

RESEARCH ARTICLE



Beyond boundary: challenging ecotourism in Indonesian wildlife reserves for the new future of orangutan conservation

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Abstract

Orangutans exhibit significant potential as a key attraction for ecotourism centred around great apes. However, current tourist attractions primarily focus on national parks, neglecting the substantial opportunities present in wildlife reserves, particularly within Indonesia. This study seeks to investigate the feasibility of orangutan tourism activities in Lamandau Wildlife Reserve (LWR). Employing bibliometric analysis of primate tourism literature published in Indonesia from 2013 to 2023 using VOSviewer, complemented by an examination of national nature tourism policies, the research aims to elucidate the regulatory framework surrounding tourism in Indonesia wildlife reserves. The study engaged in interviews with individuals who frequently interact with orangutans in LWR through a combination of snowball technique and convenience sampling. Analysis of existing literature revealed a notable dearth of discussion pertaining to primate tourism studies in Indonesia, with a particular gap identified in the context of wildlife reserves. This oversight presents a missed opportunity, especially considering that prevailing national regulations allow the utilisation of wildlife reserve for ecotourism endeavours. To address this gap, it is imperative to align these domestic regulations with established international guidelines on primate tourism, aiming to mitigate potential tourism adverse impacts on primate populations. Assessing the tolerance levels of orangutans towards human presence in the LWR became a focal point, shedding light on the anthropogenic activities that are most compatible with orangutan behaviour. The research findings and methodologies employed hold promise in fostering the growth of orangutan tourism within Indonesia's wildlife reserves, simultaneously advancing orangutan conservation efforts and catalysing economic development within local communities.

Keywords: ecotourism, Lamandau, orangutan, wildlife reserve

1. Introduction

Great apes have captivated humans with their strikingly human-like behaviours and the revelation that they share a significant portion of our DNA [1]. This fascination has sparked curiosity about the natural habitats of these apes, driving a desire among tourists to experience closer encounters with them in the wild [2]. The burgeoning interest in great ape tourism has resulted in a considerable demand, prominently exemplified by the iconic gorilla tourism industry in Africa [4]. In popular gorilla tourism destinations like Rwanda, visitors are required to pay fees ranging from USD 200 for locals to USD 500 for international tourists to observe mountain gorillas (*Gorilla beringei beringei*) [5]. Similarly, chimpanzee-watching tourism has generated substantial income, with trips ranging from USD 200 to USD 3300 per venture [6], while bonobo safaris are available for around USD 220 per trip [7]. Tourists also exhibit a keen interest in orangutan-watching tourism, willingly paying substantial fees such as starting from €190 or USD 204 in Sumatra [8], USD 5200 per person per trip in Kinabatangan, Malaysia [9], and USD 450 for a two-person trip in Tanjung Puting, Kalimantan [10]. These relatively high tariffs serve as a mechanism to regulate visitor numbers for sustainable tourism practices while simultaneously boosting income for the respective countries. The allure of unique primate tourism experiences has the potential to position it as a highly sought-after tourism segment, attracting visitors and fostering conservation efforts [11].

Great ape tourism, notably the fascinating orangutan-watching tourism unique to Asia, has captivated international tourists. As one of the charismatic mammals in Southeast Asia, orangutans have become a significant draw for visitors [12]. The region of Kalimantan is home to both wild and ex-captive orangutans, with conservation areas such as the Lamandau Wildlife Reserve (LWR) playing a key role in managing orangutan populations. LWR, a Bornean orangutan rehabilitation site (*Pongo pygmaeus* ssp. *Wurmbii*), focuses primarily on rehabilitating and releasing orangutans into the wild under the management of the Conservation Agency for Central Kalimantan (Balai Konservasi Sumber Daya Alam Kalimantan Tengah) and the international NGO, the Orangutan Foundation-United Kingdom (OFUK).

However, the reliance on international donors in conservation management poses potential challenges for the future sustainability of funding [13]. To mitigate this risk, local management must proactively strategise and consider alternatives such as implementing locally-managed tourism initiatives [14]. Despite the absence of reported tourism activities in LWR and other wildlife reserves in Indonesia, ecotourism has been recognized as a potent tool for conservation efforts, particularly when involving flagship or charismatic species like orangutans [15].

Research indicates that the appeal of large charismatic mammals, including orangutans, garners significant attention globally, thus contributing to increased funding and awareness for conservation efforts [14-16]. By integrating orangutan conservation with community development through ecotourism, it is possible to achieve positive outcomes for both the local community and orangutan populations [17,18]. The economic benefits derived from effective community-based ecotourism can enhance local perceptions of orangutans and encourage active participation in conservation activities [19].

This study aims to provide an overview of current primate tourism activities in Indonesia through a review of literature and policy analysis, an assessment of orangutan tolerance towards local activities in LWR, and recommendations for potential orangutan tourism activities within the reserve [19]. By leveraging insights from literature and policy reviews, along with input from locals engaged in daily interactions with orangutans, the research seeks to inform sustainable strategies for promoting orangutan tourism, advancing conservation efforts, and fostering community development in wildlife reserves.

2. Research Methodology

Bibliometric analysis encompassed full-length research articles published in both English and Bahasa Indonesia, sourced through an advanced search utilising Google Scholar and Publish or Perish. Google Scholar was chosen as a primary resource due to its accessibility and widespread recognition in the academic community. The search spanned articles published from January 2013 to July 2023, limiting the scope to a ten-year period. Initial literature searches revolved around four key keywords: ecotourism, wildlife reserve, Indonesia, and primate tourism, with a focus on articles covering primate tourism in Indonesia, wildlife reserves, human perceptions towards primate tourism, and resultant conservation actions. Subsequently, 28 pertinent articles meeting the outlined criteria were identified, downloaded in CVS format, and processed using VOSviewer for comprehensive research network visualisation.

The literature analysis conducted through research papers was complemented by a policy content analysis to gain insights from a legal perspective. This analysis involved the examination of relevant national policy documents issued by the Indonesian Government pertaining to wildlife reserve management. Specific keywords including tourism (*wisata*), wildlife reserve (*suaka margasatwa*), and limited tourism (*wisata terbatas*) were utilised to extract relevant policy information. Additionally, international guidelines provided by the International Union for Conservation of Nature (IUCN) were reviewed to ascertain alignment with national policies and implementations in Indonesia.

In order to supplement the findings from literature and policy reviews with real-world data, field data collection was deemed necessary to assess local anthropogenic activities near orangutan habitats in the LWR [20]. Interviews were conducted with individuals meeting specific criteria: individuals native or local to the area, actively engaged in daily activities

within or around LWR, capable of identifying and differentiating orangutans, and have observed orangutan behaviour. Respondents were recruited using a combination of the snowball technique and accidental sampling due to the lack of existing information regarding the local community in LWR and their interactions with orangutans. The snowball technique involved engaging key individuals such as LWR management personnel and village leaders to identify potential interviewees, while accidental sampling involved interviewing locals who met the predetermined criteria encountered during research activities.

Thirty respondents from four villages, namely Natai Sedawak, Karta Mulia, and Sungai Pasir villages in Sukamara Regency, and Tanjung Putri village in Kotawaringin Barat Regency, were included in the study [20]. Pertinent to the study objective, respondents were queried on orangutan behaviour during human encounters, specifically whether orangutans remained in place or fled, with responses categorised as primate reactions and corresponding human activities during encounters [20]. The categorical data gathered was subjected to chi-square testing in SPSS version 24 to assess the association between local activities and orangutan responses.

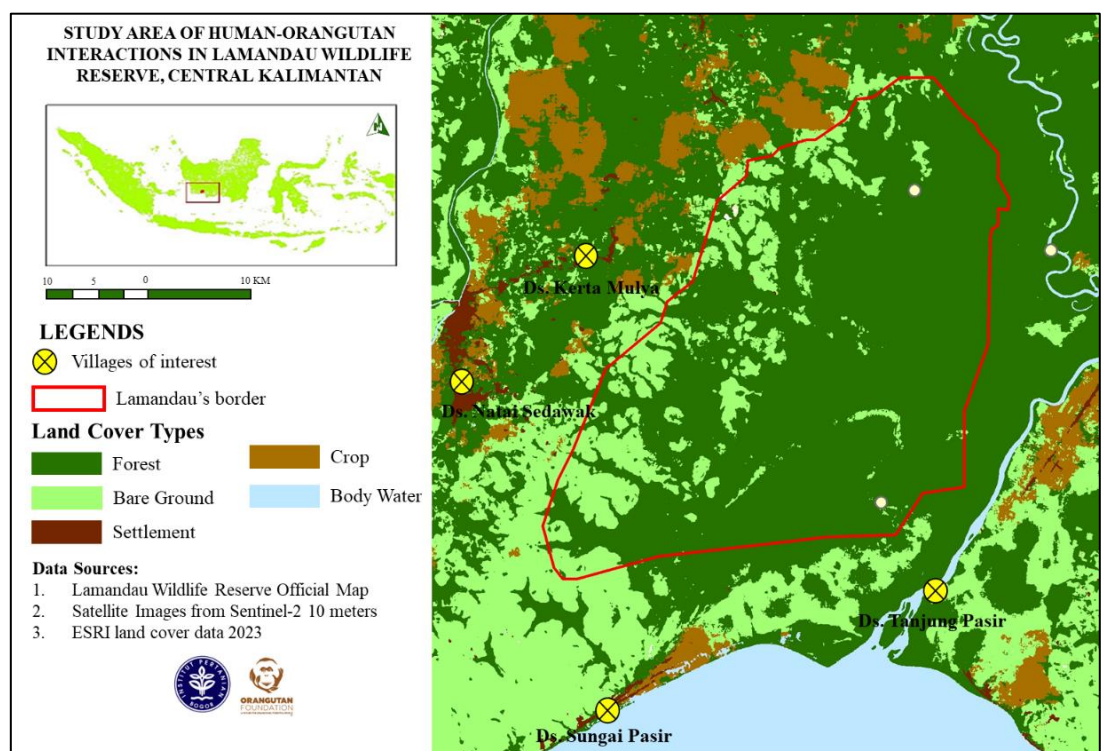


Figure 1. The study areas in Lamandau Wildlife Reserve, Central Kalimantan. This study covered two regencies in Central Kalimantan, as suggested by Lamandau's managers to be a good representation in unveiling real human-orangutan interactions happening in LWR.

3. Results and Discussion

A bibliometric network analysis of primate tourism in Indonesia was conducted using VOSviewer version 1.6.19, resulting in the identification of 5 clusters and 56 nodes, as illustrated in figure 2 [22]. The predominant themes in primate tourism within Indonesia were determined to be "research," "development," and "fauna," reflecting the primary focus areas of primate tourism discussions based on the predefined criteria [22]. These topics align with the notion that primate tourism in Indonesia is still in its developmental stages and relatively limited. The cluster of "research" signifies the foundational research efforts undertaken to gather essential information supporting the implementation of primate tourism, which subsequently transitions into the theme of "development" within primate tourism initiatives. The presence of "fauna" as a prominent topic indicates the correlation between early research endeavours in primate tourism and wildlife monitoring activities,

essential for supporting ecotourism operations. Due to the escalation of human-primate interactions in shared environments, primate studies have experienced rapid expansion [21], prompting researchers to delve deeper into more intricate facets of primate behaviour and conservation.

In contrast, the analysis revealed that the topic of orangutan tourism appeared somewhat marginalised compared to other themes within primate tourism research. To delve deeper into the orangutan tourism discourse, a broader keyword search including "orangutan" was conducted, establishing linkages primarily with "tourism" and "ecotourism" aspects relevant to the study's main focus. Notably, orangutan tourism has been predominantly practiced within Indonesia's national parks, such as Tanjung Puting National Park, Kutai National Park, Gunung Palung National Park, Gunung Leuser National Park, and Betung Kerihun National Park. However, the literature findings highlighted significant distinctions in regulations and management between national parks and wildlife reserves, indicating a lack of connectivity between orangutan-centric tourism activities and wildlife reserve areas within Indonesia. The absence of direct links between orangutans, tourism, and wildlife reserves underscores the limited presence of tourism initiatives in wildlife reserve territories in Indonesia, with the closest comparable tourism site identified in Tabin Wildlife Reserve in Sabah, Malaysia [22].

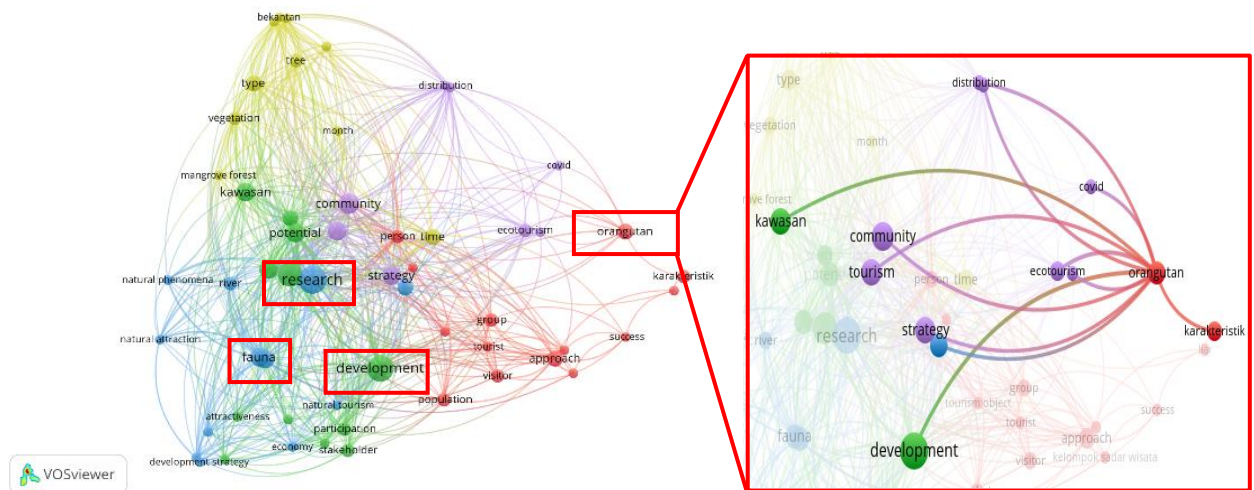


Figure 2. The network visualization of primate tourism literatures in Indonesia in 2013–2023. The left picture showed all topic networks regarding primate tourism in Indonesia with four most discussed ones. The right picture, inserted from orangutan topic, depicted in-depth detail other topics correlated with orangutan as this study’s main focus

Figure 2 on the left displayed the interconnected topic networks concerning primate tourism in Indonesia, with a particular focus on the four most discussed themes. The right section of the figure, zooming in on the orangutan topic, provided a detailed exploration of additional topics associated with orangutans, aligned with the primary objective of this study. Notably, the success of ecotourism initiatives in Tabin Wildlife Reserve has set a promising precedent [22], indicating the potential for similar endeavours in Indonesia. However, the implementation of such practices necessitates a comprehensive understanding of legal frameworks through thorough policy analysis, considering the profound impact of tourism policies on economic growth and societal aspects [23], as public policies are tailored to meet public needs.

Key regulations governing wildlife reserve management, such as Government Regulation No. 28 of 2011, endorse the permissibility of nature ecotourism activities within these areas. Further regulations, including Government Regulation No. 108 of 2015 and Government Regulation No. 8 of 2019, delineate nature tourism as voluntary trips aimed at experiencing nature's beauty and uniqueness within wildlife reserves. These stringent regulations are rooted in the conservation imperative of preserving biodiversity within reserve areas.

For the development of orangutan tourism in wildlife reserves housing wild, ex-captive, and rehabilitated orangutans, adherence to national and global standard guidelines is imperative. The Best Practice Guidelines for Great Ape Tourism, as outlined by the IUCN, furnish

protocols for orangutan tourism implementation, drawing on insights from established primate tourism sites worldwide [24]. These guidelines encompass regulations governing group size, duration of orangutan-watching activities, visitor behaviour expectations, and proximity restrictions to minimise stress and disease transmission risks for orangutans. It also regulates some unique prohibitions, such as not following a female orangutan with her infant and immediately leaving orangutans who displayed stressful behaviours (hiding behind vegetation, moving away, or making kiss-squeak sounds) after a continuous 10-day exposure to tourists.

International guidelines for great ape tourism underscore the importance of understanding primate tolerance towards human presence, acknowledging the significant impact of tourism activities on wildlife ecosystems [25]. The potential risks posed by human interactions include stress, disease transmission, and habituation effects on ape populations, necessitating stringent regulations to protect primates from such threats [26-28]. In light of these considerations, this study investigated local anthropogenic activities near orangutan habitats within the LWR.

Table 1. The sociodemographic characteristics of the research participant

Variable	Category	Total (N= 30)	Percentage (%)
Sex	Man	23	76.67
	Woman	7	23.33
Origin	Native	22	73.33
	Immigrants	8	27.67
Tribe	Malay of Kalimantan	29	96.67
	Dayak	1	3.33
Age class	25–29 years old	2	6.67
	30–34 years old	1	3.33
	35–39 years old	4	13.33
	40–44 years old	3	10
	45–49 years old	1	3.33
	50–54 years old	4	13.33
	55–59 years old	3	10
Education level	>60 years old	12	40
	Not finished elementary	17	56.67
	Elementary school	4	13.33
	Junior high school	2	6.67
Job	Senior high school	7	23.33
	Farmer	10	33.33
	Jelutong's sap harvester (<i>pemantung</i>)	8	26.67
	Fisherman	7	23.33
	Housewife	4	13.3
	Seller	1	3.33

Our interviews aimed to characterise 30 local participants in our study, as this social aspect is crucial due to its potential impact on human activities in the forest and interactions with orangutans. The sociodemographic profile of the respondents revealed that the majority were men (76.67%), natives of the studied villages (73.33%), belonging to the Malay tribe (96.67%), over 60 years old (40%), with elementary-level education or below (56.67%), and mainly engaged in farming activities (33.33%). In the study area, there was a distinct gender-based division of labour, where men were predominantly tasked with resource gathering activities in forested areas, thereby increasing their likelihood of encountering orangutans compared to women who typically remained at home. The locals' ability to navigate the forest was largely influenced by their indigenous background, providing them with a better understanding of the landscapes within the LWR.

Within the vicinity of LWR, two main tribes resided: the Malay (Kalimantan) and the Dayak. Historically, the Malay community had inhabited the LWR area even before its establishment in 1999, granting older generations (over 60 years) greater access to forest areas prior to

stricter regulations. Conversely, the Dayak people predominantly resided in the north west and north areas outside the LWR boundaries, with the Kerta Mulya Village (Fig 1) representing this tribe in this study. They chose to cultivate the lands near their villages instead of venturing the forest. The only Dayak person interviewed here was the last generation to ever go into the deep forests of LWR, aimed to harvest jelutong’s sap. The correlation between education level and occupation indicated that locals, reliant on natural resources for sustenance, often did not prioritise pursuing higher education. As such, the most prevalent occupations among participants were farmers, jelutong sap harvesters, and fishermen. In essence, individuals fitting the described characteristics—male, Malay tribe, over 60 years old, low educational attainment, and engaged in agricultural or resource-based activities—tended to engage more frequently in forest ventures, potentially leading to orangutan habituation as a result of human presence.

Habituation, a process believed to reduce primates' response to potential threats, including humans, can be a double-edged sword, beneficial for research and tourism but posing risks to primate populations [26,29]. Ecotourism, while promoting economic development for locals, must prioritise wildlife welfare and conservation awareness. Maintaining good habitat conditions for primates to exhibit natural behaviours in the presence of humans is essential, emphasising the need for strict guidelines on tourist behaviour and proximity during visits. Understanding primate tolerance towards human activities is crucial, as evidenced by the stress responses observed in proboscis monkeys (*Nasalis larvatus*) when approached too closely by boats, around 60 metres away [30]. Therefore, managers must prioritise primate welfare, educate tourists on appropriate behaviour, and ensure sustainable coexistence between humans and primates in ecotourism settings.

Table 2. The list of local activities and transportation modes affecting orangutan’s behaviour

Variable	Category	Orangutan not alarmed by humans	Orangutan fled from humans	Chi-square
Locals’ Activity	Harvesting jelutong’s sap	10	1	0.012
	Fishing by fisherman	6	2	
	Cultivating on fields	2	6	
	Passing village roads	1	2	
Transportation modes	Motor boat (<i>kelotok</i>)	6	2	0.104
	Walking by feet	13	7	
	Motorcycle	0	2	

This study aimed to assess the impact of local activities and transportation methods on orangutan behaviour, as indicated by observations of their responses from our study participants. Four distinct activities conducted by locals were identified and categorised, as outlined in table 2. Orangutans were observed to exhibit avoidance behaviour towards farmers (20%), while displaying notable tolerance, particularly during the harvesting of *jelutong* sap by locals (33.33%). Statistical analysis indicated a significant relationship between local activities and orangutan responses, with a chi-square value of 0.012, falling below the conventional significance threshold of 0.05. Conversely, transportation modes were not found to have a substantial influence on orangutan behaviour. These findings suggest a degree of tolerance among orangutans within the LWR, particularly towards local individuals engaged in sap harvesting or fishing activities.

Contrary to the anticipated hypothesis of disturbance risk [31], our observations revealed orangutans' non-fleeing behaviour and apparent comfort around humans, contradicting expectations of heightened wariness and avoidance in wildlife due to human presence. Rather than fleeing, orangutans tended to maintain their activities or positions when encountering locals, indicating a degree of habituation likely facilitated by rehabilitation practices in the area. This habituation process may have been influenced by human-provided food resources, a common aspect of rehabilitation programmes within LWR [32,33]. The consistent provision of supplementary foods during rehabilitation likely contributed to orangutans' familiarity with human presence, particularly with caretakers who provided daily sustenance. As a result of this prolonged exposure and acclimatisation to human interaction

during rehabilitation, the orangutans displayed minimal signs of stress when encountering local villagers in their forest habitat.

The observation that orangutans, potentially stemming from rehabilitation programmes managed within the LWR, exhibited minimal stress responses to certain local activities presents a promising foundation for the development of primate tourism initiatives. An essential aspect of orangutan tourism is ensuring that tourists only engage with orangutans demonstrating relaxed, unstressed behaviours, as outlined in prevailing guidelines [24]. The design of primate tourism ventures must navigate a balance between international best practices and corresponding national regulations. For instance, Government Regulation No. 8 of 2019 stipulates permissible activities for limited nature tourism within wildlife reserve areas, encompassing services such as providing tourism information, guided tours, transportation arrangements, excursions, and equipment rentals, while also setting guidelines for approved modes of transportation such as horses, bicycles, porters, and boats.

Drawing inspiration from successful orangutan tourism models like that in Kinabatangan, Malaysia, which offers orangutan viewing opportunities through lowland forest tracking or boat excursions near orangutan habitats [9], and similar initiatives near LWR in Tanjung Puting National Park featuring boat tours and treks through the peat forest [10], these existing tour packages align with both the permissible transportation modes stipulated by the Indonesian Government and the local practices observed in LWR. The prevalent use of boats by locals in LWR for their daily activities, as depicted in Figure 3, underscores the compatibility of such transportation methods with orangutan tourism endeavours in the region. While there is a lack of specific studies addressing orangutan stress responses to boat proximity, insights from a study involving proboscis monkeys suggest a safe viewing distance of around 60 metres may be conducive for orangutan tourism experiences.



Figure 3. Local people in Lamandau Wildlife Reserve observed to heavily depend on utilising natural resources, such as (A) harvesting jelutong's sap, with the ready-to-sell sap as shown on the boat and (B) looking for fish on daily basis by exploring inside LWR area. Both of these activities required locals to stay inside the forest for days to month, hence temporary hut was built as shown in picture (B). Their hut's locations were already registered legally by LWR's management.

Wildlife ecotourism presents a dual opportunity for local communities, enabling them to generate increased income while fostering a heightened sense of involvement in orangutan conservation efforts. The potential for orangutan tourism within the LWR can seamlessly blend orangutan-watching experiences with local initiatives intertwined with their daily routines. By actively engaging locals in orangutan tourism endeavours, area managers can leverage their familiarity with LWR's terrain and wildlife to enhance the tourism experience and facilitate efficient orangutan population monitoring [34]. Local guides possess invaluable knowledge of LWR's topography, enabling them to identify prime orangutan viewing sites and optimise tracking routes for tourists. Their firsthand experiences near orangutan habitats add a unique dimension to the tourism design, influencing decisions on track selection and observation spots, thereby enriching visitors' encounters with both orangutans and sustainable local practices.

The inclusion of locals in tourism initiatives necessitates comprehensive training facilitated by LWR management to ensure their readiness in catering to tourists effectively. Prior to deployment as local guides, individuals must exhibit a willingness to engage in this role while ensuring that the introduction of primate tourism does not disrupt their customary daily activities. Open communication and collaborative planning between the management team and locals are essential to align both parties' expectations and objectives. This collaborative approach aims to establish an ecotourism model that benefits orangutans, LWR management, and the surrounding communities in a harmonious manner, reflecting the directive outlined in Government Regulation No. 108 of 2015, emphasising the holistic development of communities surrounding wildlife reserves. By actively involving and economically empowering local communities, this integrated orangutan-community tourism model lays the foundation for a harmonious and sustainable future for orangutan conservation efforts.

4. Conclusions

Orangutans have emerged as pivotal assets in driving conservation efforts due to their potential as a tourist attraction. While national regulations permit orangutan tourism activities in wildlife reserve areas in Indonesia, the current implementation remains limited. Initiatives aimed at enhancing orangutan conservation through tourism need to consider the orangutans' tolerance towards human presence. Observations in the Lamandau Wildlife Reserve revealed signs of human tolerance among orangutans, possibly stemming from habituation fostered by caretakers. The absence of fleeing behaviour demonstrated by orangutans during encounters with locals underscores a suitable habitat for wildlife and human coexistence.

The development of a primate tourism programme necessitates a delicate balance between national legislations and international guidelines to ensure the well-being of primates and the safety of visitors. This framework will outline permissible activities, transportation methods, and protocols crucial for managing orangutan tourism responsibly. Leveraging insights into local activities within LWR can aid in designing tourism experiences with minimal stress impacts on orangutans. Engaging local communities in orangutan tourism endeavours can enhance the quality of tourism offerings, fostering not only economic benefits but also high levels of local participation in orangutan conservation efforts through ecotourism.

As ecotourism reflects a multifaceted interplay between ecology, sociocultural aspects, and the economy, it is essential to underscore that this study offers initial insights from legal perspectives, basic guidelines, and considerations aligned with orangutan behaviour. These preliminary findings provide a foundational understanding to facilitate the implementation of sustainable orangutan tourism for the collective benefit of orangutan conservation and local community development, setting the stage for a promising future of harmonious coexistence and biodiversity preservation.

Author Contributions

WMA: Conceptualisation, Methodology, Interview, Writing - Review & Editing; **DAR:** Conceptualisation, Methodology, Review, Supervision; **AS:** Conceptualisation, Methodology, Review & Editing, Supervision.

Conflicts of interest

There are no conflicts to declare.

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