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RESEARCH ARTICLE

Thai Elephants Welfare Standards: An Evaluation of Three Ecotourism Industries in Thailand

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Abstract

This study aims to evaluate the welfare standards of elephants that were used in the ecotourism industry at three popular tourist attractions and industries, consisting of Samphran Elephant Ground and Zoo (Nakornpathom Province), NongNooch Garden Pattaya (Chonburi Province), and Ayutthaya Elephant Palace and Royal Kraal and Elephant Kraal Pavilion (Ayutthaya Province), located in the central and western parts of Thailand. These tourism industries had more than thirty elephants in each place and were categorized as large elephant camps. Therefore, the researcher aims to investigate the standards of these elephant camps, which entertain tourists, including the elephant show. The result revealed that both Samphran Elephant Ground and Zoo and NongNooch Garden Pattaya were ranked as five-stars (97.2 % and 94.23% scores, respectively), while Ayutthaya Elephant Palace and Royal Kraal and Elephant Kraal Pavilion (Ayutthaya Province) had the same score (86.15%) and the same four-stars ranking, respectively. Since the score and standard level depend on various components and factors, observation and personal inquiry from staff in each place were used to collect data on Thai elephants' welfare, aiming to bring improvement in the status of elephants employed in the ecotourism industry of Thailand in the future.

Keywords: Elephant welfare standards, Evaluation, Ecotourism industry, Thailand

Introduction

Elephants are the largest terrestrial mammals. They are considered honorable animals in Thailand and have been held in high esteem in Thai society since ancient times. They have played several economic and socio-religious roles in ancient Thailand. Historically, elephants in Thailand were used for many purposes, including the royal coronation and ceremonies, where the king rode on the elephant for public view (PNEP, 2002). But in recent decades, the value of elephants has gradually decreased, since only a few elephants were used in royal ceremonies, with no use in warfare or logging. Their roles have now shifted to the tourism industry, used for tourist rides and shows to entertain tourists (FAO, 2002). In a report, it was stated that Thai elephants were exploited, as the elephants were made to walk on the city streets to get food offered by the tourists and onlookers, and also were used for exhibition in the circus. For ecotourism entertainment, they were trained by the mahouts in various ways, such as ordering them to stand in various unnatural postures during the show for entertainment, standing with two front legs or hind legs (Tipprasert, 2002). Thus, while training these elephants to entertain the customers, they were abused and had to face challenging situations, which affected their health and welfare (Kontogeorgopoulos, 2009a). Elephant shows, elephant rides, photogenic elephants,

and feeding elephants are popular forms of entertainment that contribute a lot of income to the ecotourism industry of Thailand. Therefore, ecotourism industries are set up in many places, consisting of elephant camps, zoos, and safaris (Rodger et al., 2007). The ecotourism industries that use elephants have three main activities consisting of: 1) Entertainment activities such as playing music (e. g. , beating the drum and blowing a harmonica); 2) Interaction with tourists, such as tourists feeding elephants, clicking a photo with elephants, and riding the elephants. 3) Obedience to the mahout, such as standing, lifting their legs, dancing, and various other shows (kicking the ball, shooting the ball, walking with two legs, and massaging tourists), as per the instructions of their mahout (Kontogeorgopoulos, 2009a). However, there should be consideration of issues about animal care and their welfare for these elephants employed in ecotourism industries around the world, such as: 1. To relieve deprivation of food and water by providing facilities to get water and healthy food; 2. To relieve aches, suffering, and irritation by keeping them in a comfortable environment for rest and shelter; 3. To protect from pain and disease by providing facilities for medical care, medicines, treatment, and an accurate diet; 4. To increase facilities for expressing their natural behaviour and instincts; and 5. To relieve elephants from cruelty, stress, and discomfort. If these conditions are met, it can be assumed that the welfare status of elephants is good (Boonrotts Elephant Sanctuary, n.d.; Intrepid Travel, n.d.).

Research objectives

1. To find the forms of entertainment in the ecotourism industry of Thailand.

2. To evaluate the elephant's welfare standard in three popular ecotourism industries of Thailand.

Literature review

World Animal Protection (2026) reported that 2/3 of captive elephants employed in Thailand's tourism industry still live in poor welfare conditions, such as inadequate diets, dirty living conditions, and inadequate veterinary care, and are used for tourism entertainment, despite some limited progress since the last assessment in 2019.

Speiran (2026) stated that despite animals playing active roles in the tourism industry, there is a lack of research on the ethical concerns surrounding their welfare. The chapter questioned the economic structures that sustain exploitative wildlife tourism practices and proposed economic policy and regulatory interventions aimed at reducing harmful tourist–animal interactions and supporting conditions that support animal agency, well-being, and resilient multispecies communities. The study suggested promoting ethical stewardship by empowering those directly involved in animal tourism (e. g. , mahouts) through training, availability of career stability programs, literacy initiatives, and humane handling certifications.

Green et al. (2025) stressed that although there have been regularized elephant ride instruction rules for most operators or handouts, some do not strictly adhere to the rules about the limit on the number of passengers per ride on an elephant. However, with consideration of animal welfare, research has reported that there was a notable decrease in the number of venues offering elephant rides.

Campiranon (2025) reported that there is a profound impact of tourism on the welfare of captive elephants, often resulting in stress for the animals due to the high frequency of human interactions and the physical demands imposed by tourist activities. Also, the well-being of elephants is influenced by the experiences and compassion shown by their mahouts. So, for enhancing animal welfare, it is important to evaluate positive human-animal relationships (HAR). It is recommended to implement cognitive-behavioral training for handlers and incorporate HAR assessments into welfare audits.

Fakfare et al. (2024) emphasize the significance of ethical beliefs, attitudes, and awareness in animal-based tourism entertainment, with special reference to the behaviors of Asian tourists regarding having ethical concerns in animal-based tourism.

Rastegar (2022) reported that even though there are many studies on justice debates in tourism policy and planning documents, this has not necessarily been implemented into tourism practice. So, it is important to stimulate more justice research for pathways to integrate multispecies justice in tourism practice. Such future research should demonstrate how an in-depth discourse, creative and innovative thinking, and critical analysis can help in the vision and enactment of a radically different future for tourism.

Bansiddhi et al. (2020) conducted a study of 122 elephants from 15 different elephant camps in Thailand to investigate whether there is variation in their management and differential effects on elephant well-being. It has been observed that elephants employed in the eco- tourism entertainment industry are often exploited and forced to perform unnatural behaviors for entertainment or education in tourism. The results concluded that improving the management activities that harm the health and well- being of elephants is necessary. The study further suggested that government agencies plan and implement scientific guidelines and regulations to ensure better management practices of elephants used in tourism entertainment in Thailand.

Bansiddhi et al. (2019) mentioned that elephant camps need improvement in the management of elephants' welfare and concern about diseases and other health conditions that affect elephants. For instance, the problem of obesity among elephants can be solved by creating a balanced work environment for them, along with the availability of resting hours, exercise, and healthcare facilities and healthy food. Most employed elephants have foot problems, which can be solved by minimizing walking on concrete hard floors and checking elephants' feet at regular intervals. Usually, a hook is used for the safety of elephants, mahouts, and tourists in free- contact circumstances. However, the management committee should take care so that it does not cause harm to the elephant. Lastly, there should be availability of training programs for mahout in terms of handling elephants and using a hook, or a saddle, so that any harm, wound, or disease that affects an elephant's health and welfare is avoided.

Bansiddhi et al. (2018) reported that generally Pang Chang or elephant camps have resting time for elephants only in the absence of tourists during lunch hour approximately 1 hour. And in this resting time, elephants move around to search for food and water. There is variation in the daily walking distance of elephants per day, ranging from 3.20-8.90 kilometers in the case of Asian elephants, 7.0 kilometers in the case of Indian elephants, and 5.3 kilometers in the case of American elephants. From a welfare standpoint, this variation in the distance of walking is not influenced by the physical or health condition of elephants. It has been confirmed that this exercise of walking 14 hours /week helps elephants reduce obesity. However, it is important to observe elephants that walk at a higher speed as it may cause them to be tired. Also, care should be taken while using a hook with an elephant so that the hook does not cause pain or put pressure on the body of the elephant. An inappropriate way of using a hook needs to have a welfare concern for prolonged usage of it can create wounds, and pressure on the elephant's body. For the saddle, a piece of equipment that is placed on the back of the elephant can cause lesions to the elephant, and the chance of having lesions increases with the intensity of working hours/ day, heightened by a workload of six to seven hours, and also related to the elephant's age. Usually, lesions on the body result from a saddle made of improper padding material and fitted very tightly, such as a saddle made from a rice sack. Saddles made from a softer material such as a blanket cause fewer lesions on the body of elephants. Also, when performing, elephants are made to stand in awkward postures for a prolonged period; there can be a risk to the elephant's health, causing many diseases of the bones, muscles, and joints. Besides this, care should be taken when the elephants are forced to sit in an imbalanced sitting posture because this can be the cause of fatal diseases of the bladder, intestine, and uterus and even death.

De Mori et al. (2019) reported that Thailand's various Pang Chang or elephant camps must use appropriate and ethically approved methods to evaluate the elephants' welfare. There is a risk of increasing harm to elephants by using an invalid welfare assessment method.

Malikhao and Servaes (2017) pointed out the need to address animal welfare issues, using both feasible and infeasible approaches to develop sustainable tourism industries in Thailand.

Similarly, Dick (2016) demonstrated how elephants were abused and used for unproductive leisure entertainment in tourism, which he considered harmful to elephants and a strong contributing factor to their decreasing population, thus disqualifying this tourism entertainment. Besides, interaction activity between tourists and elephants has to be monitored for the safety and health of both tourists and elephants due to the risk of infection.

Piriyapornpipat (2013) reported that there was a high probability of people infected with Mycobacterium tuberculosis touching the elephant. As this disease is

susceptible to being easily transmitted from human to human and from human to elephants and elephants to elephants, the elephants are likely to be infected too through contact with infected people or elephants. Therefore, elephant camp owners or managers should have regular health check- up measures with the availability of veterinary doctors for both elephants and mahouts to prevent this infectious disease.

Veasey (2006) described that the management of an elephant camp or zoo should meet the animals' welfare requirements, such as awareness of their behavioral ecology and biology. Since welfare measures are difficult to measure, it is suggested that those who manage zoos and other eco- tourism entertainment shows should research the suffering and welfare of animals involved in the program, considering their physical and behavioral requirements.

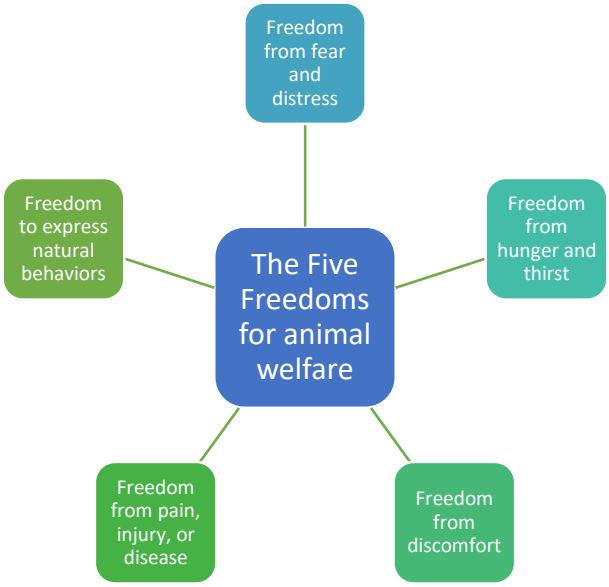

Figure 1 The five freedoms for animal welfare framework
Source: Author

Research gap, theoretical contribution and methodology

The above literature review highlighted the intense use of animals in various entertainment activities in tourism, and research focusing on the welfare of animals is an insufficient recent phenomenon (Wattanacharoensil et al., 2024). Consequently, animal-based tourism has raised concerns about animal welfare issues (Lee et al., 2024), which is an important element of animal ethics analysis as it refers to an animal's physical and mental state, and an ethical attitude to promote the prevention of inhumane treatment of animals (Wunderlich et al., 2021). The generic term 'animals' here refers to those that are sentient, having negative and/or positive subjective experiences which matter to them (Mellor, 2019). Animals like humans have pain, stress, and suffering, both physical and psychological (Schweiggart, 2024), and animals employed in the tourism industry have to face these burdens. For instance, to tame and train these animals for tourism entertainment, animals are deprived of their innate needs, confined in cages to live in zoos, forced to perform unnatural behaviors and positions, tied up with ropes to prevent them from escaping, and subjected to cruel practices to train and control them. Despite millions of animals being used as attractions in wildlife tourism, ethical considerations surrounding their treatment have been significantly overlooked in both academic research and tourism practices (Fennell et al. 2026). Although many elephants are now used in the tourism industry of Thailand, the welfare of these working elephants used in eco- tourism entertainment has been an issue in terms of their health and welfare that needs considerable discussion and research among

researchers, academicians, stakeholders, and tourists (Magda et al., 2015; Chatkupt et al., 1999). Recently, there is a growing awareness of these sufferings of animals among social workers, academicians, and policymakers, which made them work hard to develop animal welfare perspectives (Fennell & Coose, 2022) from many dimensions, including management perspective such as welfare standards, practices, challenges (Bansiddhi et al., 2020; Ci & Xu, 2019), tourists' experiences, attitudes, and ethical considerations (Flower et al., 2021; Kontogeorgopoulos, 2009b). So, the concept of animal welfare can be analyzed from two theoretical perspectives in tourism, that is, how animals are treated and the consideration of the well-being of animals (Winter, 2020). From the above literature review, the concept of animal welfare can be analyzed from two theoretical perspectives in tourism, that is, how animal is treated and consideration of the well-being of animals, and is based on the Five Freedoms Assessment Framework given in Figure 1: 1. Ready access to fresh water and a diet to maintain full health and vigor; 2. Providing an appropriate environment, including shelter and a comfortable resting area; 3. Prevention or rapid diagnosis and treatment of disease; 4. Providing sufficient space, proper facilities, and company of the animal's own kind; and 5. Ensuring conditions and treatment to avoid mental suffering.

The welfare of an animal includes its physical and mental states, how it is coping with its environment, human experiences, and ethics to evaluate animal welfare through observation and interpretation of an animal's behavior and health status. The Five Freedoms are used as the basis for writing animal care protocols and expectations for many professional groups, including veterinarians. They have been adopted by representative groups internationally, including the World Organization for Animal Health and the Royal Society for the Prevention of Cruelty to Animals. Most of the animal welfare audits developed for implementation on farms and in processing facilities are based on the Five Freedoms (Michigan State University, 2020).

Description and historical background of the study area

This research evaluates the behavior and activities of only three ecotourism industries in Thailand due to limited budget and time:

1. Samphran Elephant Ground and Zoo (Nakornpathom Province)
2. NongNooch Garden Pattaya (Chonburi Province)
3. Ayutthaya Elephant Palace, Royal Kraal and Elephant Kraal Pavilion (Ayutthaya Province).

A brief description and historical background of this study area are given below.

Samphran Elephant Ground and Zoo (Nakornpathom Province)

This zoo is a popular tourist place on the Petchkasem Road, about 40 kilometers from Bangkok in Tha Kham sub-district, Samphran district, Nakornpathom Province, Thailand. It was established by one person, Mr.Pichai Chaimongkoltrakul, and officially opened and began serving Thai and foreign tourists on March 28, 1985. It is now a learning resource zoo, a nursery of plants and animals, especially crocodiles that are almost extinct from natural sources, and also serves as an elephant conservation resource. This zoo also has trained and skilled mahouts who train the elephants to maintain their habitat. About 3, 000 tourists usually visit this zoo per day.

The zoo has the following activities:

- Crocodile show- It has three shows per day at different starting times: 12. 45, 14. 20, and 16. 20. (Monday-Saturday). Sunday has additional shows at 10.30, 12.05, 16.05, and 16.20.
- Magic show- It starts at 13.15 o'clock, 15.00 o'clock (Monday-Saturday). Sunday has an additional show at 11.00 o'clock.
- Elephant show with music- It starts at 13.45 o'clock, 15.30 o'clock (Monday-Saturday). Sunday has an additional show at 11.30 o'clock.
- Elephant trekking show- It starts at 09. 00, 13. 00 o'clock (Monday-Saturday). Sunday starts at 09.00 - 11.00 o'clock (Samphran Elephant Ground & Zoo, 2026).

NongNooch Garden Pattaya (Chonburi Province)

NongNooch Garden is located between Pattaya and Sattahip district, about 163 kilometers from Bangkok on Sukhumvit Road in Chonburi Province of Thailand. It was established in 1954 and owned by two persons named, Mr. Pisit and Mrs. Nongnooch Tunsajja, with an area of 1,500 rai (600 acres / 2. 4 square kilometers). The owners initially purchased the land to make an orchard but later on decided to change it into a wildlife conservation project, which was then opened for public viewing in 1980 and its management was thereafter transferred to Nongnooch's son, Kampon Tansacha, in 2001. Currently, this place is a leading tourist attraction in Southeast Asia. There are about 2,000 tourists per day from all over the world. The exhibition here consists of the Thai art and cultural show and an intelligent elephants' show (e. g. , kicking football, basketball, shooting, painting, massaging tourists, and so on). It is open every day, 4 times per day at different times: 9.45, 10.30, 15.00, and 15.45 hours. The duration of each show is about one hour (EmagTravel, 2019).

Ayutthaya Elephant Palace, Royal Kraal, and Elephant Kraal Pavilion (Ayutthaya Province)

Ayutthaya Elephant Palace is located on Patone Road, not far from Khum Kunpan Ayutthaya Historical Park, Pratuchai sub-district, Phra Nakhon Si Ayutthaya district, in Ayutthaya Province. Among the important places in this palace include the Elephant Camp of Ayuthaya. This area is an elephant and mahout resting place. It was established on February 17, 1997, and initially named Pangchang Ayutthaya but was later changed to Ayutthaya Elephant Palace to bring prosperity to both the owner and the palace. This elephant palace was supported by the Fine Arts Department under the Tourism Authority of Thailand. It was founded to preserve and sustain rare elephant species in Thailand by solving many hardships imposed on elephants, such as saving drugged elephants to make them work hard in the logging industry. As a result of this palace' s creation, many elephants were brought from the North to the Central and Northeast of Thailand, thus saving them from illegal human exploitation. In addition, it has many other facilities with systematic, standardized management and rearing. This place has initiated the first elephant wedding program in the world (for elephant breeding), and the program was found to be very successful. Along with this elephant breeding program, it has several activities such as playing and touching the baby elephant, taking a photo with baby elephant after payment of servicing charge of 40 Baht/ photo, elephant riding experience, watching intelligent elephants show with beautiful music (elephant dance, standing with two hind legs, hula hoop rotation of elephant's trunk, and tourists are allowed to touch the elephant's stomach as it is considered to be lucky) (Ministry of Tourism and Sport, 2019).

Royal Kraal and Elephant Kraal Pavilion is located at 74/ 1 M. 3, Suan Prik sub- district, Phra Nakhon Si Ayutthaya district, Ayutthaya Province. This place has a habitat of 80 elephants and a village of mahouts. In the past, it was called the elephant department with important roles to perform, including the protection of Ayutthaya Province from enemies' attacks and also used as a shelter for retired elephants, elderly elephants, and baby elephants. Now, it is used as a training center and mahout school and is open to tourists who want to have a live experience with elephants. The visiting hours of this place are from 8.30 to 17. 30 hours and are open every day (Dmiceplanner, 2016).

Technique of data collection

The research, led by World Animal Protection elephant expert and wildlife veterinarian, assessed 236 tourism venues having 2,849 elephants across Thailand between February 2024 and January 2025 (World Animal Protection, 2026). The study used a mixed-methods data collection technique. The study collected both quantitative and qualitative data using techniques such as surveying, in- depth interviews with four key informants (mahouts), and participant observation of tourists, mahouts' behavior, and elephant activities in three selected popular tourist areas located in the central and eastern parts of Thailand. Purposive sampling was used to conduct in- depth interviews with 4 key informants with expertise related to the study topic. This sampling method ensures that all selected individuals possess adequate knowledge to provide information on the research objectives. All participants for the in-depth interview were contacted by phone and official letter, requesting that they spare time for the interview at a

particular place and time according to their convenience. When they gave consent for the interview, the researchers conducted the interview. The data were collected through an interview schedule that the researchers designed, keeping in mind the study' s objectives. The in-depth interview took about one hour. All the data provided were kept anonymous and confidential, following the ethical principles of the Helsinki Declaration. Additionally, secondary data were obtained by reviewing literature from various sources. There were 35 elephants in Samphran Elephant Ground and Zoo (Naornpathom Province) , 69 elephants in NongNooch Garden Pattaya (Chonburi Province), and 97 elephants in Ayutthaya Elephant Palace and Royal Kraal and Elephant Kraal Pavilion (Ayutthaya Province) . In addition, standard valuation forms for these ecotourism industries were also used, adapted from previous studies (Thailand Tourism Standard, 2018). The various components in this evaluation form are shown in Table 1.

Table 1 Major components and minor components for elephant camps evaluation

Major components	Minor components
1. Structural elephant camp components	
	1.1 Place
	1.2 Elephant
	1.3 Staff
2. Administration and management components	
	2.1 Environment
	2.2 Safety
	2.3 Assurance of tourist
	2.4 Database
	2.5 Staff development
	2.6 Standard control and maintenance
3. Educational components	
4. Local participation components	

After evaluation, the point can be calculated using the following equation:

$$FS = \frac{ES * W}{TS}$$

Where;

FS is the Final score

ES is the evaluated score (Total of each component)

TS is the Total score of each component

W is the Weight score of each component

**Weight score and total score can be calculated as in Table 2.

Table 2 Giving standard marks of elephant camp for tourism

Components	Weight (*W*)	Total score (*TS*)	Evaluated score (*ES*)	Final score (*FS*)
1. Structural elephant camp components	50%	615		
2. Administration and management components	35%	483		
3. Educational components	7.5%	45		
4. Local participation components	7.5%	27		
Total	**100%**	**1,170**		

The standard level measurement of the elephant camp was divided into three levels by combining the marks for each factor and calculating them as percentages, as shown in Table 3.

Table 3 Standard level of elephant camp for tourism

Score level	Standard level	Standard level
+90	5*****	Best
81-90	4****	Good
71-80	3***	Pass
61-70	2**	
51-60	1*	

Results and discussion

The results of surveying and evaluation at Samphran Elephant Ground and Zoo, Nakornpathom Province, have shown that the structural elephant camp components had 598 scores out of 615 (full score), comprising Place with176 scores, Elephants 284 scores, and Staff 138 scores. Administration and management components obtained 465 scores from 483 (full score), consisting of environment 66 scores, safety 267 scores, ensuring tourists 42 scores, database 45 scores, and standard control and maintenance 45 scores. Educational components and Local participation components both obtained full scores, with 45 and 27 scores, respectively, as shown in Table 4.

However, this elephant camp achieved a five-star standard level, but there were some faults, especially in the show, where the elephants stood and walked on their two legs, as shown in Figure 2.



Figure 2 Mahout instructs elephants to stand on two legs before the show

The results of surveying and evaluation at NongNooch Garden Pattaya (Chonburi Province) show that the structural elephant camp components have 560 scores out of 615 (full score). The components consist of Place (194 scores), Elephant welfare status (252 scores), and Staff skill and training status (114 scores). Administration and management components obtained 465 scores out of 483 scores (full score), consisting of the environment (66 scores), safety (270 scores), ensuring tourists (39 scores), database (45 scores), and standard control and maintenance (45 scores). Both Educational components and Local participation components obtained full scores, 45 and 27 scores, respectively, as shown in Table 4.

On analysis through observation, the camp was found to have several faults that need improvement, such as allowing the tourists to have direct contact with the elephant, the mahouts ordering the elephants to stand and walk on two legs, walking on the concrete street that had much traffic, and the elephant massaging tourists, as shown in Figures 3 and 4.

Table 4 Comparison of elephant camp ecotourism standard ratings

Elephant camp	Structural components(50%)	Administration and management (35%)	Educational components (7.5%)	Local participation (7.5%)	Total score (ES)	Final score (FS)	Standard level	Evaluation level
Samphran Elephant Ground and Zoo, Nakhon Pathom Province	598	465	45	27	1,135	97.32	Five stars	Best
Nong Nooch Garden Pattaya, Chonburi Province	465	45	27	1,097*	465*	33.7	Five stars	Best
Ayutthaya Elephant Palace and Royal Kraal & Elephant Kraal Pavilion, Ayutthaya Province	587	420	27	27	1,079	86.15	Four stars	Good

Note: Maximum total score (TS) = 1,170.



(A)

(B)

Figure 3 Interaction of tourists with elephants: tourist sitting on elephant tusk (A), and the elephant standing with only two legs (B)

On analysis and evaluation of the survey data from Ayutthaya Elephant Palace, Royal Kraal, and Elephant Kraal Pavilion (Ayutthaya Province), it was found that the Structural elephant camp components obtained high scores, 587 scores from 615 (full score. These structural components comprise Place (188 scores), Elephants (279 scores), and Staff (120 scores). Regarding the Administration and management components, it obtained 420 scores out of 483 (full score). The components of this consist of: environment (60 scores), safety (228 scores), Assurance of standards for tourists (42 scores), database (45 scores), and standard control and maintenance (45 scores). Finally, the educational components and local participation components both obtained full scores, 45 and 27 scores respectively, as shown in Table 4.

From observation of this place by the researcher, it was found that since the elephants employed there were used mostly for elephant trekking or riding, they had to walk long distances across the streets. Besides, they were made to stand on a small iron stool chair in an unnatural and imbalanced position in the elephant show, as shown in Figure 5. The researcher considers it to be risky for the elephants, as they may lose their balance and fall, which is dangerous to their life and bodies.


(A)


(B)

Figure 4 Baby elephants walking on the concrete street (A) and an elephant massaging a tourist (B)


a.


b

Figure 5 a. Elephants standing on a small iron stool chair; b. Elephants standing in unnatural positions on the stool chair

Conclusions

From the above analysis of results and discussion on elephant welfare standards evaluation of three popular large ecotourism industries having elephant-based tourist attractions, it can be concluded that the welfare standards of these ecotourism industries were found to be satisfactory. Samphran Elephant Ground and Zoo (Nakornpathom Province) and NongNooch Garden Pattaya (Chonburi Province) received the best standard level, a five-star elephant camp rating, having scores of 97.32% and 94.23%, respectively. Meanwhile, Ayutthaya Elephant Palace and Royal Kraal and Elephant Kraal Pavilion (Ayutthaya Province) received a good standard level with a four-star elephant camp rating score of 86.15%. It is also concluded that even though the elephants are strictly controlled by the mahouts to entertain tourists during the show or interaction with tourists, their lives and health are in a risky position due to accidents or imbalances.

Although the sample sites in this study obtained the best standard level, several risks need to be considered for improving the elephants' welfare, particularly elephants standing on only two legs, standing on a narrow, small stool, and also standing or sitting in an unnatural or imbalanced position. At the same time, tourists' interactions with elephants and feeding may be contaminated or lack nutritional value. These factors may cause health hazards to elephants.

Recommendations

Although the sample sites in this study obtained the best standard level, several risks need to be considered for improving the elephants' welfare, particularly elephants standing with only two legs, standing on a narrow, small stool, and also standing or sitting in an unnatural or imbalanced position. At the same time, tourists' interactions with elephants and feeding may be contaminated or lack nutritional value. These factors may pose health hazards to elephants, leading to diseases such as arthritis, disability, lameness, joint problems, and hernias, as found in previous research (Bansiddhi et al., 2018). Moreover, walking on the street barefoot will cause pain in the elephant's foot due to the scorching heat on the street in hot weather conditions (Bansiddhi et al., 2019). The study has many limitations: Firstly, it is confined to only three ecotourism industries, even though Thailand has many tourism industries. Secondly, it has used only surveys, in-depth interviews with a few mahouts, and observation, along with literature reviews. These limitations are due to the limited budget and time. Nevertheless, the research results can give direction for future research to expand into other regions of Thailand, too. Finally, this study did not cover many other components, such as health care, education, and local participation, because the researcher had to ask permission from the ethics board for their details, which is a long process. On the whole, this study has contributed to future research direction, suggesting additional research to find more evidence to obtain valid information, improvement, and development of the elephant camps, to improve elephant welfare standards as per international organizations' ecotourism industries in the future.

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Conflict of interest statement

The authors declare that there is no conflict of interest.

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Ethics statement

All participants were informed about the study's aims, and their voluntary participation was secured through informed consent. Anonymity and confidentiality were assured throughout the data collection and analysis process. The study followed the general ethical guidelines of the Helsinki Declaration Principles.

Declaration of generative AI in scientific writing

The authors declare that generative AI tools were used only for language improvement. All analyses, interpretations, and final content were reviewed and

verified by the authors, who take full responsibility for the integrity and originality of the manuscript

CRediT author statement

Sayam Aroonsrimorakot: Sponsor of the research funding, Project Administration, Conceptualization, Methodology, and Validation. **Kampanad Bhaktikul:** Project Administration, Conceptualization, Methodology, and Validation. **Meena Laiphrakpam:** Data Curation, Language Editing, Writing Review, Original Draft, Visualization, Editing, and Proofreading. **Warit Paisantanakij:** Data Curation, Methodology, Writing Original Draft, Visualization, and Validation. **Laiphrakpam Anjelika:** Language Editing and Proofreading. All authors contributed equally to this research study. All authors read and approved the final manuscript.

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