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Two Sides of a Coin: Do Genders Affect Human-Orangutan Interactions in Lamandau Wildlife Reserve, Central Kalimantan?

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Abstract

Anthropogenic impacts on primates usually discussed as a community-level variable, with very few studies dissecting into a personal factor such as human gender. There is a gender bias in utilizing forest resources, resulting in men and women having different chances encountering primates, moreover orangutans. We investigated human genders' influences on human-orangutan bi-directional receptions as it affected their reactions and analyzed their interactions in Lamandau Wildlife Reserve, Central Kalimantan. We conducted interviews with 30 locals by applying snowball and convenience sampling techniques. This study revealed that orangutans displayed more promoting behaviors towards humans. However, distinct human reactions to encountering orangutans differed by gender. There were significant relations between human genders and orangutan behaviors, suggesting that orangutans might view humans differently from their genders. We recommended that managers adapt their local-based orangutan conservation activities adapting these findings. We also encouraged further research especially in exploring the orangutan's perspectives towards human-orangutan interactions.

Keywords: gender, human-primate interactions, Lamandau Wildlife Reserve, orangutans

1. Introduction

The ever-growing need for lands driven by human population growth has bridged humans to live closer to wildlife habitats, especially to primates, since they often share some same needs. There is an apparent increase in human-nonhuman primate interactions, consequently, both sides endure more frictions affecting their lives. The shared landscape has exuded growing chances for both humans and primates to interact more often. Thus, the growing nonhuman primate research had pivoted around the anthropogenic impacts on primates. However, only a smaller portion of such studies discuss the mechanism of how humans influence human-nonhuman primates interactions, further determining the feasibility of the two coexist by their tolerance behaviours [1–3].

Such a dynamic usually starts from food provisioning by humans. Human intrusion into the lands near forests, frequently converts them into agricultural lands. It has prompted more food availability, which attracts primates to expand their coverage into the cultivation lands. As primates will meet humans more often, they give various coping mechanism behaviors under this anthropogenic disturbance. Most will perform the avoidance behaviors, maintaining some distance from humans for easier escape [4]. Meanwhile, others will tolerate human presenceto some degree, commonly by learned habituation [5–7]. These altered primate behaviors dictate how primates survive, with humans venturing closer into their habitats.

Most publications only investigated the general impacts that humans brought into primates' lives, focused on primates' ever-changing behaviours [6,8–25], mapping their habitat availability [2,14,15,19,26–30], or conflicts with human due to overlapping landscapes [1,3,11,13,16,18,20,22,24,27,31–40]. They classified the human impacts as a

singular variable affecting primates, with very few separating them based on personal factors like gender [41,42]. Only one paper discussed the differentiated primates' behavioral changes stimuli by human genders, specifically from tourists [42]. However, primates lingering near tourism places might already have some less fear towards tourists, which came from habituation by tourist daily visitations. Learned habituation on primates live near human settlements often found outside conservation areas. Orangutans are one of the primates surviving in such a living condition yet endangered by human disturbances [27]. The heightened human-orangutan interactions on the shared landscape with humans will result in more orangutans grow less afraid encountering humans.

Orangutans have been driven by the impending threat due to anthropogenic disturbances, labelled as critically endangered by IUCN Red List [43]. Most orangutans in Indonesia surviving outside the conservation area, predicted around 75% of their populations [7], often venturing outside rainforests [27]. Even with the rest of its population residing inside conservation areas, interactions with humans cannot be overlooked. One of the orangutan population distributions, located in one of the conservation areas, is the Lamandau Wildlife Reserve (LWR). This place functions as the orangutan rehabilitation area which both rehabilitated and wild orangutans (*Pongo pygmaeus wurmbii*) living there. Despite this place employing strict regulations permitting people to come into the area, local people around LWR can access the area to a certain extent, which will not disturb orangutans' lives. Therefore, interactions between the orangutans and humans will still exist. Locals have been going into the wildlife reserve area to utilize natural resources by fishing, harvesting sap, cultivating lands, or looking for more water during the dry season.

Since humans come into the forest, there might be a potential habituation effect on orangutans. Traditionally, people relying on the forest resources tend to divide the labors by genders [44], affecting how frequently men and women venture into the forest. Therefore, we hypothesized that the different chances for men and women to encounter orangutans will also bring out different reactions from the orangutans. However, studies discussing human-orangutan interactions and their dynamics affected by human genders in any conservation area are yet to be well-documented. Thus, investigating different scenarios of how orangutans react toward men or women will be an excellent foundation for understanding the bi-directional tolerances, deeper on such a personal factor by human genders. Furthermore, utilizing the knowledge of orangutans' tolerance of human gender influence might benefit the success of any conservation programs. The area managers can consider which gender group will be better suited for their program implementation.

2. Materials and Methods

We collected data from March to April 2023. This research covered four villages around the Lamandau Wildlife Reserve area: Kerta Mulya, Natai Sedawak, Tanjung Pasir, and Sungai Pasir, as displayed in Figure 1. We considered these villages based on the criteria: 1) the village had to be located around the wildlife reserve area, 2) the villagers were known to utilize natural resources inside the wildlife reserve area, 3) there were identified or suspected orangutan populations near the village either by reported incidents or monitoring surveys, and 4) the area must not be inside the rescued orangutan rehabilitation area to minimize orangutan behavior bias caused by habituation.

After considering the suitable villages to visit, we interviewed locals in the study area. We used the snowball technique by initially interviewing key people to narrow our search. These key people comprised Lamandau Wildlife Reserve's managers (Conservation Agency for Central Kalimantan and Orangutan Foundation-United Kingdom), heads of villages, and influential local figures in the villages recommended which potential villagers to interview. Apart from this snowball technique, we also applied coincidental sampling by interviewing the locals we coincidentally met in the study area. Locals deemed fit to be respondents for this study must meet all of these criteria: 1) they could be either native or immigrants but had resided in the villages during this research, 2) they had been doing daily activities inside or near the LWR area, 3) they could identify orangutans apart from other primates in LWR and 4) they had seen orangutans directly during their daily activities in LWR.

We interviewed thirty respondents originating from four villages. Several topics asked of the locals consisted of 1) orangutan's behavioral responses toward humans, categorized as promoting and inhibiting behaviors; 2) locals' responses toward orangutans, differed by positive and negative responses; and 3) locals' perceptions of orangutans by the benefits or loss they experienced, which then would be grouped as three types of human-primate interactions. We categorized information by respondents as categorical data and tested it with Chi-square in SPSS version 24. The previous three topics that we asked, grouped as categorical data, were tested by Chi-square and interpreted to have significant relations by less than 0.05 Chi-square value.

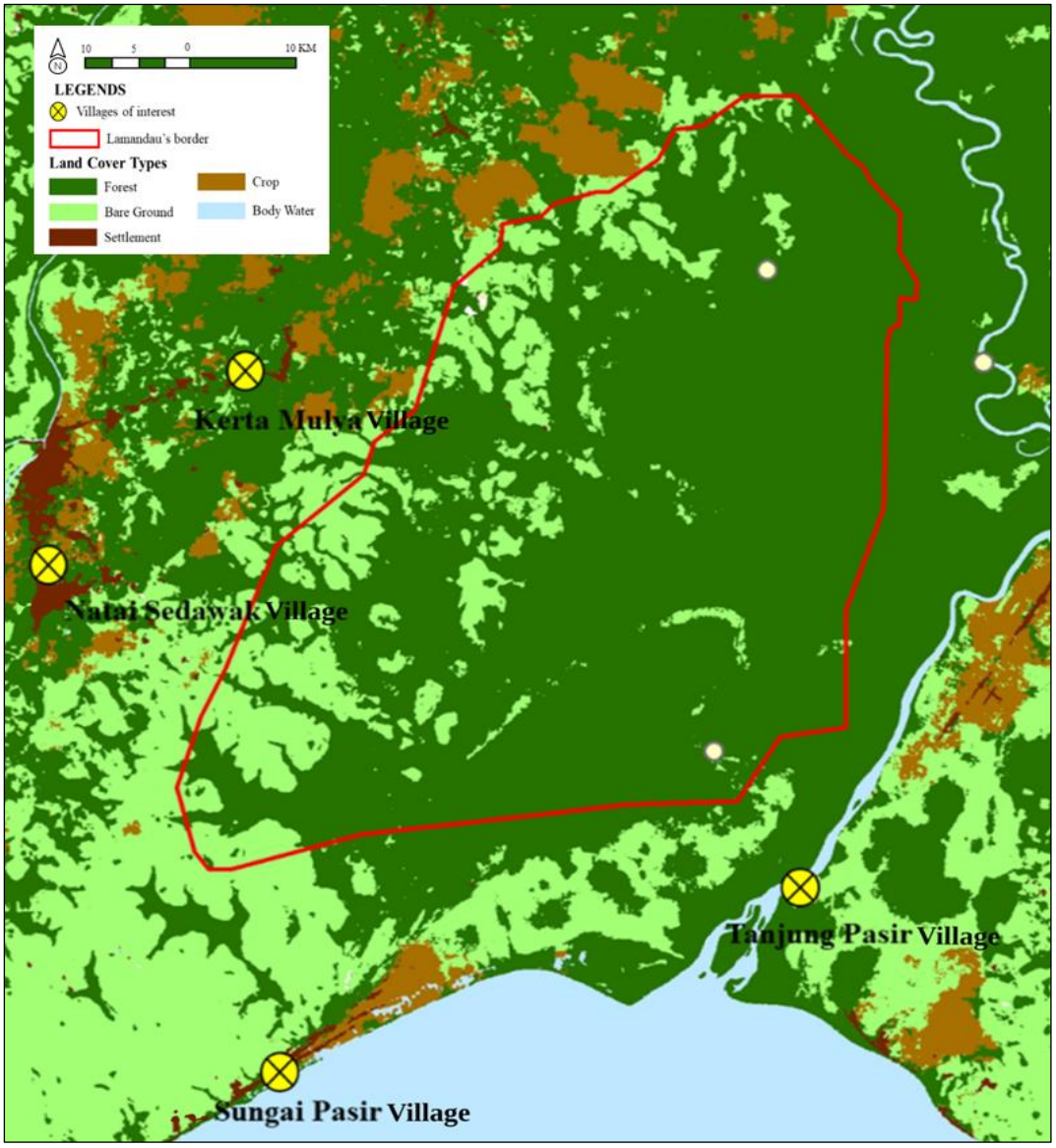

Figure 1. The study area of this research, which respondents came from four villages outside Lamandau Wildlife Reserve's area border (LWR). This conservation area is a wildlife reserve with the main focus on conserving orangutans, with lands covered by lowland and swamp forests coupled with small river lines (was not detected by the satellite). Villagers usually went into the forest with permission from the Conservation Agency for Central Kalimantan. They were registered as legal fishermen and sap harvesters and usually stayed inside the forest for months to collect either fish or jelutong's sap. Therefore, they interacted with orangutans during their stay.

3. Results

We interviewed 30 people, categorized into six sociodemographic variables. They mostly had characteristics of men (76.7%), were the native locals (73.3%), came from the Malay tribe (97.7%), aged more than 60 years old (40%), did not finish their elementary school (56.7%), and worked as farmers (33.3%) (Table 1). The obvious huge difference, specifically of respondent's tribe origin, resulted from the villages' distance to the LWR area. Most Malay villages were located near the forest rather than Dayak's. The Malays visited in this research were Natai Sedawak, Tanjung Pasir, and Sungai Pasir villages. Kerta Mulya became the only one in Dayak's village, with the only respondent who were able to witness orangutans directly in their daily lives. It also came with the change in the area's function from a regular forest area into a wildlife reserve in 1999, which meant that there would be limited access to the forest accordingly. Therefore, it prompted the villagers to change the fulfillment of their daily needs from utilizing the natural resources in the forest to cultivating nearby available lands.

Table 1. The socio-demographic variables of this study's respondents

No.	Variables	Category	Total (N = 30)	Percentage (%)
1	Sex	Men	23	76.7
		Women	7	23.3
2	Origin	Native	22	73.3
		Immigrant	8	27.7
3	Tribe	Malay	29	97.7
		Dayak	1	3.3
4	Age	25–29 years old	2	6.7
		30–34 years old	1	3.3
		35–39 years old	4	13.3
		40–44 years old	3	10.0
		45–49 years old	1	3.3
		50–54 years old	4	13.3
		55–59 years old	3	10.0
		Over 60 years old	12	40.0
5	Educational level	Not graduated from elementary school	17	56.7
		Elementary school	4	13.3
		Secondary school	2	6.7
		High school	7	23.3
		University	10	33.3
6	Job	Lowland farmer	8	26.7
		Jelutong's sap harvester	7	23.3
		Fishermen	4	13.3
		Stay-at-home wife	1	3.3
		Seller	2	6.7

There were 76.7% men and 23.3% women. Men dominated the respondent's gender in this study due to their high frequency of outings to the forest in the LWR area. As LWR is a wetland area that consists of lowland and swamp forests, locals became dependent on fulfilling their daily needs with natural resources. Men usually came into the forest to collect natural resources while women in LWR usually stayed at home waiting for their husbands or male siblings to bring crops or fish. Respondents were mostly native (73.3%). Locals categorized as native meant that they had lived in the four villages from their previous generations, which in this study we limited to their grandparents' generation. Meanwhile, immigrants came from various places, even outside of Borneo.

The next variable, age group, was found that the elderly aged more than 60-year-old, had seen orangutans more than youngsters (40%). In Indonesia, this age was categorized as a non-productive age group which usually did not commit their whole time by working.

Coinciding with the previous variable, the educational level the respondents received was mostly due to them not finishing elementary school (56.7%). We suspected that the low education most respondents had might be linked to their dependency on nature. Before being assigned legally as a wildlife reserve area, Lamandau was just a regular forest that had more access for people to venture. Locals had grown accustomed to the available natural resources they could get near their homes, therefore it resulted in low interest in pursuing higher education. The dependence on nature also correlated to the available jobs in Lamandau. They mainly consisting of farmers (33.3%) and jelutong's sap harvesters (26.7%). Most men pursued either of these two jobs, which was in line with the most respondents' gender to venture deep into the forest and meet orangutans.

Our respondents admitted that most orangutans did not flee from them (66.7%). Some promoting behaviors, as defined by Smith[45],observed by locals consisted of orangutans staying at their place and proceeded what they were doing before humans came, staying at their place by looking at the humans quietly, chasing after locals, and even destroying local property in the forest. Meanwhile, the rest resulted in the orangutans fleeing from humans, producing aggressive and loud vocalizations to scare humans, and vegetation display[45] by throwing branches or hiding behind trunks (33.3%). Orangutans in LWR tended to show these promoting behaviors which most locals reciprocated negatively by men (43.3%) and women (13.3%).

Villagers admitted they were afraid that orangutans would possibly attack them; hence, they chose to evade the great apes or throw some objects at orangutans. Meanwhile, human's negative responses towards primates do not only come from humans evading said primates but also from humans approaching them. Some locals revealed that they approached orangutans out of curiosity. It would not be a good response for both parties as orangutans might attack humans. Meantime, the only positive response by both men (33.3%) and women (10%) was to not disturb or approach orangutans nearby by maintaining a safe distance from the apes.

There were three human-orangutan interactions found in LWR, which mainly formed the negative ones (40%) then, followed by neutral (33.3%) and positive ones (26.7%). Furtherly, negative interactions were caused by locals' fear of the primates (26.3%) and personal experiences with the property damaged by orangutans (13.7%). Locals who directly suffered from orangutans' attacks on their property admitted that they had lost around IDR 150,000.00 and even up to IDR 2,400,000.00. Some properties were tents that locals usually used to shelter in the forest, 20 kilos of coconuts eaten by orangutans, and five palm oil trees damaged. Such loss caused the involved individuals to grow fear and resentment of orangutans, affecting this primate's opposing view.

Next, neutral was prompted by the locals' ignorance of orangutans' value for the less damaging interaction. They informed that since they had not directly known or experienced the impact of orangutans' existence, they did not mind or honestly care whether orangutans were near them. It could be a worrying matter if, in the future, this ignorance which might be caused by the low-level understanding of orangutan values, such as socioeconomics and ecology, which resulted in the low participation from locals to conserve orangutans. Lastly, the positive interactions came from locals' experience and knowledge about orangutan's ecological roles. Respondents felt entertained when they observed orangutans' behavior during their stay in the forest and were aware of orangutan's potential as ecotourism subjects (16.7%). The others were highly aware of the orangutan's ecological role as an agent to spread tree seeds in the forest (10%).

Since most locals in LWR responded negatively towards orangutans, we tried to investigate the possible cause by the available five sociodemographic variables. We excluded the tribe origin since only one respondent was from the Dayak tribe, which will cause origin bias. Previous studies have narrowed down some factors influencing local acceptance of primates into three variables, comprising social beliefs, primate morphology determining local's fear of their size, or people's personal experiences dealing with property loss or crop raids by primates [24,46]. Therefore, we tested five sociodemographic variables to human responses towards orangutans, the bi-directional responses towards each other's existences, and each response from locals and orangutans to the formed interactions, all by

Chi-square test. We found no significant relations between sociodemographic variables and human responses (Table 2), which we guessed that there might be a more profound factor affecting human perception of primates' existence outside this study's variables.

Table 2. The Chi-square test of socio-demographic variables to human responses

Variable		Category	Responses		Chi-square
			Negative	Positive	
Men	Origin	Native	7	7	0.428
		Immigrant	6	3	
	Age	25–29 years old	1	1	0.356
		30–34 years old	1	0	
		35–39 years old	2	1	
		40–44 years old	1	0	
		45–49 years old	0	0	
		50–54 years old	0	2	
		55–59 years old	3	0	
		60+ years old	5	6	
	Education level	Not finished elementary school	3	1	0.670
		Elementary school	7	8	
		Primary school	1	1	
		High school	2	0	
	Job	Fishermen	3	3	0.449
		Jelutong's sap harvester	3	5	
		Seller	1	0	
		Farmers	6	2	
Women	Origin	Native	4	3	-
		Immigrant	0	0	
	Age	25–29 years old	0	0	0.657
		30–34 years old	0	0	
		35–39 years old	1	0	
		40–44 years old	2	0	
		45–49 years old	0	1	
		50–54 years old	1	1	
		55–59 years old	0	0	
		60+ years old	0	1	
	Education Level	No finished elementary school	1	2	0.657
		Elementary school	2	0	
		Primary school	0	0	
		High school	1	1	
	Job	Fishermen	1	0	0.257
		Jelutong's sap harvester	0	0	
		Seller	0	0	
		Farmers	0	2	
		Stay-at-home wife	3	1	

Previous results prompted us to test whether humans' and orangutans' responses would affect the three types of human-orangutan interactions in LWR. We found that human's responses had strong significant relations with human-orangutan interactions, as shown in Table 3 by value less than 0.05 (0.001). It aligned with the previous study stating that humans are the main factor driving human-primate interactions [6]. In this study, positive human responses tended to create more neutral interactions, while negative ones evoked more negative interactions.

As proven before that humans' responses did affect the interaction between humans and orangutans, we tested deeper on the personal factor if human genders did influence

orangutan's behaviors. The bi-directional response test resulted in significant relations with orangutan behavioural responses by value less than 0.05 (Table 4). It meant that human behaviors, differed by gender, had strong relations to how orangutans might respond human's presence. Interestingly, orangutans gave different reactions when they met men and women. Orangutans tended to show promoting behaviours when encountering men, with only slight differences from inhibiting ones. Contrastingly, orangutans reciprocated women's presence negatively.

Table 3. Chi-square test human's and orangutan's responses to the two's interactions

Variable	Category	Interaction type			Chi-square
		Negative	Neutral	Positive	
Human's responses	Positive	2	9	2	**0.001***
	Negative	10	1	6	
Orangutan's responses	Promoting behavior	8	6	5	0.947
	Inhibiting behavior	4	4	3	

*Chi-square value less than 0.05 meant both variables had significant relations

Table 4. Chi-square test of bi-directional responses of humans and orangutans

Variable	Category	Promoting behavior (n)	Inhibiting behavior (n)	Chi-square
Human's responses by gender	Positive (Men)	0	10	**0.000***
	Negative (Men)	13	0	
	Positive (Women)	2	1	**0.033***
	Negative (Women)	0	4	

*Chi-square value less than 0.05 meant both variables had significant relations

4. Discussion

Before testing the five sociodemographic variables to human-orangutan interactions, we built some hypothesizes of which variable from each gender might influence more vital of how local people responded to orangutans near them. First, we hypothesized that since natives already lived longer in the LWR area compared to the immigrant ones, they would have a higher chance to understand and roam the forest around in LWR. They might be able to venture deeper into the forests, with a higher chance of finding the shy, wild orangutans in LWR, which usually live further from human hotspots.

Secondly, we also guessed that younger respondents would have dominated this study since locals who went into the forest would require stronger and sturdier bodies to endure the hard terrain. However, we were proven different since the elderly dominated this study's respondents. Then, we tried to link this finding with the LWR's historical area functional change in 1999, with years before 1999, locals had free access to the forest rather than the years after. We surmised that the minimum age for young people to help their parents in the forest was around 15 in 1999; they should have aged more than 40 by the time this research was conducted. Hence, this fact aligned with most respondents aged 40 years or older (76.7%).

The respondents over 60 years old meant they had lived and utilized the resources in LWR years before the limited access starting in 1999. It meant that people who lived before 1999 depended on forests and had a higher chance of interacting with wildlife in LWR. However, these two factors did not have strong relations to either men or women reacting to orangutans. Therefore, respondents' origin and age did not necessarily impact the frequency of encountering orangutans. We concluded that the area policy of limiting people's access to the forest had cut off the knowledge and experience sharing between the older and younger generations in knowing better about their forest and its wildlife.

As the sociodemographic variables did not relate to humans' responses, we traced back to the correlation between the jobs and gender, connected to the natural area in LWR. Typically found in the usual nature-dependent family's gender-based work division, men

had more chances to utilize natural resources [44,47]. They usually cultivate lands, collect fish, and harvest sap. We discovered that women in LWR were socially structured to be stay-at-home wives to help process what their husbands got from the forest. They mostly did the processing, such as cutting and drying fish, usually for local consumption inside their villages or daily household consumption.

Previous studies also supported this phenomenon, as women near forests showed a pattern of utilizing forest resources mainly for household subsistence [44,48].Thus, this explained how women in LWR were less likely to see orangutans directly in their natural habitat. They relied on their husbands or male family members to inform them regarding the orangutans they encountered. The lack of direct experience dealing with orangutans might have instilled some fear in women regarding orangutans. They told us in some interviews that they considered these primates big, scary wildlife. Their admission synchronized with previous studies affirming that humans, compared to their ape relatives, are the most fearful one when approached by threats or dangers [49,50].

Human's perception of orangutans might be related to how humans and orangutans perceive each other. Previous studies suggested that in humans and great apes, including orangutans, body and facial expressions are pivotal in communication to detect dangers [41]. It might explain why both parties felt threatened as they saw each other as a threat, which escalated into negative interactions. One of researches stated that primate size also determined humans' acceptance of primates [46]**.** Correlated with how big orangutans are compared to humans, locals applied attack or defense actions whenever they encountered them. In this study's case, people tended to run away due to fear or, for worse, approached orangutans. These behaviors led to orangutans reciprocating negatively.

We speculated that primates, in general, might show more aggressive behaviours toward women as their coping mechanism due to women's fear-based responses. A study investigating macaques' responses toward tourists discovered that the macaques behaved aggressively due to women's scared expressions and actions [42]. As women of our respondents usually tried to run away or scream once they met orangutans, these apes would act negatively, either evading or chasing the women. However, an interesting fact came with humans expressing fear-based vocalizations to respond to danger as their "predator," often by screaming.

Meanwhile, primates did not scream as humans did; instead, they made alarm calls with loud voices to deter the predators. While both might have different intentions to scream or produce loud noises, their fear-based vocalizations had the same characteristics identified by high-pitched screams [41]. These responses might provide cues to each other that they both were terrified, resulting in negative responses. As this study was mainly based on the human perspective through interviews, we encourage that there must be a further study investigating how orangutans' tolerance affects human-non-human primate interactions, peculiarly from orangutans' psychology aspect.

5. Conclusions

Our study unveiled those human genders had significant relations to orangutans' tolerance of humans, which also affected the interactions between the two. More negative orangutan reactions were experienced by locals, particularly when this primate encountered women. This revelation might be linked to how the two perceived each other facial and body expressions and women's tendency to run away and scream, which might be perceived as fear towards orangutans. Since genders were proven to influence the human-orangutan interactions in the LWR, which in this study was limited to the information gained from human perspectives, this information can become a consideration in designing more suitable social approaches to orangutan conservation programs. Adaption might increase the program implementation success and local participation, with the managers better plotting which gender group for any specific conservation agendas. Men might be better suited to conservation programs that require them to visit orangutans' habitats, such as in orangutan monitoring activity or orangutan-watching ecotourism. Meanwhile, women would fit better as conservation education agents towards their families and the villagers.

Author Contributions

WMA: Conceptualization, Methodology, Interviews, Writing - Review & Editing; **AS**: Conceptualization, Methodology, Review; **DAR**: Methodology, Review.

Conflicts of Interest

There are no conflicts to declare. This research had received legal permissions from the Faculty of Forestry and Environment of IPB University (1610/IT3.F5/TA.00.03/M/B/2923; 1611/IT3.F5/TA.00.03/M/B/2923; 1612/IT3.F5/TA.00.03/M/B/2923) and The Nation and Political Union of West Kotawaringin (070/18/KESBANGPOL-IV/III/2023).

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