

Ethics and Animal Welfare Evaluations in South East Asian Zoos: A Case Study of Thailand

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Concern for zoo animals is palpable throughout society in many countries in South East Asia. It is important to understand problems of animal welfare in order for zoos to make significant improvement in maintaining high standards. With a case study of 3 zoos in Thailand, this article presents results for the first time on how ethics and welfare evaluations are conducted in South East Asian zoos. The study identified several major and minor welfare problems and provided constructive suggestions to zoo authorities, which in turn significantly improved the standards of animal welfare. Thus, the data presented in this article could serve as a model for other zoos to follow animal welfare evaluations locally, regionally, and globally.

The South East Asian Zoos Association (SEAZA) is the only major organization connecting about 90 zoological gardens and recreational parks in the region covering 12 countries and territories: Brunei, Cambodia, Hong Kong, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Taiwan, Thailand, and Vietnam. It was formed as a registered association in 1990, and its objectives are to strengthen *in-situ* conservation, to increase captive breeding, to improve stan-

dards of animal welfare, to educate public about wildlife, and to promote tourism (Agoramoorthy & Hsu, 2001b; SEAZA, 1998b).

Although the ethics of zoo keeping continues to be exceedingly complicated and multi-faceted (Haworth & Travers, 1993; Jamieson, 1986; Singer, 1990), the zoos in South East Asian countries are trying their best to maintain acceptable standards, despite pressing social and economic hardships. When SEAZA organized the Strategic Planning Workshop in 1998, it was decided that the Ethics and Welfare Committee should commence evaluation of member zoos (SEAZA, 1998a). The aim was to assess ethics and welfare in zoos to identify problems of animal welfare so that constructive suggestions can be provided to improve standards. During September 2000, three of the five zoos administered by the Zoological Park Organization in Thailand—Nakhon Ratchasima Zoo, Khao Kheow Open Zoo, Dusit Zoo—invited the committee to evaluate these zoos.

PROCEDURES

Data on animal welfare were collected using questionnaires and data forms. A total of four representatives, two from the executive board (Evaluators 1 and 2), one from the committee (Evaluator 3) and one from each local zoo (Evaluator 4) participated in the collection of data. The reason for including local representatives was to learn how they would evaluate their own zoos. The evaluators checked each exhibit carefully to record problems of animal welfare and also reviewed records on zoo management, nutrition, veterinary care, hygiene, animal acquisition, transportation, management, disposal of surplus animals, breeding programs, education, research, safety, public health, and funding.

Each evaluator also targeted a single exhibit or species to assess welfare problems thoroughly. The selection of the exhibit or species was based on the choice of the evaluators. Animal welfare problems were apparently grave in some of the mammalian exhibits that led to the selection of animals such as bears, elephants, cats, camels, antelopes, and primates. In an ideal exhibit, animals should have access to sufficient food and drinking water, shelter to avoid inclement weather conditions, clean enclosure to reduce the spread of infectious diseases, and responsible staff to care for them while they are in distress; finally, animals displayed should exhibit normal behavior (SEAZA, 1998b). The exhibit for mammals should be as large as possible with adequate environmental and behavioral enrichment devices following internationally accepted minimum husbandry and welfare standards (American Zoo and Aquarium Association [AZA], 1997).

A few months prior to the evaluations, the forms were translated in Thai and were forwarded to all three zoos. Thus, the zoo employees were familiar with the evaluation questionnaire. Before each evaluation, a meeting with the zoo's staff was held. After the evaluation's completion, staffs were briefed on the results. A

total of 94 questions were addressed to collect qualitative and quantitative data on ethics and welfare. The questions were organized in seven broad categories adapted after Thorpe (1969) and Spedding (1993):

1. Freedom from hunger and thirst,
2. Freedom from thermal and physical discomfort,
3. Freedom from pain, disease and injury,
4. Freedom to express normal behavior,
5. Freedom from fear and distress,
6. General management, and
7. Conservation programs, finance, and responsibility.

While recording data on each category, an evaluation point was given: (1) best, (2) good, (3) average, (4) poor, and (5) worst. Statistical analyses were done using SAS software, and mean values are presented as ± 1 standard deviation. The effect of zoos and evaluators were tested using analysis of variance in General Linear Model. The Duncan's Multiple Range Test (SAS, 1989) was used to test the differences of mean scores.

RESULTS

The results of the evaluations are presented in Tables 1 to 5 and all three zoos obtained acceptable average standards despite variations in each evaluator's response (see Tables 1 to 3). The Khao Kheow Open Zoo was the best and it received the highest points for Categories 1 to 7, followed by Nakhon Ratchasima

TABLE 1
Average Scores for Nakhon Ratchasima Zoo

Category	Evaluator				Average Score
	1	2	3	4	
1	3.20	2.60	2.40	1.80	2.50
2	2.10	1.50	1.80	1.20	1.65
3	2.44	1.89	2.00	1.72	2.01
4	1.92	1.42	2.00	1.08	1.60
5	2.88	1.50	2.00	1.63	2.00
6	2.67	2.78	2.44	2.04	2.48
7	1.33	2.00	2.00	—	1.78
Average	2.42	2.09	2.15	1.66	2.08

Note. Categories 1 through 7 are described in the text. Based on scale ranging from 1 (*best*), 2 (*good*), 3 (*average*), 4 (*poor*), to 5 (*worst*).

TABLE 2
Average Scores for Khao Kheow Open Zoo

Category	Evaluator				Average Score
	1	2	3	4	
1	2.00	2.30	2.00	1.70	2.00
2	1.90	2.20	2.00	1.60	1.93
3	1.50	1.61	2.00	1.11	1.56
4	2.08	2.50	2.08	1.75	2.10
5	1.75	2.25	2.25	1.75	2.00
6	2.52	2.19	2.33	2.37	2.35
7	1.11	1.56	2.00	1.11	1.44
Average	1.95	2.07	2.13	1.72	1.97

Note. Categories 1 through 7 are described in the text. Based on scale ranging from 1 (*best*), 2 (*good*), 3 (*average*), 4 (*poor*), to 5 (*worst*).

TABLE 3
Average Scores for Dusit Zoo

Category	Evaluator				Average Score
	1	2	3	4	
1	3.10	3.13	2.40	2.20	2.67
2	2.80	3.25	2.20	2.00	2.52
3	1.82	2.13	2.11	2.06	2.01
4	2.83	2.83	2.08	2.42	2.54
5	3.14	3.00	2.75	2.75	2.94
6	2.88	2.88	2.22	2.11	2.49
7	1.78	1.60	2.00	1.20	1.83
Average	2.60	2.71	2.22	2.14	2.40

Note. Categories 1 through 7 are described in the text. Based on scale ranging from 1 (*best*), 2 (*good*), 3 (*average*), 4 (*poor*), to 5 (*worst*).

Zoo and Dusit Zoo (Table 4). On the other hand, the Nakhon Ratchasima Zoo received the highest average points compared to the rest for the individual exhibit or single species category (Category 8; Table 5). Over all, Khao Kheow Zoo received the highest score ($M = 1.91$, $SD \pm 0.40$) followed by Nakhon Ratchasima Zoo ($M = 2.01$, $SD \pm 0.53$), and there was no significant difference between them. However, the performance of Dusit Zoo was significantly lower ($M = 2.42$, $SD \pm 0.53$) compared to the rest ($p < .05$, Duncan's Multiple Range Test). Besides, there were significant differences in the performance of three zoos, $F(2, 77) = 9.84$, $p < .001$, and four evaluators, $F(3, 77) = 5.19$, $p < .001$. The local investigators gave higher scores to their own zoos compared to three

outside evaluators ($p < .05$, Duncan's Multiple Range Test). There were no differences, however, in the evaluation scores among the outside reviewers ($p > .05$, Duncan's Multiple Range Test).

NAKHON RATCHASIMA ZOO

The zoo is located at Thong Chai Road at Nakhon Ratchasima, and it was opened to the public on December 1996. This 218-acre zoo has a total of 143 employees: including 28 keepers, 2 veterinarians, and 18 administrative staffs. The zoo receives funds from the government and does not anticipate any financial problems in the near future. In general, the quantity and quality of food provided for the animals was of average standard. Clean drinking water was available for the animals. The animals displayed at the zoo appeared to be in good health. The zoo has a hospital equipped for taking care of all basic problems re-

TABLE 4
Average Scores for Categories 1 Through 7

Name of Zoo	Evaluators				Average Scores
	1	2	3	4	
Khao Kheow	1.95	2.07	2.13	1.72	1.97
Nakhon Ratchasima	2.41	2.10	2.15	1.67	2.09
Dusit	2.60	2.71	2.22	2.14	2.40

Note. Categories 1 through 7 are described in the text. Based on scale ranging from 1 (*best*), 2 (*good*), 3 (*average*), 4 (*poor*), to 5 (*worst*).

TABLE 5
Average Scores for Category 8

Name of Zoo	Evaluators				Average Scores
	1	2	3	4	
Nakhon Ratchasima ^a	2.89	2.29	2.00	1.40	2.14
Khao Kheow ^b	3.31	2.22	2.76	1.19	2.37
Dusit ^c	3.24	3.12	1.91	1.25	2.39

Note. Category 8 = single exhibit/species evaluation. Based on scale ranging from 1 (*best*), 2 (*good*), 3 (*average*), 4 (*poor*), to 5 (*worst*).

^aAsiatic black bears, elephants, small cat complex, lions. ^bSun bears, Arabian camel, marmoset/tamarin, baransingha. ^cGibbons, bears, nocturnal house, waterfowls.

lated to pain, disease, and injury. Despite the lack of environmental and behavioral enrichment, most animal enclosures have naturalistic atmosphere.

Animal Welfare Problems and Recommendations

Seven Asiatic black bears were housed in two subgroups of four and three. One subgroup stayed outdoors while the other was locked up for three days continuously in a small (4 m × 4 m × 3 m) indoor enclosure that lacked both platforms for resting and enrichment devices to reduce boredom. These bears needed indoor space doubled in size and equipped with wooden platforms and enrichment devices.

The elephants were underfed: 100 kg per day for two animals weighing 1200 kg each. The amount of food should be doubled (100 kg per day per animal). The elephant exhibit had no enrichment devices. Setting up simple items in the exhibit—rubber tires, upright logs, and steel poles—would stimulate physical and mental activities for the elephants.

In the gibbon exhibits, there were not enough ropes for the gibbons to brachiate. Some exhibits had no ropes at all (e.g., concolor gibbons). It is important to provide as many ropes as possible for the gibbons to minimize walking and to maximize brachiating.

The enclosures of the dusky leaf monkey, mandrill, lar gibbon, and Francois's langur at the rescue center were not well kept. The floor was dirty with extensive algal growth. A total of 8 macaques (long-tail and stump-tail) were seen mixed in a small (4 m × 4 m × 2.5 m) enclosure. One macaque showed abnormal self-mutilation by continuously biting its own tail and limbs. The rescue center needs immediate renovation. Primates should be provided a better cage, clean water, shade, sunlight, and adequate enrichments. Special attention should be paid to animals that show pathological behavior. Macaques belonging to different species should not be mixed.

One or two local animal welfare representatives must be included in the zoo governing board. This requirement applies to all three zoos.

KHAO KHEOW OPEN ZOO

This zoo is located in 480-acre area at Chon Buri and has a total of 249 employees: including 80 keepers, 5 curators, 3 veterinarians, and 25 administrative staffs. It receives funds from the government and does not anticipate financial problems in near future. The food provided for the animals was of average standard. The zoo has a hospital equipped with medical and nutritional laboratories to solve problems related to disease and diet. It has an incinerator to dispose of

carcasses and freezers to store endangered species blood, semen, hair, and other biological samples. Furthermore, the zoo has a factory to manufacture wild animal feed. Specially prepared wildlife feed is being distributed to other zoos in Thailand.

Animal Welfare Problems and Recommendations

1. There were no sleeping boxes for the gibbons who were kept in the island exhibits. It is essential to provide sleeping boxes for gibbons.
2. A young chimpanzee was kept singly (see Figure 1) in a small (3 m × 3 m × 2 m) cage at the animal show facility with no enrichment. He should be kept with a companion chimp or in a social group in a larger enclosure with adequate environmental and behavioral enrichment devices.
3. An adult male pigtail macaque at the animal show facility had a hernia. He was weak and motionless. He should have been kept at the hospital for monitoring and treatment.
4. Two of the sun bears at the exhibit had visible mouth tumors (see Figure 2). They needed immediate veterinary attention. The night quarters of sun bears were dirty with poor hygiene and lack of ventilation. The indoor den must be rebuilt to provide bears a decent place for resting.



FIGURE 1 Young chimpanzee in a small cage with no enrichment (photo: G. Agoramoorthy).



FIGURE 2 Sun bear with visible mouth tumor (photo: G. Agoramoorthy).

DUSIT ZOO

Thailand's first public zoo, established about 60 years ago, is located in the capital city of Bangkok. It attracts 2 million people annually and has 142 employees including 38 keepers and 2 veterinarians. The zoo receives funds from the government and does not anticipate any financial problem in the near future. The food provided for the animals was of average standard. The animals displayed appeared to be in good health, except for the animals housed at the rescue center. The zoo has a hospital equipped to take care of basic problems related to pain, disease, and injury.

Animal Welfare Problems and Recommendations

1. The hygienic conditions were poor in most of the zoo's enclosures. It is essential for the zoo to make necessary changes to improve better sanitation for the animals.
2. Sun bears were kept in the dark in an outdoor enclosure. Due to lack of enrichment, bears were seen digging the concrete floor and wall. The water in the moat was dirty, and the indoor dens were small with no ventilation and enrichment devices. Rebuilding of the entire enclosure is urgent as the current exhibit is not suitable for bears.
3. The orangutan exhibit had no water and lacked enrichment devices. It is important to make immediate changes to provide a better environment for the great apes.

4. In the quarantine section of the rescue center, animals were over-crowded in small cages with poor hygiene (because of lack of branches or ropes, gibbons sat on wet floors; a masked palm civet and a moon rat expressed abnormal behavior; and pythons were dumped into a concrete pit). The rescue center needs more space with better enclosures for animals. Both the zoo administrators and animal keepers must pay special attention to issues related to animal welfare.

DISCUSSION

Do zoos adequately address public concern toward care and welfare of animals? Compared to many other areas of animal use, zoos enjoy a high degree of public acceptance (Mench & Kreger, 1996). Nevertheless, zoos are vulnerable to condemnation because the natural exhibits displayed are just an illusion. The exhibits might seem real to the visitor, but to the animals they are monotonous, lacking most of the niches that would otherwise be found in the wild. Some zoos house animals that are not accurate representations of their natural habitat. Social structure and survival features are missing and often replaced with physical and psychological suffering, diseases, and reliance on humans.

The most controversial ethical issues that face zoos are the acquirement of animals for breeding programs; disposal of surplus animals; basic animal care and husbandry; and use of animals for research, education, and recreational shows (Hutchins & Fascione, 1991). All these aspects were covered during the evaluations, but we focused more on issues related to basic animal care and husbandry.

We followed Hughes's (1976) definition of *animal welfare* as "a state of complete mental and physical health, where the animal is in harmony with its environment" (p. 1006). To be more specific, what attributes that are important for an animal to cope, adapt, and stay in harmony with the environment. This process also involve values. Hence, to conceptualize animal welfare, we have avoided creating technical definitions that eliminate values, but the task of making the value-related assumptions explicit is necessary so that we do not mistake value issues for technical ones (Sandoe & Simonsen, 1992). There appears to be widespread consensus that a high level of welfare implies freedom from suffering in the sense of intense and prolonged pain, fear, distress, discomfort, hunger, and thirst (Carpenter, 1980). Thus, we focus on these items carefully.

Although the zoos we evaluated all met acceptable average standards in terms of animal welfare and ethics, we did see a number of problems. We were astonished to see the quick response of zoo employees to resolve some problems such as adding more ropes in gibbon enclosures to stimulate behavioral enrichment and socializing a chimpanzee that was kept alone in a small cage. We had productive interactions with the employees of Khao Kheow Open Zoo and Nakhon Ratchasima Zoo. Both showed progress by solving some minor issues and

promptly submitted reports on how they solved the problems and what measures were being taken to solve major issues that might otherwise require more time and funds (for complete descriptions, see Appendixes A and B). This willingness indicates how animal welfare problems concerned some zoos and also demonstrated their moral and professional obligations to provide humane care for animals under their care.

On the other hand, our results indicate that the local evaluators, when inspecting their own zoos, evidently gave high scores, possibly because they were unable to notice welfare problems and thus underestimated the extent of animal welfare issues. Furthermore, they selected the best exhibits for evaluation whereas the outside evaluators selected the worst with major welfare problems. This showed that the local zoo evaluators not only were reluctant to look at the welfare problems in the worst possible exhibits critically but also were biased toward a political–fairness standpoint. The role of outside evaluators thus becomes critical and crucial to make the assessment procedure fair, efficient, and successful. Future zoo evaluations in South East Asia must be always done with a few outside evaluators.

Two major issues that need immediate attention in Thailand's zoos are (a) rebuilding enclosures that are a few decades old (Dusit Zoo) and (b) the dumping of confiscated and abandoned animals, both by the general public and other governmental agencies. Funding and time are vital to tackle both these inconveniences. Most zoos in Thailand and elsewhere in South East Asia rescue animals, and this pressure brings the quality of zoos down because of the lack of space in holding areas and insufficient manpower to care for them. Even the chronically sick animals cannot be euthanized because Thailand firmly follows Buddhist philosophy; killing animals is not permitted in public institutions such as zoos. Instead of waiting for funds to rebuild cages, zoos should embark on projects to relocate rescued animals to more specialized rehabilitation centers run by nongovernmental organizations (Agoramoorthy, 1997; Agoramoorthy & Hsu, 2001a). Zoos also could find suitable humane solutions promoting conservation and education by developing projects such as quickly releasing healthy animals after a short period in captivity, strictly following international guidelines, or captive breeding of rare and highly endangered species for eventual reintroductions into the wild.

We found this evaluation process adequate because it helps zoos understand basic animal welfare problems, which eventually lead to the improvement in standards. However, it is essential for each zoo and each national zoo association to set up an ethics and welfare committee by including one or two local animal rights or welfare representatives. This committee could be of immense help in identifying and solving animal welfare issues before small problems escalate. Besides, both local and international animal rights or welfare organizations must be willing to work with zoos, providing constructive criticisms, and possibly raising funds to improve the quality of zoos.

By 2005, the Ethics and Welfare Committee hopes to complete the first round of assessment of major zoos in the region. In the meantime, we hope that the national zoo associations will set up their own welfare committees to continue future evaluations of zoos in their respective countries. For example, the Indonesian Zoos Association has a membership of 28 zoos and has recently established an ethics and welfare committee. The committee plans to continue future zoo evaluations in Indonesia. Other national zoo associations should follow this model.

In the future, the Ethics and Welfare Committee aims to work closely with national zoo associations to initiate accreditation, and only zoos that maintain acceptable animal welfare and ethical standards will be accredited. Thus, the prospect of improving animal welfare standards in South East Asian zoos looks bright, and the Committee is dedicated to promote high professional and ethical standards among member zoos.

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Appendix A

Response From Khao Kheow Open Zoo (September 2000)

1. New sleeping wooden boxes (70 × 100 × 70 cm³) were installed immediately after the evaluation and placed on all four islands.
2. The chimpanzees have been moved to a new island exhibit. The night quarters have three large rooms, just opposite to the island exhibit. The young female was moved to Dusit Zoo. The two adult males were moved to adjacent cages and allowed to socialize.
3. The veterinarian examined the pig-tail macaque and a hernia was diagnosed. The animal was restrained at hospital, and the staff collected blood on September 8, 2000. The result of the blood work showed no significant abnormality. This indicated that the animal was safe for an operation. On September 11, 2000, an operation was performed to correct inguinal hernia. The operation was successful, and the animal recovered well and began displaying normal behavior.
4. Four sick bears were moved to the quarantine center, and tissue samples were collected and sent to the veterinary pathology department at Chulalongkorn University. Three of the samples had squamous cell carcinoma, and another sample was diagnosed as epulis. However, we are not sure of the causative agent. Two bears were kept in a treatment cage, and a trial of Vincristine sulphate was used (dosage of 0.6 mg. per bear once a week for 3 weeks) with little effect. We concluded that Vincristine could not cure squamous cells carcinoma in Malayan sun bears, and we are now looking for alternative treatments such as cryosurgery.
5. The zoo requested a budget increase to improve the exhibit and holding facility in 1998. The budget was approved in late 2000. The new enclosures will be ready July 2001. Since September 12, 2000, most of the bears have been moved to the rescue center and off-exhibit area. The zoo continues to face the problem of rescued sun bears and often is burdened with the responsibility of taking care of them.

Appendix B
Response From Nakhon Ratchasima Zoo
(September 2000)

1. More branches were placed in the night quarters, and platforms were placed in each night quarter. All bears were mixed in a single group in the exhibit. The budgeting plan was set up for the exhibit modification with enrichment devices included for next year.

2. More leaves were provided, as the elephants eat more leaves than grass. The total feed requirement has been increased as recommended by the evaluators. The budget plan was set up for the exhibit modification next year. We have provided more safety to the keeper by increasing the escape routes that humans, but not elephants, can pass through. We also provided more safety by adding one more door. And all necessary signboards were added.

3. Branches and ropes were placed on each of the seven islands to provide more opportunity for the gibbons to brachiate. Some tree branches were trimmed off, as they were too dense and obstructed the gibbon in brachiating.

4. The long-tail and stump-tail macaques have been separated. Their food was served on the hanging tray outside the cage to avoid contamination with the food on the floor.

5. The current policy of the Zoological Park Organization (ZPO) is to direct its budget toward welfare and enrichment for all zoos. ZPO has plans to train all keepers to learn more about animal welfare. ZPO is aware that the welfare of rescued animals is inadequate in zoos. The responsibility of rescued animals used to be the responsibility of the Royal Forest Department, but it was an obligation of the zoos not to refuse any animals although we had no place for them! In view of the continued problem, the ZPO has to find more funds from the government to establish additional rescue centers or to relocate the animals to more specialized centers.