



**Conservation and Revitalisation Strategies for Historical and
Ecological Heritages of Grass Island: A Case Study of a More
Than 400 Years of History Island's Sustainability
(Project No. EP86/27/24/11-23)**

**Study on Anthropogenic Influence and Assessment for the
Conservation Management of Tap Mun**

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Abstract

This study utilizes field surveys, visitor questionnaires, and ecological assessments to analyze human impacts on Tap Mun's biodiversity, focusing on interactions between visitors and local wildlife, particularly cattle and wild boars. The findings indicate a pressing need for improved visitor facilities and conservation strategies, as significant portions of participants expressed dissatisfaction with current amenities and awareness of the area's cultural heritage. Notably, over 90% of respondents supported the establishment of a conservation and education center, underscoring community interest in eco-stewardship and cultural preservation. The paper proposes a series of conservation management strategies, including habitat restoration, enhanced educational initiatives, and community engagement programs to foster sustainable tourism practices. Through the integration of local knowledge and participation, the study aims to develop actionable plans that not only mitigate human impacts but also preserve the ecological and cultural assets of Tap Mun for future generations.

1. Background information

1.1 Overview of Tap Mun's ecological and cultural significance

Grass Island is an island located at the South Mirs Bay, east of Tolo Channel and north of Long Harbour. It faces the Sai Kung West Country Park and the Hoi Ha Wan Marine Park, with its back to Mirs Bay. The size of the island is 1.69 km², with a height of 129 meters.

Grass Island has a geological advantage attracting fishermen to fish to gather at there. The waters facing Mirs Bay are deep and with strong wave, however, the waters facing Hoi Ha Wan and Sai Kung West Country Park are an inner waters area which favor for sedimentation and the waters are calm.

70% of the Grass Island habitat is covered by woodland, 8% is covered by shrubland, 5% of grassland and farmland and around 17% are other habitats such as village and coastal. Residential villages of Tap Mun are concentrated on the south-western shoreline of the Island. The South Island was farming field in the old days, only few fields are active in recent years, most of the fields have been abandoned.

1.1.1 History of Grass Island

The written history of Grass Island (“Tap Mun” in Cantonese) can be traced back to 1595, the place “Tap Mun” where known as “Stupa Door” (佛塔門) was listed in the “Coastal Map of Guangdong” in “Yue Da Ji” (粵大記之廣東沿海圖) (Chan, 2020). It was the Ming dynasty at that time, Grass Island was already a place lived with fishermen. However, the evidence of how Grass Island looked like in or before Ming Dynasty is deficient. In 1661, the Qing government issued the Great Clearance, in order to fight the anti-Qing loyalist movement of the erstwhile Ming Dynasty (Johnson, 1984). The Great Clearance banned the human settlement of some coastal areas including Grass Island. Grass Island was then deserted from 1661 to 1683, making loss of some of the old buildings, houses, or historical evidences of the Ming Dynasty (Chan, 2020). Therefore, the relatively complete written history of Grass Island started being recorded during the Qing Dynasty.

The concrete history of human living in Grass Island can be traced back to the Tin Hau Temple built in the Qing Dynasty, the time of Kangxi Emperor (1669) (Chan, 2020). The prototype of Tin Hau Temple was built in 1669, and extend to today’s scale in 1743 (Chan, 2020). In the temple, there are antiquities that showing the old history of the temple. A copper bell from 1737 was found in the temple, which confirmed that religious activities were frequently conducted in Grass Island at that time (Chan, 2020).

Villagers on the island mainly believe in Tin Hau, however, there is a Christian Church on the Island as well.

There are some villages in the island, they are Tap Mun New Fishermen's Village, Yung Shu Village, Hoi Pong Street, Ha Wai, Chung Wai and Sheung Wai. The fishermen colony concentrated in the Tap Mun New Fishermen's Village and Yung Shu Village. The villagers in Hoi Pong Street and Ha Wai, Chung Wai and Sheung Wai are usually Hakka villagers, who did business or farmed on the island in the old days.

In the 1950s, the number of people at Tap Mun reached 2,000 and many fishing boats was gathered at the Tap Mun waters. The peak of the fishing boats reached few hundreds in 1950s. It was the busiest moment of Grass Island from 1950s to 1960s. As the remote of the island, residents moved to the city or oversea, and now only around 100 people living on Grass Island.

1.1.2 Current management and situation of Grass Island

The village of Grass Island is mainly located in south western Grass Island, as the west side of Grass Island is at the inner bay which has little water wave. The east side of Grass Island faces Mirs Bay which with stronger water wave and increases the erosion of the east side of Grass Island. The north side of Grass Island is now covered by woodland and shrubland, there is not a clear route that can walk through the most northern part of Grass Island. Therefore, visitors are mainly having activities, such as hiking and camping in the east side of Grass Island. Although there are two iconic landmarks in the northern Grass Island, the Hau Tsz Kok and Lung Keng Kan, there is not a formal hiking trail to reach two landmarks.

The Grass Island does not fall into the area of Country Parks and Marine Parks, therefore the management is not by the Agriculture, Fisheries and Conservation Department, it is mainly managed by the Lands Department, the Home Affairs Department and villagers.

There are around 100 villagers, most of them are elderly. According to the observation of this study, there are usually not more than 30 visitors visiting the island at weekdays. However, it may reach to more than 200 people on weekends or holidays.

1.1.3 Facilities on the island

The island capacity is important for promoting local travel or eco-tours on the island. As there may be more than 200 people at weekends, if there are not enough public facilities, it may lead to overflow of trash, hygienic problems, and reduce the desire of visitors to visit the island.

There is one public pier, one police station, one Tin Hau Temple, one church, three public toilets, one water filling station, at least five pavilions, at least 5 restaurants/tuck shops, one children playground and one basketball court. Rubbish bins are set up near the grassland area, where the campers usually set up camps. No camping facilities such as barbecue pit on the island. However, there are observation that some campers firing on the grassland, and we will talk further on this issue in chapter 4 and 5.

1.1.4 Ecological value of the island

Twenty-seven field surveys were conducted in a year on Tap Mun by the Environmental Association Limited. Here are some highlights of the biodiversity survey results:

Plants: A total of 205 plant species were recorded including 152 native species and 51 exotic species. Two species were unidentified. Two species are protected by the Protection of Endangered Species of Animals and Plants Ordinance Cap. 586 (CITES Appendix II). One species is protected by the Forests and Countryside Ordinance Cap. 96.

Birds: A total of 44 bird species were recorded including 6 water bird species and 38 forest bird species.

Butterflies: A total of 46 butterfly species were recorded including 45 native and 1 exotic species. Four species are listed as very rare or rare in Hong Kong by AFCD.

Mammals: Six mammal species were recorded.

Mangrove: Four mangrove tree species were recorded.

Marine Wildlife: A total of 29 coastal and marine animal species were recorded. Two of the coral from Scleractinia are listed as vulnerable in IUCN red list.

1.2 Definition of anthropogenic influence

Anthropogenic influence refers to the impact that human activities have on the environment and natural ecosystems (Vitousek, P. M., et al., 1997). These influences can alter physical, chemical, and biological properties of ecosystems and often lead to environmental changes that affect biodiversity, habitat quality, and ecosystem functions. Common examples of anthropogenic influences include urbanization, industrial activities, agriculture, pollution, deforestation, and climate change. These actions can create stress on natural systems, leading to degradation, loss of habitat, and shifts in species composition, ultimately affecting ecological balance.

Anthropogenic influences can have a wide range of negative impacts on nature and ecosystems (Sala, O. E., et al., 2000). Habitat Destruction, urbanization, deforestation,

and land conversion for agriculture lead to the loss of habitat for many species, resulting in reduced biodiversity and increased extinction rates. Invasive Species: Human activities can introduce non-native species to new environments, where they can outcompete or harm native species. Disruption of Ecosystems: Changes in temperature and precipitation patterns can affect species distributions, breeding seasons, and migration patterns. Water Pollution: Runoff from agriculture (pesticides and fertilizers) and industrial discharge can contaminate water bodies, harming aquatic life and drinking water sources. Air Pollution: Emissions from vehicles and industries can lead to smog and acid rain, which have detrimental effects on plant and animal health. Soil Degradation, Erosion and Nutrient Loss: Agricultural practices can lead to soil erosion, loss of soil fertility, and increased salinity, impacting food production and local ecosystems. Alteration of Ecosystem Services: Ecosystems provide essential services such as pollination, water purification, and carbon sequestration. Anthropogenic influences can degrade these services, leading to economic and health consequences for human populations. Changes in Species Interactions: Changes to the abundance and distribution of species due to anthropogenic factors can disrupt predator-prey relationships, competition for resources, and mutualistic interactions, leading to imbalances within ecosystems. Increased Dispersal of Natural Disease: Certain human activities, like feeding and poor land use practices, can increase the dispersal of natural disease such as weed and insect dispersal disease.

2. Purpose of the Study

This study is to identify and assess anthropogenic impacts on the environment of Tap Mun and proposing conservation management strategies entails developing actionable plans that aim to mitigate negative anthropogenic impacts on the

environment; knowledge into concrete actions aimed at protecting and restoring natural environments, that thereby ensuring a sustainable future for both biodiversity and human communities in Tap Mun.

3. Research Questions

Tap Mun is an area rich in ecological and cultural value, and it is also a popular destination for tourists, camping, and hiking. Therefore, this study will investigate the impacts of human activities on Tap Mun and explore whether conservation management measures can be implemented to mitigate these human impacts. Below, we outline several questions that will be covered in this research.

1. What are the main anthropogenic activities impacting Tap Mun?
2. How do these activities affect local biodiversity and ecosystems?
3. What conservation management practices can be implemented?

By addressing these questions, this research aims to provide a comprehensive understanding of the impacts of human activities on Tap Mun and to offer scientifically-based recommendations for effective conservation management strategies. This will help protect Tap Mun's ecological and cultural assets while fostering a sustainable relationship between visitors and the local community.

4. Literature Review

4.1 Overview of Anthropogenic Influences

Anthropogenic influences, or human impacts on the environment, have emerged as a significant concern in contemporary ecological research. These influences span various domains, including climate change, habitat destruction, pollution, and biodiversity loss.

Understanding these impacts is critical for developing effective conservation strategies (Sala et al., 2000).

One of the most pressing anthropogenic influences is climate change led by deforestation (IPCC, 2014). As the planet warms, its ecosystems face stressors like altered rainfall patterns, increased frequency of extreme weather events, and shifts in species distribution (Peters et al., 2019). These changes not only affect wildlife but also compromise the ecosystem services that sustain human populations, such as clean water and food supply (Millennium Ecosystem Assessment, 2005).

Habitat destruction, often associated with urbanization, agriculture, and logging, poses another critical threat to biodiversity. According to Wilcove et al. (1998), habitat loss is the primary cause of extinction for many species, as natural habitats are fragmented and reduced to unsustainable sizes. This fragmentation disrupts ecological processes and limits species' ability to adapt to changes, including climate change (Fahrig, 2003).

Pollution, encompassing chemical effluents, plastic waste, and noise, represents a further anthropogenic influence on ecosystems. Water pollution from agricultural runoff discharge has led to the degradation of aquatic habitats and the decline of marine species (Carpenter et al., 1998). Likewise, land and air pollution adversely affect terrestrial ecosystems, causing direct harm to flora and fauna and secondary impacts through food web interactions (Baker et al., 2020).

Moreover, anthropogenic influences extend to invasive species introduction. Human activities, such as global trade and travel, have facilitated the spread of non-native

species, often outcompeting indigenous flora and fauna, which can result in declines in local biodiversity (Falk-Petersen et al., 2020). Invasive species can alter nutrient cycling and disrupt ecological relationships, further exacerbating the challenges faced by native ecosystems (Simberloff, 2003). In response to these challenges, conservation strategies must take a holistic approach that considers the interconnectedness of anthropogenic influences. Engaging local communities, promoting sustainable practices, and advocating for policies aimed at reducing carbon emissions are crucial steps in mitigating anthropogenic impacts (Soulé & Lease, 1995). Moreover, increasing awareness and education about the significance of biodiversity and ecosystem health can empower individuals and communities to engage in conservation efforts (Sutherland et al., 2011).

4.2 Anthropogenic influences from tourism and recreational activities

Tourism and recreational activities are significant drivers of anthropogenic influences on natural environments, leading to substantial ecological, social, and cultural consequences. As the global tourism industry continues to grow, understanding its impacts has become critical for sustainable management (Gössling, 2002).

The ecological consequences of tourism are multifaceted and include habitat destruction, biodiversity loss, and the pollution of natural resources (Mason, 2005). Additionally, coastal and marine ecosystems face threats from recreational activities such as boating, fishing, and diving, which can cause physical damage to sensitive habitats like coral reefs (Beck et al., 2018).

In terms of pollution, tourism contributes significantly to water, air, and soil contamination. Waste management issues are prevalent in tourism hotspots, where

increased visitor numbers often overwhelm local infrastructure (Zhou et al., 2016). Contaminants from recreational activities, such as fertilizers, plastics, and chemicals, have been shown to adversely affect water quality in rivers and oceans, leading to harmful algal blooms and the deterioration of aquatic ecosystems (Carpenter et al., 1998).

Socially, the influx of tourists can lead to overcrowding, straining local communities and ecosystems. As highlighted by Cohen (2012), this phenomenon can result in increased competition for resources, such as water, food, and space, causing conflicts between residents and tourists. Furthermore, the cultural landscape can suffer from commodification, where local customs and traditions are altered to meet tourist expectations, consequently eroding the authenticity of local identities (MacCannell, 1999).

Moreover, tourism can introduce invasive species, as global travel facilitates the unintentional transfer of non-native organisms into new environments (Hastings et al., 2007). These invasive species can outcompete local species, leading to biodiversity loss and altering ecosystem dynamics. (Miller et al., 2014).

Given these challenges, there is an urgent need for sustainable tourism practices that mitigate the negative impacts of recreational activities. Effective management strategies should include limiting visitor numbers in sensitive areas, implementing stringent waste management practices, and fostering community involvement in tourism planning (Buckley, 2009). Furthermore, raising awareness among tourists about their ecological footprint and promoting eco-friendly practices can significantly

contribute to reducing the negative effects of tourism on the environment (Weaver, 2011).

In summary, while tourism and recreational activities can bring economic benefits and cultural exchanges, their anthropogenic influences pose substantial risks to ecological integrity and local communities. By prioritizing sustainability and responsible management, it is possible to balance the benefits of tourism with the need to protect natural and cultural resources.

4.3 Village conservation management plan

Village Conservation Management Plans (VCMPs) are increasingly recognized as integral tools for sustainable development, integrating conservation efforts with local community needs and aspirations. The implementation of VCMPs is often a response to the dual pressures of environmental degradation and socio-economic development, highlighting the necessity for frameworks that balance ecological preservation with community welfare (Borrini-Feyerabend et al., 2004).

VCMPs typically aim to protect local biodiversity and natural resources while promoting community engagement and socio-economic benefits. According to the World Conservation Union (IUCN), effective VCMPs involve stakeholders at all levels, ensuring that local voices and traditional knowledge are incorporated into conservation strategies (IUCN, 2008). This participatory approach not only enhances the relevance and effectiveness of conservation initiatives but also empowers local communities, fostering stewardship and sustainable resource management (Mann, 2015).

The role of human-wildlife interactions is a crucial aspect of VCMPs. Communities living in proximity to biodiversity-rich areas frequently face challenges from wildlife, such as crop damage and livestock predation. Addressing these conflicts through VCMPs is essential for achieving conservation goals (Kenya Wildlife Service, 2012). Measures such as compensation schemes, educational programs, and the development of eco-friendly practices can help mitigate human-wildlife conflicts while promoting conservation objectives (Thirgood et al., 2005).

Economic incentives are also a vital component of VCMPs. By providing alternative livelihoods through eco-tourism, sustainable agriculture, and community-based resource management, VCMPs can alleviate pressure on local ecosystems while enhancing community resilience (Tisdell, 2005). Successful case studies, such as the establishment of community wildlife conservancies in Kenya, demonstrate how VCMPs can lead to improved wildlife populations and diverse income sources for local communities (Cheetah Conservation Fund, 2017).

Challenges in implementing VCMPs often arise from issues of governance, funding, and external pressures, such as land-use change and urbanization. Effective VCMPs require strong institutional support, capacity building, and continuous monitoring and evaluation to adapt to changing circumstances (Blair, 2012). Community involvement in the planning and decision-making processes is critical, as it fosters a sense of ownership and accountability among local stakeholders (Mastrorillo et al., 2016).

In summary, VCMPs play a crucial role in the intersection of conservation and community development, promoting sustainable practices while addressing socio-economic needs. Effective implementation relies on participatory approaches,

economic incentives, and comprehensive strategies to mitigate human-wildlife conflicts. Future research should focus on developing methodologies to enhance the adaptability and resilience of VCMPs in the face of environmental and social changes.

5. Methodology

5.1 Field studies and ecological assessments

Field studies will involve a combination of observational techniques and ecological assessments. The study will be conducted over 20 times visits to ensure diverse data collection across different times and weather conditions. Researchers will observe tourists in various habitats to note activities, group sizes, duration of stay in specific locations, and interactions with wildlife. A checklist will be developed to systematically record tourist behaviors, such as feeding animals, taking photographs, and engaging in recreational activities like hiking, picnicking, or camping. Data collected throughout the study period will be analyzed to identify trends in tourist behavior and their ecological impacts. Statistical methods may be used to correlate tourist activities with wildlife observations, providing insights into how tourism influences local ecosystems. Field studies and ecological assessments in Tap Mun provide a comprehensive approach to understanding the relationship between tourism, wildlife, and habitat health. By documenting tourist behavior and interactions with animals in various habitats, this research can inform effective conservation strategies that support both biodiversity preservation and sustainable tourism.

Field studies and ecological assessments will be conducted to observe the situations in Tap Mun. This survey presents a detailed account of anthropogenic impacts on Tap Mun, emphasizing the interaction between human activities and the local environment, especially regarding cattle and the littering problem. Further

assessments and mitigation strategies may be warranted to preserve the ecological integrity of the area.

The observation includes 1) human activities, 2) Wildlife interactions, 3) Campsite conditions, 4) Trash and waste management, 5) Communication Engagement and Feedback, 6) Other special findings and observations. The sample sizes of visits are 20 times, from June 2022 to Aug 2023.

Human activities

Recording the various types of activities people engage in, such as camping, hiking, or interacting with wildlife (e.g., cattle). Noting the types of people participating in these activities (age groups, by group vs. individual). And understand how those people interact with the environment, such as littering, feeding wildlife, or disturbing natural habitats.

Wildlife interactions

Noting the presence of local fauna, especially cattle and wild boar, and how humans interact with them. This includes feeding, touching, photographing, or creating conflicts. Also, noting any changes in animal behavior due to human presence, such as changes in feeding patterns and approach to human being.

Campsite conditions

Reporting on the state of any established campsites, including cleanliness, maintenance, we can understand the pressure of grassland suffer. Also, we may predict the demand of facilities like toilets and waste bins.

Trash and waste management

Observing the type, amount, and distribution of litter found in the area (e.g., plastics, food waste, camping gear). And assessing the condition of designated rubbish collection points. Are they used properly? Are they overflowing? Also documenting any observed incidents of individuals or groups littering and their reaction to it.

Communication Engagement and Feedback

Noting any organized volunteer work being conducted in the area for conservation or restoration efforts. And what effect from observed from the engagement works.

Other special findings and observations

Documenting any conflicts, either among visitors or between humans and wildlife. Any unique sightings, such as rare species, signs of environmental degradation, or noteworthy conservation practices.

A sample of record sheets is attached in Appendix 1.

5.2 Surveys and questionnaires

Surveys and questionnaires serve as key tools for collecting quantitative and qualitative data from visitors. Surveys collect data on tourist motivations, awareness of local wildlife regulations, and their perceptions of the impacts of tourism on the island's ecosystems. The survey will be distributed at hotspots around Tap Mun, mainly in grasslands during weekdays, weekends and public holidays. A sample size of around 500 respondents is targeted to achieve statistical relevance. Data obtained from surveys will be analyzed. Descriptive statistics will summarize tourist demographics,

preferred activities, and interaction frequencies, such as the link between tourist demographics and awareness of conservation practices.

Understanding tourist behavior is critical for developing effective conservation strategies. Findings may indicate trends such as high interaction rates with certain species or areas with significant ecological footprints due to recreational activities. These insights can inform the development of management plans that emphasize sustainable tourism and conservation education (Borrini-Feyerabend et al., 2004). These findings will be essential for implementing sustainable tourism practices and effective management strategies, ultimately promoting ecological resilience while accommodating visitor expectations.

The survey questions are set as below, and the questionnaire sample is attached in Appendix 2.

1. Date of the survey

The date helps to provide context for the data collected. Public opinions and behaviors can change over time, and knowing when the survey was conducted allows for better interpretation of results. The date may also impact the sampling process, especially in surveys reliant on current events or demographics. Knowing when the survey was conducted can indicate whether the sample is appropriately reflective of the population at that time.

2. Name of recorder

Identifying the recorder creates a sense of accountability. If issues arise with the data collection process, knowing who conducted it allows for follow-up and clarification. Researchers can address potential biases or errors (Creswell & Creswell, 2017). If multiple surveys are conducted or if a longitudinal study

requires repeated measures, knowing who recorded the data can help ensure consistency in methodology and approach over time. This is crucial for maintaining the integrity of longitudinal data collection (Dillman et al., 2014).

3. How many days will you be camping at Tap Mun?

Regarding the duration of stay at a location like Tap Mun, the number of days participants plan to stay can provide valuable insights. Understanding how many days visitors plan to stay helps in planning for necessary resources such as water, waste management, and staffing for facilities like restrooms or campsites.

4. What are your reasons for choosing Tap Mun as a camping site? (You may select more than one option.)

- a. Convenient transportation
- b. Attractive scenery
- c. Easy to access
- d. Not managed by government departments
- e. Fewer visitors
- f. Other

Analyzing the reasons can reveal insights into the demographics and preferences of visitors. For example, if "fewer visitors" is a common reason, it might indicate a preference for solitude or nature, which can inform future policies or programs aimed at maintaining low visitor impact. Knowing what aspects of a campsite are appealing allows for targeted improvements. By examining the reasons over time, trends can be identified. For example, if more people start selecting Tap Mun due to sustainability or environmental considerations, it could signal a shift in visitor priorities that deserves attention.

5. What factors do you consider when choosing a camping site? (You may select more than one option.)

- a. Transportation
- b. Popularity
- c. Nearby facilities
- d. Environmental consideration
- e. Other

Understanding the factors that people consider when choosing a camping site provides valuable insights into the preferences and priorities of potential campers. It helps to identify what attracts visitors, which can guide future planning and government efforts. Tracking the evolving preferences of campers can reveal trends over time. This information is invaluable for adapting to changes in camper behavior, such as growing preferences for eco-friendly camping.

6. Besides camping, what activities will you engage in at Tap Mun? (You may select more than one option.)
- a. Hiking
 - b. Kite flying
 - c. Water sports
 - d. Dining at local restaurants or shops

Identifying additional activities can benefit local businesses and the surrounding community. If dining or shopping is popular, local establishments can be encouraged to offer services tailored to campers, leading to economic benefits for the area. Also, we may understand the impacts towards environment through the activities, and predict the capacity of grassland of Tap Mun.

7. What activities will you do at the campsite while camping? (You may select more than one option.)
- a. Shower in public toilets
 - b. Fetch water from public toilets

- c. Cook at the campsite
- d. Barbecue
- e. Interact with or feed cattle

Understanding how campers plan to use resources such as water and sanitation facilities can highlight areas where demand might exceed available resources, leading to potential overuse and strain on these amenities. Some activities, like barbecuing or interacting with animals, can lead to environmental concerns, such as littering, soil degradation, or wildlife disturbance. Identifying these activities allows government to educate users about responsible practices and minimize ecological impact. Also to help anticipate waste generation and inform waste management strategies. This can include more frequent garbage collection or the provision of recycling bins to mitigate littering. Understand visitor behavior patterns, which can be useful for anticipating congestion at specific areas of the campsite, thus facilitating better crowd control and enhancing safety.

8. Do you think the campsite facilities are sufficient? If yes, answer question 9; if no, answer question 10.

Yes

No

This question directly evaluates how well the campsite meets visitors' needs and expectations. Understanding if users feel the facilities are sufficient can provide insights into overall satisfaction levels. If a significant number of respondents answer "No," it highlights potential deficiencies in facilities, such as insufficient toilets, lack of cooking space, or inadequate water supply. This feedback is essential for targeted improvements. The responses can help management prioritize resource allocation and budgeting.

9. What facilities do you think should be added to the campsite? (You may select

more than one option.)

- a. Water source
- b. Public toilets
- c. Cooking facilities
- d. Camping equipment rental
- e. Information center
- f. Recycling station
- g. Other

If facilities are deemed insufficient, management can focus on upgrading or adding amenities where needed. Visitor feedback on facility sufficiency can inform long-term planning and development strategies. This can involve expanding facilities or enhancing existing ones based on actual user demands.

10. Do you think camping at Tap Mun is illegal?

Yes

No

Don't know

Knowledge of the legality of camping is essential for compliance with camping rules. If visitors believe camping is illegal, they may avoid the area altogether or engage in unauthorized activities, potentially leading to conflicts with related management. The responses could inform discussions about policy or regulatory adjustments necessary to clarify camping rules at Tap Mun. If the perception is widely held that camping is illegal, it may prompt a review of current regulations and outreach strategies to ensure they meet visitor needs.

11. Have you researched the history or cultural background of Tap Mun before your visit?

Yes

No

This question assesses how engaged visitors are with the site prior to their arrival.

A "Yes" response indicates that visitors are interested in the cultural and historical context of the area, which can enhance their overall experience. If most respondents indicate "No," it may signal a need for improved resources or outreach to educate potential visitors about the cultural and historical background of Tap Mun. An understanding of the cultural and historical significance of a site can promote more respectful and responsible visitor behavior. If many visitors are informed, they are likely to engage more thoughtfully with the environment and local community.

12. Have you checked tourism guides or routes for Tap Mun before your visit?

Yes

No

This question helps assess how well-prepared visitors are before arriving at Tap Mun. A "Yes" response indicates that visitors are actively seeking information and planning their activities. Knowing how many visitors refer to tourism guides can provide insights into which materials or resources are popular or effective.

13. Do you support the establishment of a conservation and education center at Tap Mun? If yes, answer question 12; if no, answer question 13.

Yes

No

This question gauges the public's interest in conservation and education initiatives. A positive response indicates that visitors value these aspects and may prioritize them in their future visits. A conservation and education center could enhance the visitor experience by providing educational programming, resources, and interpretative materials about local flora, fauna, and cultural heritage. Visitor

support can help prioritize these initiatives. If there is strong support, this could be a strong support on developing an education centre at Tap Mun.

14. If a conservation and education centre is established at Tap Mun, what type of information would you like to know?

- a. Visitor guide
- b. Historical or cultural information
- c. Camping facilities (e.g., restrooms)
- d. Rental of camping supplies
- e. Workshops (e.g., farming workshops)
- f. Other

This question is designed to gather specific insights about visitor interests and needs. Collecting this data will help to shape the focus of the conservation and education center based on what potential visitors find most valuable. It can assist in prioritizing resources, programming, and facilities that align with visitor interests and enhance the overall experience at Tap Mun. This input is critical for ensuring that the center fulfills its educational and conservation objectives while also being relevant and useful to the community and visitors.

15. Can you rank the following issues the government should address at Tap Mun in order of priority? (1 is the highest priority, 5 is the lowest priority)

- a. Grass restoration
- b. Cattle issues
- c. Transportation
- d. Facilities
- e. Other

Ranking the issues that the government should address at Tap Mun is important for understanding community priorities and guiding effective management

strategies.

16. Any other comments or suggestions?

This open-ended question provides an opportunity for respondents to share additional thoughts, concerns, or suggestions regarding the conservation and education efforts at Tap Mun.

6. Results

6.1 Field study and observation

20 field visits were conducted between June 2022 to August 2023. In 20 surveys, we recorded a total of 1,803 visitors to Tap Mun, averaging about 90 visitors per survey. During this time, we encountered instances of people feeding cows on three occasions, with a total of 18 individuals involved. Additionally, we observed people taking photos with cows on eight occasions. We also noted that cattle entered the camping areas or approached people for food in.

According to our observations, camping was noted in all 20 surveys, with the number of campers ranging from 2 to over 100, depending on the weather and the date. Near holidays, the number of tents could exceed 100, whereas the average number of tents was 17. Furthermore, the most common activities at Tap Mun include picnicking, hiking, and enjoying the scenery, followed by barbecuing, camping, and flying kites. We also observed volunteers feeding cows on about three occasions.

In 20 records, we found leftover garbage on the grass at Tap Mun in 18 instances. However, we only observed people littering directly on two occasions. During 15 of our observations, we noticed that the trash bins contained only a small amount of garbage, and only once did we find a bin that was full with additional trash placed

beside it. Additionally, we recorded wild boars chasing people or begging for food on five occasions.

6.2 Questionnaire and survey results

510 questionnaires were collected from May 2022 to November 2023. Both weekdays, weekends, and public holidays are covered. A chart summary is attached in Appendix 3.

1. How many days will you be camping at Tap Mun?

412 (81%) respondents will not stay overnight, and only visit Tap Mun for a half day. 70 (14%) respondents staying one nights and 28 (5%) respondents staying for two nights.

2. What are your reasons for choosing Tap Mun as a camping site? (Multiple options can be chosen)

423 respondents (83%) selected “attractive scenery”, 166 respondents (33%) selected “convenience transportation”, 112 respondents (22%) selected “easy to access”. Few selected “not managed by government departments”, “fewer visitors” and “biodiversity”.

3. What factors do you consider when choosing a camping site? (Multiple options can be chosen)

398 respondents (78%) selected “transportation”, 264 respondents (52%) selected “nearby facilities”, 186 respondents (37%) selected “popularity of the location”, 32 respondents (6%) selected “environmental consideration”.

4. Besides camping, what activities will you engage in at Tap Mun? (Multiple options can be chosen)

392 respondents (77%) selected “hiking”, 299 respondents (59%) selected “dining at local restaurant or shops”, 92 respondents (18%) selected “watersports” and 32

respondents (6%) selected “kite flying”. A very small portion are selected “barbecue”, “cattle watching” or “volunteer works.”

5. What activities will you do at the campsite while camping? (Multiple options can be chosen)

378 respondents (74%) selected “cook at the campsite”, 320 respondents (63%) selected “fetch water from the public toilets”, 77 respondents (15%) “barbecue”, and 73 respondents (14%) selected “shower at public toilets”. A very small portion are selected “feeding cattle”, or “never camping”.

6. Do you think the campsite facilities are sufficient?

302 respondents (59%) say “No”, and 208 respondents (41%) say “Yes”.

7. What facilities do you think should be added to the campsite? (Multiple options can be chosen)

238 respondents (47%) selected “water source”, 218 respondents (43%) selected “public toilet”, 157 respondents (31%) selected “cooking facilities”, 102 respondents (20%) selected “camping equipment rental”, 95 respondents (19%) selected “information centre”, 45 respondents (9%) selected “recycling stations”, and 2 respondents (<1%) selected “showering place”.

8. Do you think camping at Tap Mun is illegal?

229 respondents (45%) selected “I don’t know”, 159 respondents (31%) selected “illegal”, and 122 respondents (24%) selected “legal”.

9. Have you researched the history or cultural background of Tap Mun before your visit?

442 respondents (87%) say “No”, and 68 respondents (13%) say “Yes”.

10. Have you checked tourism guides or routes for Tap Mun before your visit?

394 respondents (77%) say “No”, and 116 respondents (23%) say “Yes”.

11. Do you support the establishment of a conservation and education center at Tap Mun?

466 respondents (91%) “support” and 44 respondents (9%) “do not support”.

12. If a conservation and education centre is established at Tap Mun, what type of information would you like to know? (Multiple options can be chosen)

414 respondents (81%) selected “visitor guide”, 287 respondents (56%) selected “historical and cultural information”, 189 respondents (37%) selected “camping facilities”, 135 respondents (26%) selected “workshops” and 130 respondents (25%) selected “rental of camping supplies”.

13. Can you rank the following issues the government should address at Tap Mun in order of priority?

“Grassland recovery” as the highest priority, followed by “cattle and wild boar problem”, followed by “transportation and facilities”.

14. Other recommendations

Other recommendations from the visitors include “appreciating terns on the island”, “suggesting that police should patrol more to deal with illegal firing problem”, and “related department such as AFCD should deal with the problems on wild boar.”

7. Data Analysis and Findings

7.1 Field visit and observation

The interactions between visitors and cattle raise important questions regarding wildlife management and public education. Feeding wildlife can lead to dependency on human sources for food, impacting their natural behavior and leading to potential conflicts. Addressing this issue through educational campaigns that inform visitors of the risks associated with feeding cattle would be beneficial. Such as deliver informative

brochures and set up signages, partnership with local patrol, provide regular guided tours and launch social media campaign. Additionally, promoting positive wildlife interactions, such as guided wildlife observation instead of feeding, could enhance visitor experiences while protecting animal welfare. The data suggests a strong preference for camping, especially during holidays. This spike in visitors necessitates adequate infrastructure, including more camping facilities, improved waste disposal options, and amenities that can accommodate larger crowds. Mitigating environmental impacts from concentrated human activity are also important to be notified. The prevalence of litter and inadequate waste disposal highlights a pressing need for improved waste management strategies at Tap Mun. Community engagement, possibly through organized clean-up days or educational programs, could foster a sense of ownership and responsibility among visitors. The observations of wild boar interactions, particularly instances of them chasing people for food, underscore significant concerns regarding safety and wildlife management at Tap Mun. Collaborating with the Agriculture, Fisheries and Conservation Department (AFCD) to develop a comprehensive wildlife management plan that addresses human-wildlife interactions while safeguarding both parties is essential. The observations made during the field visits to Tap Mun reveal critical insights into visitor behaviors, wildlife interactions, and environmental conditions. Addressing the challenges identified, particularly concerning interactions with cattle and wild boars, waste management practices, and the infrastructure needed to support a growing number of visitors, will be essential in preserving the ecological integrity of Tap Mun while enhancing the visitor experience. Implementing effective management strategies and fostering community engagement will be key to ensuring a sustainable and enjoyable environment for both wildlife and visitors alike.

7.2 Questionnaire and survey result analysis

A total of 510 questionnaires were collected during the specified period, ensuring that responses represent a diverse range of visitors across different times, including weekdays, weekends, and public holidays.

A significant portion of the respondents, 412 individuals or approximately 80%, indicated that they do not plan to stay overnight at Tap Mun. Instead, they prefer to visit the area for just a half day. This preference for brief visits highlights a trend of casual excursions, 70 respondents, accounting for about 14%, expressed intentions to stay for one night. This indicates a modest interest in experiencing an overnight camping experience, which may be driven by the desire to enjoy the natural surroundings more fully or to partake in activities like evening barbeque or night-time stargazing. Only 28 respondents (approximately 5%) reported plans to stay for two nights. This suggests that long-term camping experiences are relatively uncommon among the visitors. The low percentage may indicate that while some people appreciate extended stays, barriers such as logistical considerations, comfort, or amenities available on-site may discourage extended camping. The data reveals that Tap Mun largely attracts daytime visitors, most likely families, tourists, and local residents who seek short, recreational outings. The substantial number of respondents opting for half-day visits indicates a preference for activities such as picnicking, hiking, or light exploration without the commitment of overnight accommodations.

The most significant reason for camping at Tap Mun was its attractive scenery, with 423 respondents or approximately 83% selecting this option. This result underscores the importance of natural beauty in drawing visitors. Tap Mun is likely known for its picturesque landscapes, ocean views, and opportunities for photography.

Whether it's the views of the sea, lush greenery, or the overall natural environment, these factors create a compelling reason for campers seeking a connection with nature. 166 respondents (around 33%) highlighted the convenience of transportation as a significant factor in their choice. This suggests that accessibility plays a crucial role in attracting visitors. Efficient transportation links, make it easier for campers to reach Tap Mun without logistical challenges. The ease of getting to the site likely decreases barriers to entry for potential campers. Following transportation, 112 respondents (around 22%) mentioned easy access as a reason for their choice.

This could refer to the accessibility of grassland, the availability of amenities, and the general navigability of the site. A smaller number of respondents mentioned reasons such as not being managed by government departments, suggesting that some campers may prefer a more rugged or natural experience without formal regulations. This could attract visitors looking for a more personal or less moderated camping environment. Some respondents appreciated the relative tranquility of Tap Mun, as indicated by the mention of fewer visitors. A less crowded environment can enhance the camping experience, allowing for greater relaxation and connection to nature. Lastly, a focus on biodiversity was mentioned by a few respondents, indicating that those interested in nature may seek out areas rich in wildlife, plants, and ecosystems, thus enhancing their outdoor experience.

For responses regarding the factors that respondents consider when choosing a camping site, the most critical factor, selected by 398 respondents (approximately 78%), is transportation. This indicates that ease of access to a camping site is a primary concern for many campers. Good transportation options, whether through public transit, private vehicles, play a significant role in the decision-

making process, especially for families or those with time constraints. Easier transportation means less stress and greater convenience for reaching the camping site. Following transportation, 264 respondents (about 52%) identified the presence of nearby facilities as an essential consideration. These facilities may include restrooms, water sources, food options, waste disposal, and other conveniences that enhance the camping experience. Campers often seek locations that provide these amenities to ensure comfort and safety, making it easier to enjoy time outdoors without worrying about basic needs. The popularity of the location was important for 186 respondents (around 37%). This suggests that many campers might gravitate toward well-known sites that offer social proof—places that friends or family have recommended, or that are frequently highlighted in travel literature. Lastly, only 32 respondents (approximately 6%) selected environmental considerations as a factor. This indicates that while some campers are mindful of the ecological impact of their camping decisions, it is not a primary concern for the majority. This could suggest a gap in awareness around sustainable camping practices or reflect a preference for convenience over environmental impact, pointing to an opportunity for education on responsible camping practices.

The most popular activity, selected by 392 respondents (approximately 77%), is hiking. This high percentage indicates that Tap Mun likely offers well-maintained hiking trails with scenic views, diverse landscapes, and an opportunity for adventure. The popularity of hiking aligns with the overall appeal of natural environments, making it a significant draw for campers seeking physical activity and a chance to connect with nature.

299 respondents (around 59%) selected dining at local restaurants or shops as an activity. This indicates a strong interest in local cuisine and the experience of exploring local culture through food. The presence of nearby restaurants and shops enhances the camping experience by providing a chance to taste local dishes, socialize with locals, and support small businesses in the area. This also suggests that visitors are interested in combining their outdoor adventures with culinary experiences. 92 respondents (about 18%) chose watersports as an activity. While this is the least popular of the core activities listed, it still represents a notable interest in engaging with the water, possibly through activities like kayaking, paddleboarding, or snorkeling. This could be an opportunity for venue expansion or partnerships with local businesses, potentially offering rental services or guided experiences. Selected by 32 respondents, kite flying represents a niche but enjoyable activity, suggesting that some visitors appreciate open spaces and gentle winds conducive to flying kites. While its popularity is lower than other activities, it can still add to the diversity of experiences available at Tap Mun. Additional activities mentioned include barbecue, cattle watching, and volunteer work. These activities indicate varied interests among visitors, ranging from social bonding barbecuing to appreciation of local wildlife cattle and community service (volunteer work). Encouraging these activities can help foster a sense of community and enhance the visiting experience, providing opportunities for visitors to engage more deeply with one another and their surroundings.

The responses regarding activities campers engage in while at the campsite provide valuable insights into their preferences and behaviors. The most popular activity, chosen by 378 respondents (approximately 74%), is cooking at the campsite. This high percentage reflects the importance of self-sufficiency and the enjoyment many campers derive from preparing their own meals outdoors. Cooking can enhance the

camping experience, allowing families and friends to bond over meals prepared in a natural setting.

Selected by 320 respondents (around 63%), fetching water from the public toilets indicates that campers may have limited access to water sources nearby. This activity may reflect a necessity rather than a choice, suggesting that improving water accessibility at the campsite could improve overall satisfaction. Easy access to clean water is a vital consideration for campers regarding comfort and safety. Barbecuing was selected by 77 respondents (approximately 15%). While this number is smaller compared to cooking and fetching water, it still signifies a recreational aspect of the camping experience. With 73 respondents (around 14%) selecting showering at public toilets, this activity indicates that while some campers prioritize cleanliness, they also have to rely on available facilities. The relatively low preference for this activity might reflect personal comfort levels with available shower facilities, and the fact that not all campers may feel the need to shower daily while camping. Additional activities mentioned include feeding cattle and a response indicating that some people never camp. Feeding cattle may suggest an interest in local agriculture or rural experiences, while the mention of never camping indicates that there could be potential visitors who have not yet experienced camping or have chosen other forms of recreation.

A significant majority of 302 respondents (approximately 59%) indicated that more people believe campsite facilities are not sufficient. This finding suggests that there may be numerous aspects of the facilities that are not meeting the expectations or needs of the campers. In contrast, 208 respondents (about 41%) felt that the facilities are sufficient. While this represents a smaller segment of respondents, it indicates that there is a substantial number of campers who are satisfied with the current offerings.

The responses regarding additional facilities desired at the campsite highlight key areas where improvements can enhance the overall camping experience. 238 respondents (approximately 47%) indicated the need for a water source. This overwhelming response points to a critical requirement for campers who need easy access to clean water for cooking, and hygiene. Insufficient water availability can significantly impact the camping experience, making this a top priority. Selected by 218 respondents (about 43%), the call for additional public toilets suggests that existing facilities is inadequate in number and far away from the camping site. Clean and sufficient restroom facilities are essential for hygiene and overall camping experience. With 157 respondents (around 31%) expressing interest, this indicates a desire for enhanced cooking facilities. These could include more barbecue pit, which would align with the interest in cooking seen in previous survey responses. 102 respondents (approximately 20%) expressed the need for camping equipment rental services. This facility could support those who may not own personal camping gear and could encourage more people to participate in camping by reducing barriers to entry. Selected by 95 respondents (about 19%), an information center would be beneficial for providing visitors with guidance, maps, activity information, and local resources. It could enhance the orientation experience, helping newcomers navigate the site and participate in local activities.

High level of uncertainty (45%) indicates a lack of awareness or clarity about the legal status of camping activities in the camping area in Hong Kong, reflecting that the government should strengthen the promotion and education on related regulations.

The findings regarding whether respondents have researched the history or cultural background of Tap Mun before their visit. The overwhelming majority, 442 respondents (approximately 87%), indicated that they have not researched the history or cultural background of Tap Mun prior to their visit. This suggests a general lack of awareness or resources in the cultural heritage among most visitors. Only 68 respondents (around 13%) reported that they have researched the history or cultural background of Tap Mun, indicating limited information or resources can visitors reach the history or cultural background of Tap Mun.

The findings regarding whether respondents have checked tourism guides or routes for Tap Mun before their visit. A significant majority of 394 respondents (approximately 77%) indicated that they have not checked tourism guides or routes for Tap Mun prior to their visit. This indicates a considerable lack of engagement with available information resources that could enhance their experience. In contrast, 116 respondents (around 23%) reported that they have checked tourism guides or routes, suggesting that a smaller segment of visitors value or utilize these resources in planning their visits. The high percentage of visitors who do not check guides indicates an opportunity for the government or education centre to cultivate greater awareness and interest in tourism resources. Lack of pre-visit research may result in missed opportunities for visitors to explore Tap Mun's attractions, navigate efficiently, or embrace the natural and cultural offerings of the area. The data suggest that tourism resources may not be effectively reaching or appealing to potential visitors. Improving the accessibility and attractiveness of these guides can enhance visitor engagement and satisfaction.

The responses regarding support for the establishment of a conservation and education center at Tap Mun. An impressive 466 respondents (approximately 91%) expressed support for establishing a conservation and education center at Tap Mun, indicating a strong community interest in environmental stewardship and educational initiatives. Only 44 respondents (around 9%) indicated that they do not support the initiative. This relatively small dissenting voice suggests that the majority of the survey participants are aligned in their values concerning conservation and education or they are already well known about Tap Mun information. The overwhelming support signals a public recognition of the importance of environmental conservation and education, suggesting that the establishment of such a center could play a vital role in preserving Tap Mun's natural and cultural resources, help to raise awareness about conservation issues and foster a sense of community ownership over Tap Mun's environmental and cultural heritage. With strong support for an educational center, there is potential to develop a robust programming framework that could educate visitors and locals about the significance of Tap Mun's ecosystems, biodiversity, and cultural history.

The responses to the question about the type of information respondents would like to know if a conservation and education center is established at Tap Mun. The majority of respondents, 414 (approximately 81%), indicated an interest in receiving visitor guide information, such as creating a detailed visitor guide that includes essential information about attractions, activities, logistical details, and safety tips. This suggests that potential visitors are keen on having comprehensive details about the attractions, activities, and amenities available at Tap Mun. A significant number of respondents, 287 (around 56%), expressed a desire for historical and cultural information. This indicates a strong interest in understanding the heritage and background of Tap Mun, enriching their experience during their visit. Such as specific

exhibitions or programs that highlight the history and culture of Tap Mun. Collaborate with local historians, cultural experts, and community members to deliver authentic content. 189 respondents (around 37%) selected interest in camping facilities, highlighting that outdoor recreational options are appealing to many visitors. 135 respondents (about 26%) expressed interest in workshops, which implies that visitors are looking for hands-on learning experiences related to conservation and the local environment. Lastly, 130 respondents (approximately 25%) indicated interest in information about the rental of camping supplies. This suggests that visitors may require assistance in accessing necessary equipment for their outdoor activities.

Respondents have identified grassland recovery as the top priority issue. This suggests a significant concern for preserving and restoring the mostly significant natural ecosystems at Tap Mun, and most of the respondents think that this issue is important. The second priority is the cattle and wild boar problem. This indicates that respondents recognize the impact of non-native species and domestic animals on local ecosystems, and they see addressing this issue as critical for maintaining ecological balance. Also, cattle and wild boar have significant conflicts with human being. The third priority is related to transportation and facilities. This highlights a concern for the accessibility and infrastructure necessary to support both residents and visitors, indicating that improvements in this area are also essential for the sustainability of Tap Mun.

Visitors express a desire to appreciate terns, indicating an interest in birdwatching and natural observation. Terns are likely important to the local ecosystem, and this interest reflects a broader concern for wildlife and biodiversity conservation. The request for increased police patrols to deal with illegal firing points to a significant safety concern

among visitors. Illegal activities not only pose risks to wildlife but also undermine the conservation efforts and natural enjoyment of the area. Visitors believe that the AFCD should take responsibility for managing the wild boar problem. This highlights a demand for professional and structured management of the wildlife issues affecting the area.

8. Discussion

The analysis of questionnaire data shows that a large proportion of visitors are attracted to Tap Mun for its scenic beauty, indicating that aesthetic values are central to its appeal. Notably, many respondents chose to engage in activities like hiking and dining at local establishments, which further emphasizes the need for infrastructure that can accommodate these recreational pursuits. However, the absence of adequate facilities and the prevalence of littering raise significant concerns; 302 out of 510 respondents indicated that current campsite facilities were insufficient, highlighting an urgent need for improvements. This aligns with findings from Zhou et al. (2016), who identified waste management issues stemming from increased visitor numbers in tourism hotspots.

Moreover, human-wildlife interactions, particularly concerning local cattle and wild boars, present further challenges. Instances of visitors feeding cattle, recorded on multiple occasions during field observations, can lead to unnaturally bold behaviors in wildlife, echoing concerns raised by Hastings et al. (2007) on the impacts of human activity on animals. Such behaviors not only endanger wildlife but also pose risks to human safety and alter the ecological balance of the area. The findings suggest that despite the rich cultural heritage associated with Tap Mun—evident in its historical temples and the stories of its fishing community—visitors' awareness of this cultural

significance remains low, with 87% of respondents stating they had not researched the local history prior to their visit. This gap underscores a potential opportunity for the establishment of a conservation and education center, which received overwhelming support from survey participants. Such a center could provide educational resources about local biodiversity, cultural heritage, and best practices for respectful interactions with both the natural environment and local communities. This perspective aligns with the Village Conservation Management Plans that emphasize integrating conservation initiatives with local community needs (Borrini-Feyerabend et al., 2004).

Drawing from the insights gathered, it is evident that effective management strategies that engage local communities and visitors are critical for protecting and preserving Tap Mun's unique ecological and cultural resources. Increased educational outreach, improved waste management practices, and the development of sustainable tourism frameworks will be essential in mitigating the impacts of anthropogenic activities (Buckley, 2009). Future conservation efforts must consider the delicate balance between promoting tourism and safeguarding the ecological integrity of Tap Mun, fostering a sustainable relationship between visitors and the local environment (Soulé & Lease, 1995).

The results indicate the necessity of establishing an education center that would serve multiple essential functions for visitors. Firstly, this center could play a pivotal role in delivering vital travel information, ensuring that guests have access to resources that enhance their overall experience.

Additionally, the education center could function as a hub for learning, offering educational materials and programming focused on the rich history of hiking in the

area, including insights into local environmental practices and cultural heritage. By providing this information, visitors would not only gain a deeper appreciation for the environment but also embody responsible tourism practices.

Moreover, it has been noted that the facilities currently available in Tap Mun are inadequate, according to visitor feedback. Many guests may find themselves in need of camping supplies and clean restroom facilities. By establishing comprehensive amenities, we can encourage visitors to utilize proper facilities instead of resorting to less sustainable practices. For example, the education center could provide the option to borrow barbecue equipment. This would discourage illegal or unsafe fires in natural areas, promoting environmental stewardship among visitors.

Furthermore, the education center could include well-maintained restroom facilities equipped with showers. This would discourage guests from drawing water from public toilets, ensuring that they have access to hygiene while maintaining the cleanliness of the environment. Overall, by enhancing the facilities and educational offerings at the education center, we can better support our visitors while fostering a greater sense of responsibility towards preservation and conservation in the Tap Mun area.

In conclusion, while Tap Mun is a site of significant ecological and cultural importance, it faces notable challenges from human activities. Comprehensive management strategies that incorporate community engagement, education, and sustainable practices are vital to ensure that Tap Mun remains a treasured destination for visitors while nurturing its natural and historical legacy for future generations. Addressing these challenges through collaborative efforts among researchers, local stakeholders,

and government bodies will be essential to achieving its conservation goals, as well as promoting sustainable tourism and community involvement.

9. Recommendations on the conservation management

9.1 Proposed conservation strategies

In the past of Tap Mun, most of the area was covered with grasslands and farmland, but due to the lack of management, natural succession has gradually transformed the grasslands into shrublands. Additionally, the presence of wild animals such as cattle and wild boars on the island has helped to spread weeds and other shrubs, resulting in most of the Tap Mun grasslands being replaced by shrublands. If we want to preserve the grassland habitat, we recommend removing a portion of the shrublands to slow down the succession process. This includes removing some of the Screw Pine as it grows rapidly and is abundant on Tap Mun. By controlling the number of Screw Pine trees and slightly reducing their growth area, we can create space for camping activities, which can help reduce the pressure on the existing grasslands. This will allow us to strike a balance between conservation and recreational uses, and promote sustainable development of the Tap Mun grasslands.

We also suggest educating visitors on Tap Mun about terns and providing binoculars for them to observe the terns. We recommend strengthening the conservation efforts for terns. This includes conducting surveys of the rocky shorelines of Tap Mun that are not accessible to the public to determine if terns are nesting there. If terns are found nesting in these rocky locations on Tap Mun, conservation efforts should be strengthened, including the provision of artificial nesting boxes or the establishment of conservation zone to prevent human access. We suggest collaborating with organizations such as Birdwatching Societies to conduct continuous surveys to

understand the population numbers of terns over the past 10 years and to monitor any decline in their population.

Given the positive response to the 2024 Tern Festival, which effectively promoted conservation and education about terns, we recommend continuing to hold the Tern Festival in the future. Through this event, we can educate public on proper birdwatching methods, reducing the impact of visitors on the outer islands of terns' breeding habits. The Tern Festival can continue to be held as a unique feature of their cultural events, promoting conservation and education for future generations.

Based on current findings, butterfly conservation efforts on Tap Mun can be strengthened. The previous report suggested developing a butterfly garden within the King Lam Education Centre to attract butterflies. the King Lam School Education Centre can build a butterfly garden. We can invite the school or the public to visit the butterfly garden to learn about different butterfly species. We can also organize volunteer activities to educate them on how to manage the butterfly garden. Furthermore, to attract more butterflies, we suggest providing planting recommendations or educating local residents, or assisting them in planting nectar plants in their gardens, thus establishing multiple small butterfly gardens to attract a greater variety of butterfly species.

9.2 Policy suggestions for sustainable tourism

The King Lam School Education Centre can serve as a visitor information station, providing tourists with travel information and organizing regular tours for them to participate in. Additionally, village residents will be hired as tour guides. These guides will operate sustainable tours on a self-sufficient basis to generate income. Once the

King Lam School Education Centre opens to the public, it may feature three exhibition halls. These halls can showcase various themed exhibitions tailored to different public interests. According to current suggestions, one of the exhibitions may focus on the uses of dinosaur fossils found in Hong Kong. Given that Port Island (Chek Chau) is near Tap Mun, the public can learn about dinosaur fossils at this exhibit before taking a speedboat to explore Port Island (Chek Chau). Additionally, one of the exhibitions can present the local culture and history of Tap Mun, including the Chiu/Jiao Festival culture, Tin Hau Temple culture, and the history of King Lam School, among others. And conservation on environment message can be delivered in this centre.

Local tours

In addition to the local ecology and culture of Tap Mun, we suggest using nearby attractions as themes for our tours. These include the dinosaur fossil site on Port Island (Chek Chau). We can depart from Tap Mun by speedboat to travel around Port Island, introducing the geography and fossil knowledge of the area. Furthermore, we can also organize tours departing from Tap Mun to Hoi Ha Wan, on the opposite shore, to introduce its ecology and culture, and to Ko Lau Wan, introducing the culture and history of that area. We can leverage our tourism experience over the past 5 years, and then expand to other locations, including Ko Lau Wan, Port Island, and Hoi Ha, which are near Tap Mun, to increase tourist flow.

The benefits of adding more tour destinations are that it can distribute the flow of people from Tap Mun, preventing overcrowding, and it can attract even more visitors. This allows tourists to have a richer experience. Therefore, Tap Mun will become a sustainable tourism destination, with Tap Mun as the central point of departure to visit other places. Because we have a visitor centre information station, we can use this

station as a place for registration and a travel agency-like function to organize similar tours.

Exploit Walking Trail

Furthermore, we anticipate a gradual increase in visitor numbers to Tap Mun in the future. Based on our current observations, many tourists are arriving in Ta Mau after seeing recommendations on social media platforms like "Xiaohongshu" (Little Red Book). However, the limited walking areas for tourists in Tap Mun are putting increasing pressure on the grasslands. Therefore, we propose building a walking trail from Lung King Ting to the Lung Keng Kan area, allowing visitors to explore the area. Currently, there isn't a suitable path to Lung Keng Kan, making it only accessible to those with sufficient equipment and hiking experience. Developing a trail would help to redistribute visitor traffic and promote Lung Keng Kan as a sightseeing destination.

9.3 Community engagement and education initiatives

Community engagement involve villagers' engagement on the island, villagers may be trained as interpreter to manage the education center and hold eco-tours. It is suggested to provide training for the villagers to share their stories on Tap Mun in the education center. At the same time to provide job opportunities for the island villagers. We suggest organizing a regular tern festival event every year, allowing community members to regularly participate in these events, it can attract villagers to sell goods, including snacks and provide traditional performances, which can enhance the villagers' sense of belonging. The public has also indicated that the tern festival allows them to understand the culture of Tap Mun and the importance of tern conservation.

9.4 Habitat restoration projects

There is only small patch of grassland on the island now, as most of the grassland undergoes to success into shrublands and woodland. The grassland attracts some animals to inhabit there. The succession rate of grassland is slowing down by cattle effect, erosion effect and human activities. It is suggested to keep the grassland habitat by reducing the impacts from the mentioned effect above.

In short term suggestion, cattle monitoring work should be done, the cattle are the key stone species affecting grass growth and distribution, as cattle selectively eat the carpet grass but not the zoysia grass, leading to increase of zoysia grass on the island. They also control the numbers of shrubs as they consume some species of shrubs but not another. Therefore, the grassland condition will be altered by numbers of cattle there. If there are too many cattle on the grassland, the grass will reduce and contain shrubs will increases as they help to disperse the seeds.

Grassland recovery work can be done in the second phase (5-10 years plan). As the land use and management work need to be discussed with government and get the authority to regrow the grass. 2 species are suggested to plant (the *Zoysia japonica* and *Axonopus compressus*) in the grassland for grass recovery. We recommend starting the restoration of grasslands within a 5- to 10-year plan. According to experts, the characteristic features of the grasslands on Tap Mun have been lost. Therefore, it is not possible to simply plant grass using seeds alone. The soil on the grasslands must be turned over, then fertilized and seeded to have a chance of restoring the grasslands. We recommend initially dividing the land into small, manageable spaces as an experimental basis, we can turn over the soil, seed, fertilize, and replant grass in each small space. This may allow us to restore the grasslands on Tap Mun. According to expert recommendations, restoring the grasslands of Tap Mun requires the use of

large tractors to cut the grass stems, which promotes grass growth. Furthermore, it is essential to increase the nutrients and water retention capacity of the soil to have a chance of successfully restoring the grasslands.

In addition to the issues related to grass growth, camping activities on Tap Mun also contribute to the degradation of the grasslands. Therefore, camping on Tap Mun must be regulated. We recommend educating the public about the importance of using the Tap Mun grasslands responsibly, including instructing them not to burn the ground. Furthermore, it is necessary to educate them not to pour substances such as sulfur onto the grasslands. Consequently, we suggest that government may consider hiring a resident patrol team to monitor the condition of the grasslands, including observing user behavior and the condition of the grasslands. Areas of the grasslands that have already been eroded should be subjected to less pressure. Similar to the impact of cattle grazing, we recommend removing the less ecologically valuable undergrowth from other shrub areas on Tap Mun to restore the grasslands. This would help to redistribute visitor numbers and allow for the creation of more grasslands, thereby increasing grassland habitat.

9.5 Monitoring and Evaluation

Implementing a systematic monitoring and evaluation framework can provide valuable insights into environmental conditions and the impacts of human activities. Regularly record the number of visitors and demographic information to understand patterns of use and peak visitation times. Distribute surveys to gather visitors' perceptions, behaviors, motivations, and satisfaction levels regarding their experience at Tap Mun. Conduct annual biodiversity surveys to monitor changes in plant, bird, insect, and mammal populations. This data can help track the health of local ecosystems and

identify any emerging threats. Regularly assess the condition of different habitats, such as woodland, grassland, and marine environments, to identify signs of degradation, invasive species, or loss of biodiversity. Perform periodic audits of litter types and quantities found in various locations. This will help identify problem areas and guide waste management efforts. Document instances of human-wildlife interactions, particularly those involving feeding or disturbing local wildlife. This can be done through scheduled observations and recording incidents in a log. Monitor the effectiveness of educational programs offered by conservation centers or local organizations and gather feedback from participants.

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Appendix 1. Record sheet for anthropogenic impacts observations

Location: Tap Mun

Date:

Time:

Weather Conditions: [e.g., sunny, rainy, cloudy, temperature]

1. Campsites Recorded

- a. **Numbers of visitors:** [e.g., 25 individuals]
- b. **Number of Campsites:** [e.g., 8 camps]

2. Activities Involving Cattle

- **Number of People Engaging in Activities with Cattle:** [e.g., 25 individuals]
 - a. **Feeding the Cattle:** [e.g., 10 people]
 - b. **Touching the Cattle:** [e.g., 5 people]
 - c. **Taking Photos with the Cattle:** [e.g., 12 people]
 - d. **Conflicts with Cattle:** [e.g., 3 incidents noted]

3. General Activities Observed

- **Camping:** [e.g., 15 people]
- **Flying Kites:** [e.g., 8 people]
- **Eating:** [e.g., 20 people]
- **Sitting Without Campsite:** [e.g., 10 people]
- **Setting Up Fire:** [e.g., 5 campsites had fires]
- **Volunteer Work:**
 - a. **Grass Growing:** [e.g., 3 volunteers]
 - b. **Irrigating:** [e.g., 1 group of volunteers]
 - c. **Cattle Feeding:** [e.g., 2 volunteers]
- **Hiking:** [e.g., 30 hikers]

4. Trash and Rubbish Found

- **Amount of Trash/Rubbish Found:** [e.g., 20 kg of mixed waste]
- **Types of Trash:** [e.g., plastic bottles, food wrappers, etc.]

5. Rubbish Disposal Behavior

- **Observation of People Throwing Rubbish on Grassland:** [e.g., 5 incidents seen]

6. Status of Rubbish Collecting Point

- **Rubbish Collecting Point Condition:** [e.g., full and overflowing, well-maintained, etc.]
- **Cleanliness:** [e.g., neat, scattered, etc.]

7. Special Findings

- **Notable Observations:** [Include any unusual findings such as wildlife interactions, signs of overgrazing, unique flora/fauna, etc.]

Appendix 2. Survey Questionnaire

1. **Date of the survey**
2. **Name of recorder**
3. **How many days will you be camping at Tap Mun?**
4. **What are your reasons for choosing Tap Mun as a camping site? (You may select more than one option.)**
 - a. Convenient transportation
 - b. Easy to access
 - c. Attractive scenery
 - d. Not managed by government departments
 - e. Fewer visitors
 - f. Other
5. **What factors do you consider when choosing a camping site? (You may select more than one option.)**
 - a. Transportation
 - b. Popularity
 - c. Nearby facilities
 - d. Environmental consideration
 - e. Other
6. **Besides camping, what activities will you engage in at Tap Mun? (You may select more than one option.)**
 - a. Hiking
 - b. Kite flying
 - c. Water sports
 - d. Dining at local restaurants or shops

Identifying additional activities can benefit local businesses and the

surrounding community. If dining or shopping is popular, local establishments can be encouraged to offer services tailored to campers, leading to economic benefits for the area. Also, we may understand the impacts towards environment through the activities, and predict the capacity of grassland of Tap Mun.

7. What activities will you do at the campsite while camping? (You may select more than one option.)

- a. Shower in public toilets
- b. Fetch water from public toilets
- c. Cook at the campsite
- d. Barbecue
- e. Interact with or feed cattle

8. Do you think the campsite facilities are sufficient? If yes, answer question 9; if no, answer question 10.

Yes

No

9. What facilities do you think should be added to the campsite? (You may select more than one option.)

- a. Water source
- b. Public toilets
- c. Cooking facilities
- d. Camping equipment rental
- e. Information center
- f. Recycling station
- g. Other

10. Do you think camping at Tap Mun is illegal?

Yes

No

Don't know

11. Have you researched the history or cultural background of Tap Mun before your visit?

Yes

No

12. Have you checked tourism guides or routes for Tap Mun before your visit?

Yes

No

13. Do you support the establishment of a conservation and education center at Tap Mun? If yes, answer question 12; if no, answer question 13.

Yes

No

14. If a conservation and education centre is established at Tap Mun, what type of information would you like to know?

- a. Visitor guide
- b. Historical or cultural information
- c. Camping facilities (e.g., restrooms)
- d. Rental of camping supplies
- e. Workshops (e.g., farming workshops)
- f. Other

15. Can you rank the following issues the government should address at Tap Mun in order of priority? (1 is the highest priority, 5 is the lowest priority)

- a. Grass restoration
- b. Cattle issues

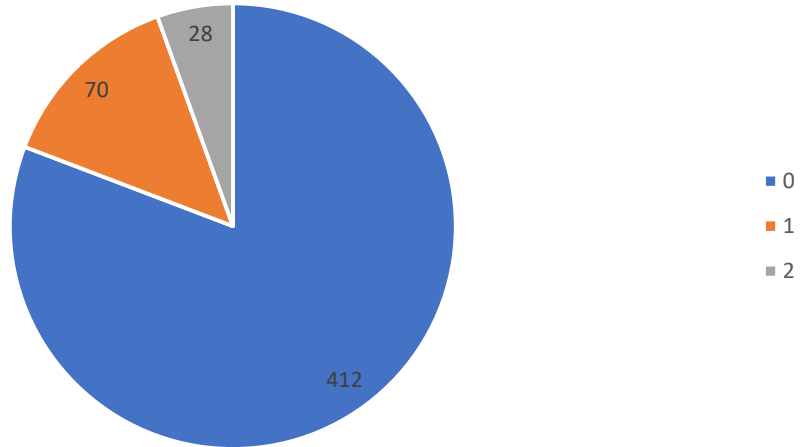


- c. Transportation
- d. Facilities
- e. Other

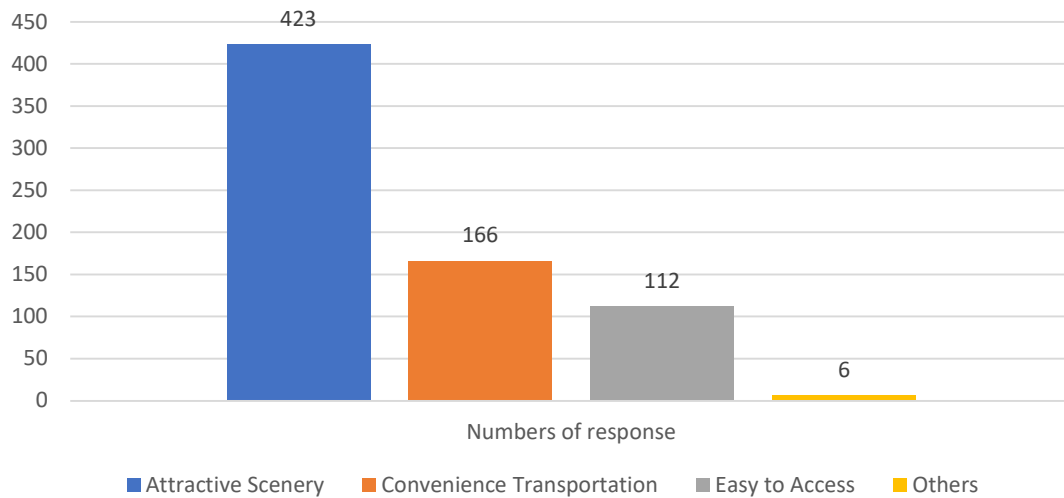
16. Any other comments or suggestions?

Appendix 3.

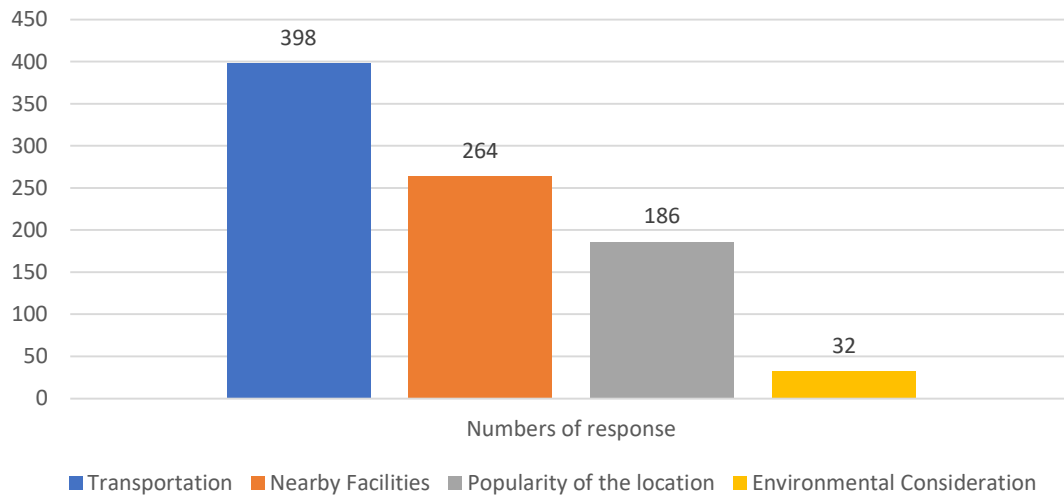
1. How many days will you be camping at Tap Mun?



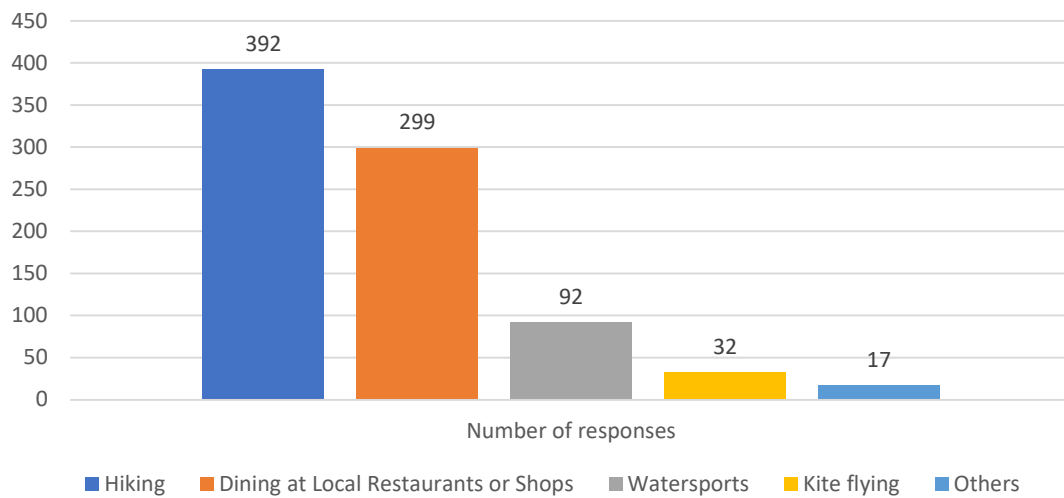
2. What are your reasons for choosing Tap Mun as a camping site? (Multiple options can be chosen)



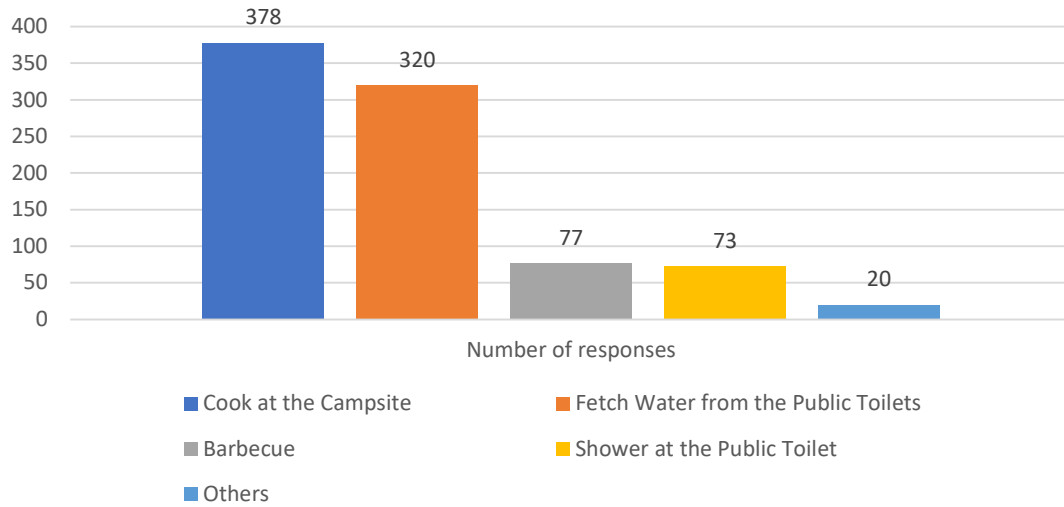
3. What factors do you consider when choosing a camping site? (Multiple options can be chosen)



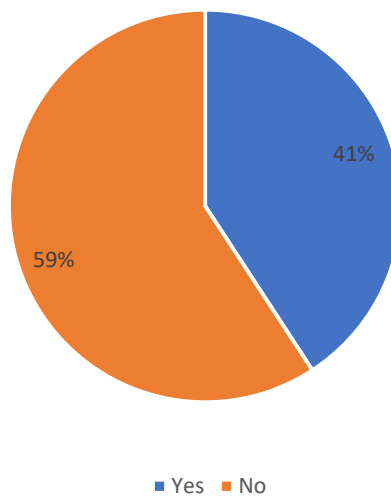
4. What factors do you consider when choosing a camping site? (Multiple options can be chosen)



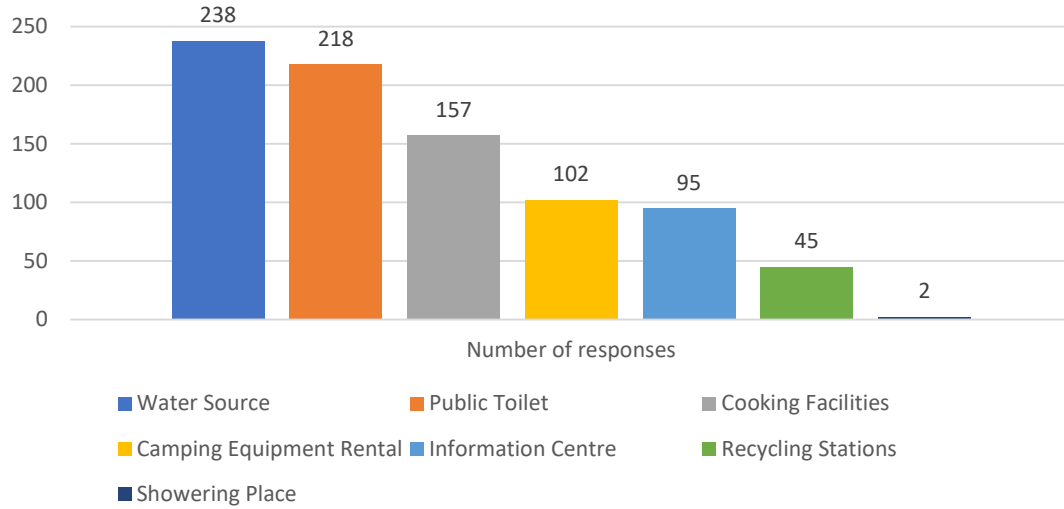
5. What activities will you do at the campsite while camping? (Multiple options can be chosen)



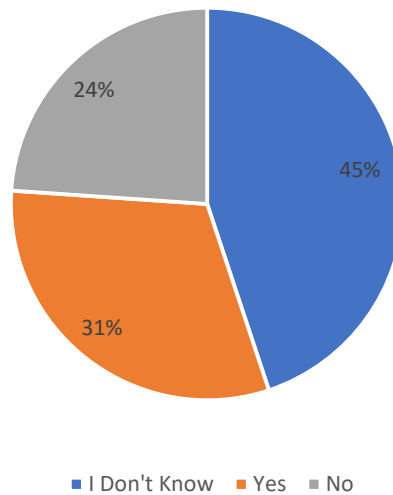
6. Do you think the campsite facilities are sufficient?



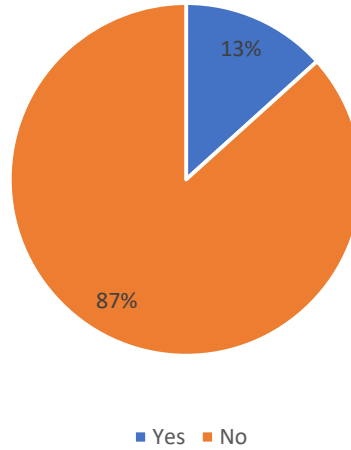
7. What facilities do you think should be added to the campsite? (Multiple options can be chosen)



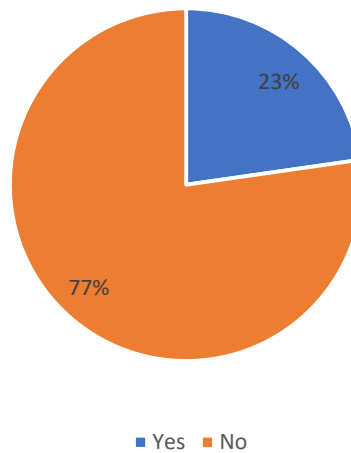
8. Do you think camping at Tap Mun is illegal?



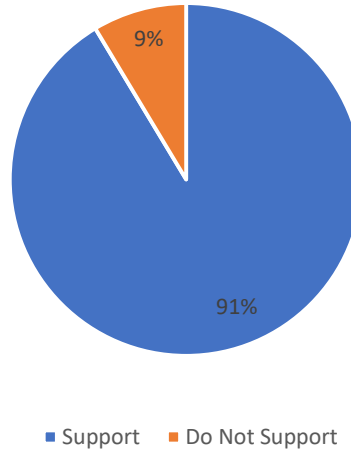
9. Have you researched the history or cultural background of Tap Mun before your visit?



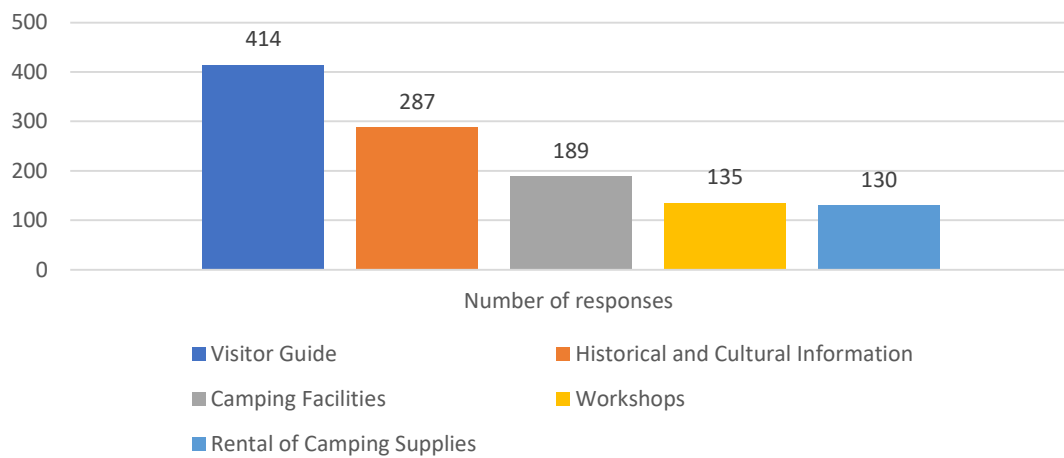
10. Have you checked tourism guides or routes for Tap Mun before your visit?



11. Do you support the establishment of a conservation and education center at Tap Mun?



12. If a conservation and education centre is established at Tap Mun, what type of information would you like to know? (Multiple options can be chosen)



13. Can you rank the following issues the government should address at Tap Mun in order of priority?

