

Preliminary Assessment on Primate Diversity and Potential of PrimaTourism Among Local People and Orang Asli Jakun (Aborigines: Proto-Malay) in Tasik Chini Biosphere Reserve, Pahang, Malaysia

Hidayah Haris¹, Yussof Nurfitri-Ezatie², Nursyuhada Othman¹, Farah Farhana Ramli¹, Nur Hartini Sariyati¹, Nurfatihah Akmal Fawwazah Abdullah-Fauzi¹, Mohd Faudzir Najmuddin¹, Mohd Lokman Ilham-Norhakim^{1,3,4}, Muhammad Abu Bakar Abdul-Latiff^{1*}

¹Environmental Management and Conservation Research Unit (eNCORe), Faculty of Applied Sciences and Technology (FAST), Universiti Tun Hussein Onn Malaysia (Pagoh Campus), 84600, Johor, MALAYSIA

²Faculty of Applied Sciences and Technology (FAST), Universiti Tun Hussein Onn Malaysia (Pagoh Campus), 84600, Johor, MALAYSIA

³Kim Ichthyologist Centre, Kg Parit Samsu, Jalan Temenggong Ahmad, 84150 Parit Jawa, Muar, Johor, MALAYSIA

⁴Akim Fishes Enterprise, 81P Pesta 2, Kg Kenangan Tun Dr Ismail, 84000 Muar, Johor, MALAYSIA

*Corresponding Author

DOI: <https://doi.org/10.30880/jsunr.2023.04.01.005>

Received 5 July 2023; Accepted 21 August 2023; Available online 31 August 2023

Abstract: PrimaTourism is a well-known aspect of nature tourism that provides valuable benefits for the primate species conservation. Malaysia, with its rich diversity of more than 25 primate species inhabited in the country, holds significant potential for enhancing primate-based tourism. However, the information on primate species in potential tourism spots like Tasik Chini remains limited, with only a few data on their behaviour and ecology. Additionally, the lack of comprehensive information on the primate species poses challenges in identifying potential PrimaTourism product. Thus, this study aimed to assess primate diversity and explore the perception of PrimaTourism among local people in Tasik Chini. A survey and interview session were conducted over five days in two villages around Tasik Chini (Kampung Gumum and Felda Chini), involving a total of 32 respondents. Most respondents reported the presence of two common primate species in their area: the long-tailed macaque (*Macaca fascicularis*) and the pig-tailed macaque (*Macaca nemestrina*). The result suggested a significant majority (81%) of respondents expressed support for the dusky leaf monkey (*Trachypithecus obscurus*) as an ideal primate species for PrimaTourism in Tasik Chini, citing its attractive coloration and favoring the development of primate-based tourism. Overall, these findings can serve as essential baseline data for implementing primate tourism in the area, engaging the local community to attract tourists to Tasik Chini effectively and eventually serve as a conservation tool for the primate species.

Keywords: Aboriginal people, Chini Lake, community, socioeconomy, UNESCO, wildlife tourism

1. Introduction

Malaysia is blessed with diverse flora and fauna, and it has the potential to become a top destination for nature tourism. However, the development of organism-based tourism is still lacking, except in Sabah [1]. Indeed, nature tourism can be very beneficial in terms of financial gains, job employment, and empowering local people. More importantly, it can serve as a conservation tool [2]. Nature tourism involves responsible travel to relatively undisturbed natural areas with the aim of seeing, admiring, enjoying, and learning about the environment, the flora and fauna, and the local culture without causing alterations or disturbances, promoting environmental conservation, and enhancing the well-being of local people [1]. Recently, tourism with the main purpose of observing the local fauna is becoming increasingly popular due to an increase in awareness about environmental issues and easy access to tourism destinations [3]. This form of tourism can be called wildlife tourism, and one example is primate tourism. However, there are only a few places where tourists can experience observing primates closely, and most of these places are not familiar enough among tourists [4].

Generally, primates can be divided into two major suborders: Strepsirrhini and Haplorhini. Strepsirrhini can be further divided into two infraorders: Lorisiformes and Lemuriformes. Haplorhini are mainly composed of tarsiers and anthropoids, consisting of the New World and Old World monkeys [5]. Malaysia is home to more than 25 primate species under five families, such as Lorisidae, Tarsiidae, Cercopithecidae, Hylobatidae, and Hominidae, which have the potential to become new tourism attractions [4], [6]. In Sabah, well-established primate tourism spots feature orangutans (*Pongo pygmaeus*) and proboscis monkeys (*Nasalis larvatus*) that have been famous icons for two decades, attracting nature tourists and benefiting the local community's socio-economic well-being [1]. Additionally, in Peninsular Malaysia, Bukit Merah Orang Utan Island, Perak houses orangutans in enriched enclosures for conservation, breeding, education, tourism, and research purposes [4]. Tourists may also enjoy observing the behavior of habituated silvered leaf monkeys (*Trachypithecus cristatus*) without enclosures in Bukit Melawati, Kuala Selangor, Malaysia [4].

Despite the popularity of primate tourism in this country, data on primate diversity in potential spots such as Tasik Chini remains unknown, with limited information about their population size, social behaviour, feeding behaviour, and ecology. Tasik Chini is the second largest freshwater lake in Malaysia and is surrounded by a network of 12 lakes [7]. The area around the lake is hilly and resembles the back of a dragon. Furthermore, Tasik Chini is surrounded by tropical forests, with a total area of natural forests and freshwater estimated to be around 12,000 acres or 4,975 hectares [8]. The region also features Mount Chini, a mountain with a height of over 800 meters, covered with thick forests. This lack of information may be attributed to less attention given to the area, a shortage of financial resources, and conflicts impacting conservation efforts [9]. Furthermore, current issues such as deforestation, land use changes, and habitat fragmentation contribute to a decrease in primate populations [10]. With small and fragmented primate populations in the area, understanding and studying primate species and their threats, with lack of information become more challenging. Therefore, this study aims to assess primate diversity and the potential for PrimaTourism in Tasik Chini using acquired data. The research will provide a baseline data for developing a conservation plan and establishing Tasik Chini as a popular PrimaTourism destination in the future, in which there is high demand for firsthand experiences due to the absence of existing primate tourism in the area.

2. Materials and Methods

2.1 Study Site

This study was conducted around Tasik Chini, located in Pekan District, Pahang State, Malaysia. As depicted in Figure 1, the area near the lake comprises five small villages: Kampung Ulu Gumum, Kampung Gumum, Kampung Melai, Tanjung Puput, and Cendahan. While Felda Chini is located approximately 8 kilometers from the lake. However, for this research, only two villages, Felda Chini and Kampung Gumum, were involved. Kampung Gumum is a small village with a population of approximately less than 100 people, mostly consisting of aboriginal people from the Jakun tribe. On the other hand, Felda Chini can be considered as a small town, having a curriculum center and several facilities such as post offices, schools, and homestays. The majority of the local people in these places work in boat services and as fishermen. These areas were selected because they are located at the forest edge, near the potential ranging area of most primate species, and have been reported to have a high visibility of primate species. The areas may also provide a sufficient number of respondents for this preliminary survey.

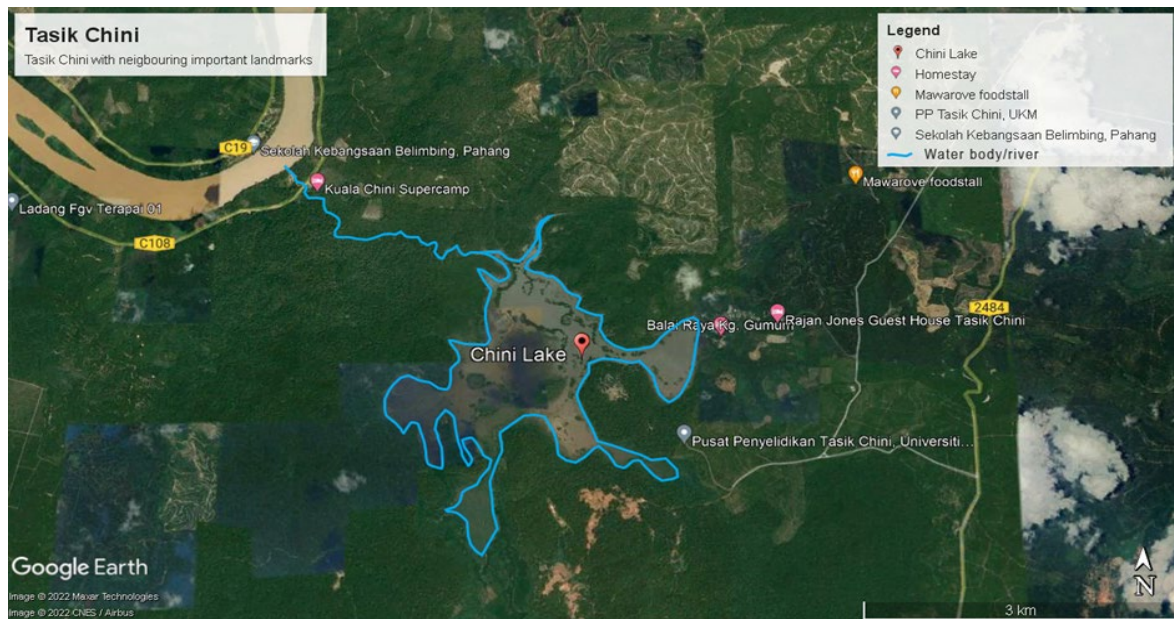


Fig. 1 - Map of study sites in Tasik Chini, Pahang (Google Map, 2023)

2.2 Survey and Interview Session

Prior to the study, we have obtained a permit from Jabatan Kemajuan Orang Asli Malaysia (JAKOA), and the Access Benefit Sharing consent form as well as Prior Informed Consent was explained to clarify the study's objectives and obtained from all the respondents. The data collection took place through a survey and interview session held for five days where small groups of researchers were divided to facilitate the survey process. A set of questionnaires was given to the local community in Tasik Chini, with respondents randomly selected from the two villages, to assess the potential of PrimaTourism in the area. The study adopted a quantitative research method by following Najmuddin et. al. [11] with some modifications, where semi-structured questionnaire forms were randomly distributed to the respondents.

The questionnaire consisted of three sections, covering sociodemography, understanding of primate species, and perception of primate-based tourism in Tasik Chini. The first section focused on demographic information, including age, gender, marital status, and level of education of the respondents. The second section aimed to evaluate the local people's understanding of primate species in Tasik Chini. To ensure accurate primate species identification, a list of primate photos was provided as visual aids for the local people. This step helped in gathering more precise data as the respondents could correctly recognize and differentiate various primate species found in the region. Meanwhile, the third section intended to explore the perception of the local people towards primate-based tourism products in Tasik Chini and their knowledge about primate-based tourism. For this section, the respondents were asked to rate the questions on an ordinal scale ranging from 1="Strongly Disagree" to 5="Strongly Agree". The questionnaire was written in Malay to facilitate better comprehension by the respondents. All information from the interviews was recorded in a jotter book and captured using audio and video recorders. Subsequently, all the collected data was analyzed and tabulated using Microsoft Excel.

3. Results and Discussion

3.1 Sociodemographic of Respondents in Tasik Chini

The interviews conducted successfully gathered a total of 32 respondents. Table 1 shows the sociodemographic information of the respondents from both villages. Firstly, respondents from Felda Chini outnumber those from Kampung Gumi, with 26 (81%) and six (19%) respondents, respectively. The majority of respondents are male, accounting for more than 50% of those surveyed. In terms of age, the highest number of respondents falls within the 31 years old and above category, while about eight respondents are aged between 15 and 20 years old. Regarding marital status, 20 respondents (63%) are already married, and only 37% of respondents involved in this survey are single. Furthermore, in terms of education level, the number of respondents from Felda Chini with educational qualifications is higher than the number of respondents from Kampung Gumi, with 25 respondents (78%) having some level of educational qualification.

From the demographic information, we can conclude that the local people mostly consist of adult male respondents aged 31 years old and older. The younger generation in Tasik Chini tends to move out to nearby cities like Pekan and Kuantan in search of better job opportunities. Moreover, most of the respondents in Tasik Chini

work independently, with some being sellers and farmers, emphasizing the need for proper education. Their income is based on selling items at Pasar Tani (local farmers' market) and fishing. For some respondents aged 31 years old and above, they may rely on financial support from their children or charity funds. Considering these factors, the local people are willing to engage in tourism activities such as PrimaTourism as a means to generate income. Their participation in this industry is supported by their willingness to be a part of it.

Table 1 - Sociodemographic data of respondents in Tasik Chini, Pahang

Demographic data of respondent Information		Frequency (n) and Percentage (%)	
		Felda Chini	Kampung Gumum
Gender	Male	18 (56%)	1 (3%)
	Female	8 (25%)	5 (16%)
Age	15-20 years old	7 (21.9%)	1 (3.1%)
	21-30 years old	2 (6.3%)	2 (6.3%)
	30 years old and above	17 (53%)	3 (9.4%)
Status	Married	15 (47%)	5 (16%)
	Single	11 (34%)	1 (3%)
Level of Education	UPSR	3 (9%)	1 (3%)
	PMR	7 (22%)	0
	SPM	13 (41%)	2 (6%)
	University	2 (6%)	0
	No qualification	1 (3%)	3 (9%)
Total Villagers		26 (81%)	6 (19%)

3.2 The Understanding on Primate Species Among Local People in Tasik Chini

The survey primarily focused on understanding the local people's knowledge of primate species in the area and their perception towards PrimaTourism. Figure 2 illustrates the local people who have encountered any primate species in Tasik Chini, based on the duration of their stay in the area. Referring to the figure, out of 32 respondents, 16 of them are permanent residents of Tasik Chini while 12 respondents have lived in Tasik Chini for more than 20 years, either due to work or family reasons. Two other respondents have been living in Tasik Chini for ten and 20 years, likely as new residents who married local people there. The remaining respondents are outsiders who visited the village to see their relatives or temporarily lived there while seeking jobs (less than 10 years). Respondents from Felda Chini have had more experiences seeing primate species near their settlement compared to respondents from Kampung Gumum.

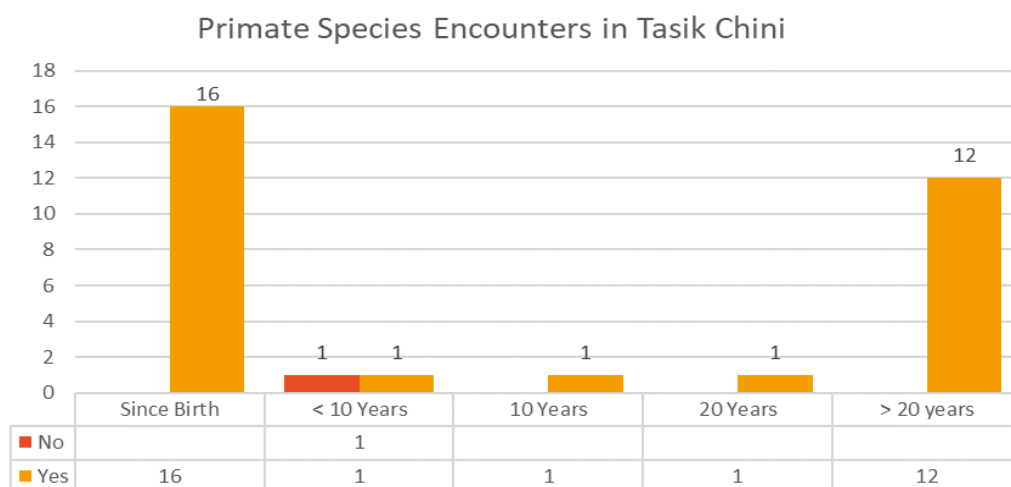


Fig. 2 - Primate species encounters depend on the duration of their stay in Tasik Chini

Based on Figure 3, the most commonly seen primate species reported by the local people are long-tailed macaque (*Macaca fascicularis*) and pig-tailed macaque (*Macaca nemestrina*) as they often see the primate species hanging around the electric wires, along the road, as well as trees around the houses. Some of them can even describe these species excellently. On the other hand, the least observed primate species among the locals was siamang (*Symphalangus syndactylus*). However, it's worth noting that some respondents are still uncertain about whether they have seen the *S. syndactylus* species or a different primate species. If it is indeed the species, the sighting was said to be occurred ten years ago, which may be considered an unreliable memory. The second highest primate species encountered by the locals is dusky leaf monkey (*Trachypithecus obscurus*), followed by banded langur (*Presbytis femoralis*) and slow loris (*Nycticebus coucang*), white handed gibbon (*Hylobates lar*), and an equal number of respondents reported seeing silvered leaf monkey (*Trachypithecus cristatus*) and white-thighed surili (*Presbytis siamensis*), with each having five respondents.

Availability of Primate Species in Tasik Chini

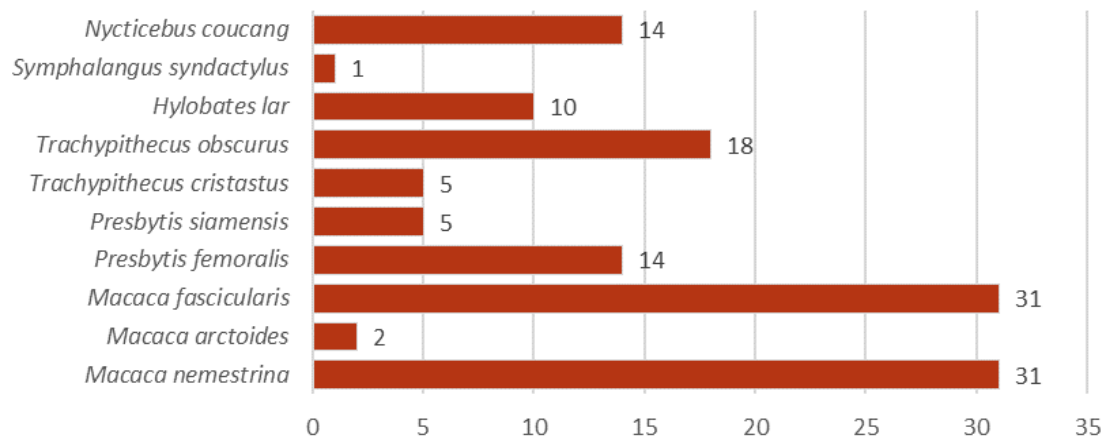


Fig. 3 - The availability of primate species reported by the local people in Tasik Chini

Overall, the local people in Tasik Chini have observed primate species, but they have not fully identified all the exact species. This can be supported from the results obtained as there were two respondents stated they have seen a *Macaca arctoides* in the area which according Osman et. al. [12], stump-tailed macaque or locally known as “beruk kento” is populate only in Perlis, Malaysia. Some of them are even unaware of the diverse primates surrounding them. However, a few can easily distinguish between closely similar langur species, such as the banded langur and dusky leaf monkey, using Malay words to refer to the species, “lutong cenekah” for the banded langur and “lutong celak” for the dusky leaf monkey, indicating a basic understanding of the primate diversity in the area. The locals are also aware and have stated that the primate species can be easily spotted during the evening when they are returning from work. The local people's knowledge about the primate species in Tasik Chini and the primate daily activity budget are significant for their active involvement in developing PrimaTourism. Moreover, they have the potential to become nature guide, or tour operators, being experts in their own hometown. Utilizing this opportunity could greatly benefit the local community.

3.3 Perception of Local People Towards PrimaTourism in Tasik Chini

As for the perception of local people towards PrimaTourism activities, Figure 4 reveals the opinion of respondents regarding which primate species is suitable for PrimaTourism in Tasik Chini. Dusky leaf monkey received the highest support, with 81.25% of respondents agreeing that the species would be ideal for primate tourism. This species can indeed be easily spotted in Tasik Chini, as they are arboreal forest dwellers, moving from one tall tree to another. The attractive coloration of this species may capture the interest of both local people and tourists, making it a promising choice for PrimaTourism as this species can be identified by having a gray or black color on their body parts, with distinctive white eye-rings. On the other hand, based on the results, none of the respondents agreed that stump-tailed macaque (*M. arctoides*) and silvered leaf monkey (*T. cristatus*) are suitable for PrimaTourism, as the macaque species cannot be found in the area while the silvered leaf monkey is rarely visible.

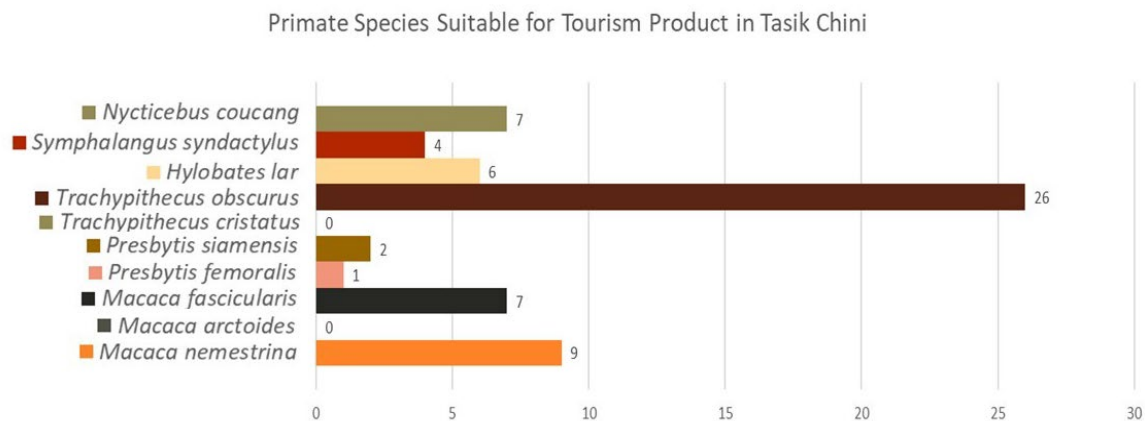


Fig. 4 - Primate species suitable for PrimaTourism in Tasik Chini based on local people

Generally, as depicted in Figure 5, most of the respondents seem to agree with the development of primate-based tourism activities in Tasik Chini. They are aware of the availability of primate species in the area and recognize its high potential to become a successful PrimaTourism product, especially in Felda Chini and Kampung Gumum. These activities provide them with sources of income and job opportunities among the local people. For instance, local residents can act as nature guides as they have an intimate knowledge of their area and can provide better explanations to the tourists. On the other hand, several respondents who answered "not sure" or "disagree" may lack in awareness and exposure to how organism-based tourism can have a significant positive impact on the local community. However, with proper education and guidance, they may change their minds and contribute their efforts and energy. As for the most suitable location for PrimaTourism spot, many locals suggested around Tasik Chini Resort as the area still have dense of vegetation for primate to find food, grooming and playing instead of the villages. This is because they are aware of primate nature that may cause conflicts in the settlement areas. Common issues and conflicts between the local community and primate species include damage to agricultural or crops fields.

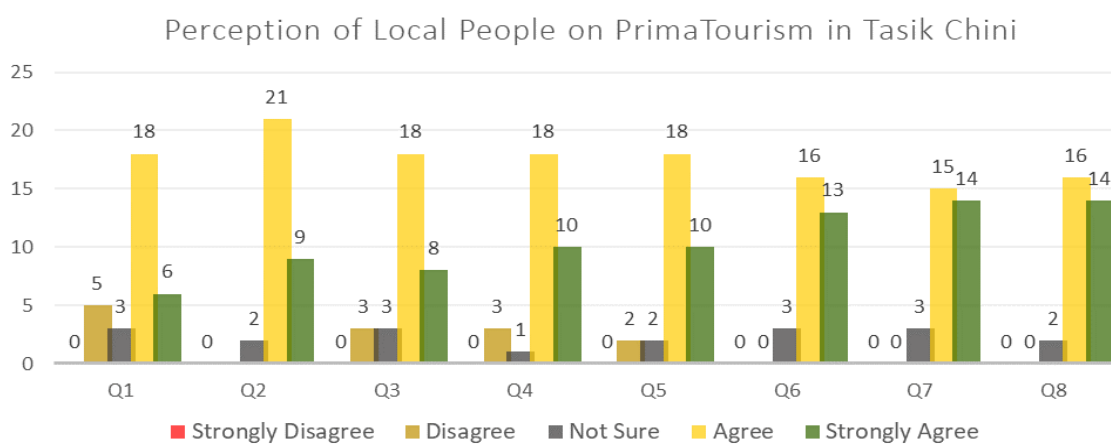


Fig. 5 - Perception of local people towards PrimaTourism in Tasik Chini

- Q1** Primate species are suitable for nature tourism products or attractions.
- Q2** The location of Tasik Chini is suitable for a PrimaTourism destination.
- Q3** The preservation and conservation of the natural heritage in Tasik Chini can be improved with primate tourism.
- Q4** PrimaTourism in Tasik Chini can attract more tourists.
- Q5** Primate tourism in Tasik Chini can increase awareness on the importance of nature.
- Q6** The local community needs to involve in primate tourism in Tasik Chini.
- Q7** Primate tourism in Tasik Chini can increase the opportunity for local community to generate more income.
- Q8** Primate tourism provides an opportunity for local people to engage in activities with other members of their community.

Despite its historical significance and beautiful landscapes, Tasik Chini can attract even more tourists as a primate-based tourist attraction. Moreover, the area is easily accessible by all modes of transportation including by boat survey. Implementing PrimaTourism will also indirectly help improve the facilities in the local area and benefit the residents. The unique environment of the region can serve as a baseline data collection for the tourism sector. Furthermore, tourists can easily observe these primates as they are ranging around the settlement in this location. However, despite the many advantages of the activities, there are still many things that the locals must learn for the tourist business to run smoothly and effectively especially on the safety aspects related with human-wildlife encounter.

It is also essential to involve the local people and seek their opinions and approval before developing any organism-based tourism product. The success of sustainable tourism in Tasik Chini relies on the active involvement and cooperation of the local community. Prioritizing the opinions and decision-making of local people is crucial to achieving great PrimaTourism. Their voices should be carefully considered among all stakeholders. Additionally, it is important to educate the local people about nature-based tourism, especially regarding the diversity of primates since this knowledge will aid in the future development of tourism with positive expectations from both the local community and tourists. To achieve this, seminars or talk programs can be organized among the local people to enhance their understanding of tourism and primate species.

4. Conclusion

The study has documented baseline data for the diversity of primate species in Tasik Chini, however the five-days timeframe for the study was not sufficient to fully cover whole villages in Tasik Chini. The data collected clearly showed that certain species exhibited high visibility in specific areas within Felda Chini and Kampung Gumum. This data will be valuable for implementing PrimaTourism in Tasik Chini in the future and can contribute to the expansion of nature-based tourism across Malaysia. However, longer research duration will be needed for future studies to ensure that PrimaTourism can be effectively conducted, considering Tasik Chini's potential for nature tourism.

Tasik Chini demonstrates great potential as a tourist attraction in Malaysia due to its ecosystem's ability to support diverse primate species. From the study, dusky leaf monkey is identified as a highly possible species among the other primate species in Tasik Chini and is considered the most desirable species to be developed into a nature-based tourism product. Tasik Chini Resort is suggested as suitable location for PrimaTourism activities, as it is close to local settlements and has dense vegetation, which can facilitate PrimaTourism and foster engagement with the local community. According to the questionnaire feedback, most local people are in agreement to participate in PrimaTourism activities because they are aware of the positive impact it can have on them. This allows for the implementation of community-based tourism and conservation, as the local people are willing to contribute their time and energy. In conclusion, this process will yield baseline data for researchers and contribute to the conservation management of the primate species involved in this study. By tapping into the potential of Tasik Chini for PrimaTourism, it can become a prominent tourist attraction in Malaysia, benefiting both the local community and the conservation of the area's diverse primate species.

Acknowledgement

This project was supported by the Ministry of Higher Education Malaysia (MOHE) under the Fundamental Research Grant Scheme FRGS/1/2022/WAB11/UTHM/02/2 (UTHM-K416), GPPS-H702 by Universiti Tun Hussein Onn Malaysia and Academy of Sciences Malaysia (ASM) through ASM Tasik Chini Task Force. We are grateful and deeply indebted to YBhg. Dato' Abdul Kadir bin Abu Hashim, Director General of the Department of Wildlife and National Parks (DWNP), for granting permission to carry out this research and providing us with the necessary facilities and assistance. This research was conducted under research permits JPHL&TN (IP):100-34/1.24 Jld 19 by DWNP. The authors acknowledge the Academy of Sciences Malaysia, Ministry of Higher Education Malaysia, Universiti Tun Hussein Onn Malaysia, Universiti Malaysia Terengganu and the Department of Wildlife and National Parks Malaysia for providing the necessary funding, facilities, and assistance.

References

- [1] Kueh, B. H. (2005). 'Anurans Tourism' in Crocker Range Park: Convergence of Research and Local People Involvement Towards Conservation. Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah.
- [2] Hvenegaard, G. T. (2014). 15 Economic aspects of primate tourism associated with primate conservation. *Primate Tourism: A Tool for Conservation*, 259.
- [3] Higginbottom, K. (2004). *Wildlife Tourism: An Introduction*. *Wildlife Tourism: Impacts, Management and Planning*, 1-14.

- [4] Md-Zain, B. M., Abu, M. H., Abdul-Latiff, M. A. B., Rahman, N. A., Lakim, M., Ampeng, A., & Yaakop, S. (2015). Malaysian Primate Diversity for Tourism Attraction. *Natural Resources, Tourism and Services Management* 2015, 137.
- [5] Perelman, P., Johnson, W. E., Roos, C., Seuánez, H. N., Horvath, J. E., Moreira, M. A., & Schneider, M. P. C. (2011). A molecular phylogeny of living primates. *PLoS genetics*, 7(3), e1001342.
- [6] Najmuddin, M. F., Haris, H., Shahrool-Anuar, R., Norazlimi, N., Md-Zain, B. M., & Abdul-Latiff, M. A. B. (2019). Primatourism: Plant selection by Schlegel's banded langur *Presbytis neglectus* in Johor. In *IOP Conference Series: Earth and Environmental Science*, 269 (1), 012036.
- [7] Zakaria, M. S., Abdul-Ghani, A. T., Yahya, M. S., & Jamali, S. N. (2020). Information Technology Risk Management for Water Quality Monitoring Iot Infrastructure: A Case Study at Tasik Chini UNESCO Biosphere Reserve. *Asia-Pacific Journal of Information Technology and Multimedia*, 9(2), 94 – 102.
- [8] Aruchunna, G., Ng, Y. F., Hazmi, I. R., & Wee, S. L. (2016). Dung beetles (Coleoptera: Scarabaeoidea) from Tasik Chini Biosphere Reserve, Pahang. *Serangga*, 21(1), 147–159.
- [9] Crabtree, S. A., Parker, J., Parker, I. C., & Parker, M. C. (2018). Development as eradication: The pillage of the Jakun 'people's bank' of Tasik Chini, Pahang, Malaysia. *South East Asia Research*, 26:3, 283-29.
- [10] Galán-Acedo, C., Spaan, D., Bicca-Marques, J.C., de Azevedo, R.B., Villalobos, F., & Rosete-Vergés, F. (2021). Regional deforestation drives the impact of forest cover and matrix quality on primate species richness. *Biological Conservation*, 263,109338.
- [11] Najmuddin, F., Haris, H., Haneef, S. K., Nabil, A., Norazlimi, N., Md-Zain, B. M., & Abdul-Latiff, M. A. B. (2021). Perception and challenges of PrimaTourism (Primate-based tourism) in Kota Tinggi, Johor, Malaysia. *Malayan Nature Journal*, 73(4).
- [12] Osman, N. A., Abdul-Latiff, M. A. B., Mohd-Ridwan, A. R., Yaakop, S., Nor, S. M., & Md-Zain, B. M. (2020). Diet composition of the wild stump-tailed macaque (*Macaca arctoides*) in Perlis State Park, Peninsular Malaysia, using a chloroplast tRNL DNA metabarcoding approach: A preliminary study. *Animals*, 10(12), 2215.