminars should be provided for tour guides. Informant 10 stated, "Training, seminars, and those kinds of things that the government could provide, um, like search and rescue, basic life support, and how to properly handle visitors." This aligns with Ayad and Hafez's suggestion (2023) in his study which aimed to provide sustainable solutions for cave tourism development and enable effective planning. According to Informant 10, even though they are DOT accredited tour guides—which is the minimum standard for operating tourism facilities and services—having additional training in areas such as search and rescue, basic life support, and visitor management would enhance their ability to handle emergencies efficiently and effectively. This would not only benefit visitors but also improve conditions at the Capisaan Cave System (CCS).

Additional Safety Gear and Equipment

Another recommendation from Informant 8 was to add more safety gear and equipment. He said, "For us, I just recommend that we add more safety gears." This aligns with Beck et al.'s (n.d.) work which highlights the importance of caution and planning in cave exploration while emphasizing the need for proper equipment. According to Informant 8, additional safety gear such as knee pads and elbow pads should be included in existing equipment to prevent injuries during cave exploration.

Communication System

Informants 1 and 2 recommended setting up a communication system between people inside the cave and those outside. Informant 1 said,

Let me just suggest how they would know if it suddenly rains heavily outside; that’s the challenge, right? For example, if it suddenly rains really hard here, how will they inform people inside that it's pouring outside, like saying, 'Hey, come out, it’s really raining here?

Informant 2 added, “How will they relay their message to other rescuers or assistants?” This recommendation also aligns with Beck et al.'s (n.d.) study, which highlighted the natural dangers of caving, including accidents that stress adequate safety equipment. The suggestions from Informants 1 and 2 could improve safety and security during cave exploration by ensuring that communication is maintained in case of emergencies. This could involve using radios or other communication tools to stay informed and coordinate actions.

The statements provided by Informants 1, 2, 8, and 10 offer diverse recommendations for addressing the problems they have observed and experienced.

By implementing these recommendations, the Capisaan Cave System can enhance its safety and security measures, contributing positively to the overall experience of tourists. A safety helmet provided to visitors to protect against head injuries during cave exploration.

Figure 10 Safety Helmets

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Figure 11 Life Vests

A life vest available for use in water-filled sections of the cave, enhancing safety and confidence for visitors navigating through the cave's aquatic passages.

Figure 12 Emergency Board for Patient Transfer

An emergency board used in the Capisaan Cave System for safely transferring patients/visitors in case of emergencies.

Summary of Features, Challenges and Recommendations

Table 2 Summary of Features, Challenges and Recommendations

Features	**Challenges**	**Recommendations**
Nine known entrances, including Lion, Alayan, and Sabrina	Safety concerns due to difficult terrain and water levels	Increase training and seminars for tour guides on emergency response, visitor management, and cave navigation (Informant 10).
Total area of 1,515.96 hectares with unique geological formations	Insufficient funding for maintenance and safety measures	Utilize collected entrance fees to fund necessary equipment and maintenance (Informant 1).
Diverse ecosystem with 91 plant species, including endemic varieties	Lack of communication systems for emergencies	Establish a communication system between cave guides and external rescue teams (Informants 1 & 2).

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Presence of rare speleothems such as stalactites, stalagmites, and helictites	Inadequate safety gear for visitors	Provide additional safety gear such as knee pads and elbow pads for visitors (Informant 9).
Recognized as a "geologist's paradise" with significant eco-tourism potential	Limited staff to monitor and protect the cave environment	Hire additional staff for environmental protection and monitoring (Informant 8).
Pathways built with live stone and river stone by the DOT	Environmental degradation due to irresponsible visitor behavior	Implement stricter regulations and penalties for damaging cave formations (Informant 14).
Unique features like "ocean park" with imaginative rock formations	Need for better visitor education on cave preservation	Develop educational programs to inform visitors about the fragility of cave ecosystems (Informant 14).

Table 2 presents a comprehensive summary of the key features, challenges, and recommendations related to the Capisaan Cave System, as identified through document scanning and informant feedback.

In terms of features, the Capisaan Cave System has unique aspects, including its nine entrances, diverse ecosystem with endemic species, and intricate geological formations such as stalactites and helictites.

In terms of the Challenges section, various issues faced by the cave system are outlined, such as safety concerns due to difficult terrain, inadequate funding for maintenance, and the need for better communication systems during emergencies.

Finally, the recommendations section provides actionable suggestions from informants aimed at addressing these challenges. These include increased training for tour guides, improved safety gear for visitors, and establishing stricter regulations to protect the cave's formations.

Section 4. Material Crafted to Assist in Addressing the Problems Encountered

In response to the question regarding suggestions to assist in addressing the problems encountered, our informants provided valuable insights. These insights were compiled into an infographic brochure designed by the researchers to address the challenges faced and highlight the features of the Capisaan Cave System. This brochure will serve as an educational and promotional tool aimed at both local authorities and tourists, providing clear, concise, and visually engaging information about the cave's features, the challenges it faces, and proposed solutions.

The infographic was formatted to present information in a visually appealing manner, utilizing a combination of images, diagrams, and text. The design incorporated vibrant colors and engaging graphics to capture attention while ensuring that the content is easily digestible. Key sections include an overview of the Capisaan Cave System's unique geological features, a summary of identified challenges such as safety concerns and maintenance needs, and actionable recommendations derived from informant feedback.

Informant 5 emphasized the crucial role of the Department of Tourism (DOT) in supporting the cave, stating that it should be the primary entity responsible for assisting in its maintenance and enhancement. Similarly, Informant 15 stressed the importance of higher government intervention, pointing out that local efforts are insufficient without substantial support from higher authorities. This sentiment aligns with Manalo's study (2016), which emphasizes that government intervention is crucial for sustainable tourism development and effective resource management. Informant 12 echoed these sentiments by suggesting a partnership between provincial, municipal, and barangay levels to maintain continuous support for cave guides and ensure preservation of the cave system. They highlighted the need for sustained funding to employ cave guards for maintenance and safety.

Meanwhile, Informant 6 discussed pathways constructed with live stone and river stone by the DOT Province and suggested finding additional funding sources to further enhance the cave's infrastructure. Informant 1 proposed using collected entrance fees to fund necessary equipment for better maintenance and visitor safety.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

Informant 7 recommended allocating funds for training seminars for tour guides to improve their knowledge and skills, particularly in guiding within the cave. Informant 10 echoed this need for training, emphasizing that equipping guides with more tools would enhance their ability to manage visitors effectively. This aligns with findings from the 6th EuroSpeleo Protection Symposium, which advocates for consistent funding and strict enforcement of conservation policies to protect cave environments (Weigand et al., 2016).

Informant 2 suggested providing training for all employees to ensure that there is always someone available to assist or conduct rescues if needed. Informant 9 highlighted the necessity of additional safety gear like knee pads and elbow pads for crawling or duck walking inside the cave, noting that these protections are essential to prevent injuries to both visitors and the cave environment. Informant 8 recommended training for guides along with additional manpower for environmental protection due to the expansive nature of the Capisaan Cave System.

Informant 14 called for stricter regulations and penalties against damaging cave formations while emphasizing the importance of educating visitors on stalagmites' fragility and the irreversible damage caused by irresponsible actions. Lastly, Informant 13 suggested organizing team-building activities and socialization events to develop tour guides' skills further; these activities could foster better teamwork and improve overall tour quality.

By integrating these suggestions from informants along with supporting research studies, the planned infographic brochure will serve as both a communication tool and a strategic guide. It will help stakeholders understand the significance of the Capisaan Cave System while outlining necessary steps to ensure its sustainability.

Figure 13 Infographic Brochure for the Capisaan Cave System

An infographic brochure designed to educate and inform stakeholders about the unique features of the Capisaan Cave System, the challenges it faces, and proposed solutions.

CONCLUSIONS

Conclusions and Recommendations

Based on the findings, several conclusions were drawn namely:

1. The Capisaan Cave System emerged as a remarkable destination for tourism. Its expansive length, multiple entrances, and impressive underground features such as halls, chambers, and a river offer a

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue VI June 2025

unique adventure for visitors. The cave's various formations—including stalagmites, stalactites, soda straws, and helictites—attract not only tourists but also geologists who find these natural wonders fascinating. The study highlighted the importance of presenting this geological beauty in an accessible format to attract tourists while promoting conservation. Emphasizing safety and visitor guidelines can ensure that the natural beauty and ecological balance of Capisaan Cave are preserved for future generations.

2. Maintaining the Capisaan Cave System requires sufficient funding, as indicated by informants. While there are adequate funds for basic maintenance, additional financial support would enhance the site and help overcome challenges such as transportation and cave guide training. Informants emphasized the need for more funds to better preserve the cave and improve visitor experiences. There are established safety measures, including gear and trained guides, that ensure secure exploration, however, the cave's upkeep and visitor safety relied heavily on adequate funding and support from various organizations.
3. The findings imply that the Capisaan Cave System needs to enhance its safety gear and equipment since informants reported that current provisions were insufficient. Recommendations include adding basic safety gear such as knee pads and elbow pads to prevent injuries, as well as establishing a communication system with radios between individuals inside and outside the cave to improve safety and security. Additionally, providing more training and seminars for tour guides could enhance their emergency response capabilities and visitor handling skills.
4. To effectively manage and preserve the Capisaan Cave System, a comprehensive approach is necessary, which includes support from higher authorities such as the government and the Department of Tourism (DOT). Financial backing is essential to provide necessary resources for infrastructure upgrades, purchase additional safety equipment, and organize training programs for tour guides since local efforts alone were insufficient to maintain and enhance the cave system.

RECOMMENDATIONS

After thoroughly considering the findings of this study, the researchers recommend the following actions:

1. The Department of Tourism (DOT) and other relevant government bodies should allocate more funds to the Capisaan Cave System for maintenance and development. Enhanced funding would enable the purchase of necessary equipment, infrastructure upgrades, and employment of additional cave guards. Partnerships between provincial, municipal, and barangay levels should be established to ensure continuous support and resource allocation.
2. Regular training and seminars should be organized for tour guides to improve their knowledge and skills in cave guiding, emergency response, and visitor management. Topics should include search and rescue operations, basic life support, and effective visitor handling techniques. Guides should receive specific training on using safety gear and equipment to ensure they are well- prepared to handle emergencies while protecting both visitors and the cave environment.
3. Investment in additional safety gear such as knee pads and elbow pads is essential to prevent injuries during exploration, especially in narrow or rough areas of the cave. Establishing a reliable communication system between inside and outside the cave will ensure timely information flow during emergencies, such as sudden heavy rainfall.
4. Improvements should be made to existing pathways and lighting within the cave to enhance visitor experience while ensuring safety. A discreet lighting system should be implemented within the cave to enhance visibility without compromising its natural ambiance. Energy-efficient LED lights could be installed at key points to highlight unique geological formations while maintaining environmental integrity.
5. Stricter regulations and penalties should be developed and enforced for damaging the cave's formations to preserve its natural beauty and geological significance. Educating visitors on the fragility of formations like stalagmites is crucial in preventing irreversible damage caused by irresponsible actions.

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Dedication

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Page/s	Page 1 of 1

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