

## Implementation of Zoo Management Strategies for Animal Welfare in Indonesia

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### Abstract

A zoo is a place to live or collect wild animals outside their natural habitat which can be controlled by the government or non-government, and functions as a breeding ground so that natural genetics is maintained. Apart from being a place of conservation, it is also a place of education and a place of recreation. The problem with zoos in Indonesia is that their management is not by the principles of animal welfare. This study aims to summarize the results of the Systematic Literature Review (SLR) by collecting reference articles related to the keyword "Implementation of Zoo Management Strategies based on Animal Welfare Standards". Management efforts must pay attention to the survival of animals by the principles of animal welfare, namely freedom from hunger and thirst; free from pain, injury, and disease; free from environmental discomfort, abuse, and violence; freedom from fear and depression; and free in expressing natural behavior. Pay attention to zoo management, animals, officers, or keepers according to their expertise. Strategy implementation using SWOT analysis, namely analysis that obtains useful strategies to implement or recommendations based on results that can maximize Strengths and Opportunities, by minimizing Weaknesses and avoiding Threats.

**Keywords:** Animal welfare, Conservation ex, Indonesia, Management, Zoo

### Introduction

Indonesia produces many variations of high biodiversity in the world such as microorganisms, flora, and fauna, so Indonesia is referred to as a mega-biodiversity country (Budiansyah et al., 2015; Nurshanti, 2022; Sotoyo, 2010; Suhartini, 2009). Along with changing patterns of life based on high exploitation ambitions and other factors, these resources experience a continuous decline, especially fauna species that are on the verge of extinction (Nurshanti, 2022). According to the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia law no. 5 of 1990 concerning the

Conservation of Living Natural Resources and their Ecosystems which aims to protect flora and fauna that are threatened with extinction. Defending all forms of biological resources from the threat of extinction is to carry out conservation actions.

Conservation can be interpreted as preserving, namely saving and protecting biodiversity, species, habitats, and ecosystems (Rachman M, n.d.; Suprianta, 2018). Conservation actions can be carried out in the natural habitat or outside their natural habitat (Masy'ud dan Ginoga, 2016; Puspitasari dan Masy'ud, 2016). Where these two conservations are related to each other such as conservation outside the

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original habitat aims to maintain the original genetic reserves in natural habitat populations (Imala, 2021; Irmalasari, 2016). According to the, (Regulation of the Minister of Forestry of the Republic of Indonesia No P.31/Menhut-II/2012 conservation outside the original habitat or ex-situ functions as a place to save animals by protecting or preserving them (Alfalisifa & Dewi, 2019). One of the conservation institutions outside the natural habitat is the zoo.

A zoo is a place for animal preservation that can be controlled every day by the keepers and staff who work at Kebun Bintang (Evitasari et al., 2020; Suherlan et al., 2020). According to the (Regulation of the Minister of Forestry of the Republic of Indonesia No. P.31/Menhut-II/2012, it is stated that one of the ex-situ conservation institutions, namely zoos, functions as a place to save, protect and care for animals. Apart from being a place of conservation, zoos also function as places of recreation and education as well as potential and valuable research (Evitasari et al., 2020; PKBSI, 2022; Suherlan et al., 2020).

Based on the general condition of zoos in Indonesia, there is a bad assessment, namely management is not by Animal Welfare standards (Suhandi et al., 2015). By (Miradona's research 2013) the management of zoos in the Magrasatwa and Cultural Park of Kinantan, Bukittinggi City, is very far below the Animal Welfare standard. One of the efforts that can be made to implement animal welfare can be done by improving animal welfare in zoos by the principles of Animal Welfare. This was also confirmed by (Guciano, 2022), who is the Director of the Wildlife Investigation Division, who stated that 90% of zoos in Indonesia prioritize economic value, while the Animal Welfare standard is very minimal, namely animals experience a lot of

suffering. According to Ward et al (2020), one of the developing countries, namely Indonesia, has zoos that have a minimum level of animal welfare which affects the mental condition of the animals and their behavior. This is due to a lack of knowledge and understanding of animal welfare principles. Meanwhile, according to Zahrah et al., (2022) the Medan Zoo and Siantar Zoo have a good tiger management system by the application of the five principles of animal freedom.

To ensure that zoo management can develop according to Animal Welfare standards in a good and sustainable manner, and minimize the negative impacts that arise. So it is necessary to have a strategy related to implementation in managing zoos and animal welfare in Indonesian zoos. Based on the description above, the authors are interested in conducting research using a Systematic Literature Review which aims to examine zoo management strategies based on Animal Welfare standards according to the Southeast Asian Zoos and Aquariums Association (SEAZA).

## **Research Methodology**

This study uses the Systematic Literature Review (SLR) method. The method the author makes in this article is by collecting reference articles related to the keyword "Implementation of a Zoo Management Strategy based on Animal Welfare Standards". Information in the form of a collection of articles was obtained electronically using a scientific database in the form of Google Scholar and other data. Data were analyzed descriptively and 39 articles from 51 sources were taken according to the topic.

## Research Results and Discussion

### Strategy Implementation

In general, implementation is defined as "implementation" or "implementation" which is several activities carried out related to human resources involving other resources to achieve strategic goals (Salusu, 1996). Strategy is an incremental action (always increasing) in the form of long-term planning by integrating goals, policies, targets, and sequences into a unified whole (Irsyad et al., 2017). The running of a strategic plan with a total number of activities and choices needed with external factors and internal factors is called strategy implementation (Wheelen & Hunger, 2003). The importance of implementing strategy implementation in the development as a tourist destination, marketing, and partnerships. One of the existing partnerships in Indonesia is the Conservation Institute.

Implementation of the strategy aims to find out the obstacles that exist in management efforts so that obstacles to management or zoo management can be optimized by improving the application of animal welfare principles, facilities, and infrastructure, and dissemination of the manager's knowledge. The involvement of human resources greatly influences the implementation of sustainable development, and participation in the protection and welfare of animals through the conservation of zoos (Febriyanti, 2022). According to the research results of Irsyad et al (2017) to create a zoo through the implementation of the strategy supported by financial support, infrastructure, and institutional partners in carrying out programs and activities, programs and

activities are divided into 4, namely tourism development programs, development of facilities and infrastructure, marketing development, and partnership development. The success and effectiveness of the implemented strategy can be measured through performance indicators on the number of tourist visits.

### Conservation

Preserving biological resources and ecosystem balance is a role in conservation. If there is no conservation agency, it will cause reserves of natural resources to decline, thus impacting the lives of wild animals and conflicts between animals and humans. So with conservation both protecting and preserving is a moral movement in realizing the preservation of resources and their ecosystems. According to RI Law No. 5 of 1990 concerning the conservation of biological resources and their ecosystems, it states that the management and use of wild animals is life support through protection, preservation, preservation, and long-term use. Such as breeding, and backing up existing animal species to replace wild animal populations, and maintaining the purity of the species through in situ and ex-situ conservation (Destiani et al., 2022; Puspitasari & Masy'ud, 2016; Waza, 2005).

In situ, conservation is interconnected with ex-situ conservation as maintaining genetic purity. Conservation efforts in the form of keeping and breeding outside natural habitats are called ex-situ conservation (Imala, 2021). According to the Regulation of the Minister of Forestry of the Republic of Indonesia No P.31/Menhut-II/2012, concerning the function of ex-situ conservation, it is an effort to protect and preserve nature that is still available by rescuing or rehabilitating these animals

(Alfalasifa & Dewi, 2019). One form of ex-situ conservation organization is the zoo (Triastusi, 2015).

## **Zoo**

According to the Regulation of the Minister of Forestry of the Republic of Indonesia, No P.31/Menhut-II/2012 concerning zoos is a place to live or a collection of wild animals outside their natural habitat that can be controlled by the government or non-government, functions as a breeding ground so that natural genetics is maintained (Maylina, 2021). According to No P.31/Menhut-II/2012, article 9 regarding criteria for zoos, namely having at least an area of 15 Ha and having at least 3 taxa classes of protected animals and non-protected animals (Suherlan et al., 2020).

The function of the zoo is as a place of conservation, place of education, place of research, place of tourist attraction, place of recreation, place of development of science and technology (Collins et al., 2019; Nekolný & Fialová, 2018; Puspitasari & Masy'ud, 2016). Star gardens have the potential for care and breeding efforts based on ethics and animal welfare (Triastusi, 2015). According to the results of Dolphina (2019), it is necessary to have a touch of environmental technology or eco-park in zoos, because the concept of an eco-park that can be adapted as an effort to manage environmentally friendly landscapes through landscape design and layout, will make visitors attractive, the economy increases the zoo's source of income.

## **Animal Welfare Principles**

According to the Southeast Asian Zoos and Aquariums Association (SEAZA) (2022) animal welfare, namely, the efforts of managers must pay attention to the survival

of animals so that animals live healthily, feed needs are met, grow and develop properly, express behavior normally and have a safe and comfortable place. According to Triastusi (2015), to achieve animal welfare, it is necessary to collaborate with zoo managers according to their respective expertise, such as keepers, provision of cages, facilities, feed and drink, vitamins, and veterinary medical personnel.

3 important aspects of Animal Welfare, namely: Welfare Science, Welfare Ethics, and Welfare Law. Welfare Science is observing the impact on animals in different situations and environments, from the animal's point of view. Welfare Ethics is assessing how humans should treat animals. Welfare Law is seeing how humans should treat animals. Animal Welfare discusses human treatment and concern for each animal, in improving the quality of life for individual animals (Triastusi, 2015).

The welfare of animals in zoos is one of the key components to achieving goals in the form of conservation, research, education, and recreation. If animal welfare standards have a low value, it will affect the reproductive success of animals, this will reduce the opportunities for zoos to contribute to conservation strategies both in situ and ex-situ (Godinez & Fernandez, 2019; Ward et al., 2020a). A successful zoo is a zoo that has high animal welfare with proper assessment and evaluation (Miller, 2012). Assessment of animal welfare in zoos can be done by observing animal physiology and behavior, heart rate variability, animal conditions, and environment, this refers to the Five Freedoms to achieve good welfare in conservation institutions (Ralph & Tilbrook, 2016; Wolfensohn et al., 2018).

To realize animal welfare in Indonesia, there are rules regarding standard

principles of animal welfare (Table 1.) by the Republic of Indonesia Government Regulation No. 95 of 2012 concerning Veterinary Public Health and Animal Welfare article 83 (1), namely the principles of animal welfare include; (a) freedom from hunger and thirst; (b) free from pain, injury, and disease; (c) free from environmental discomfort, abuse, violence (torture); (d) free from fear and pressure; and (e) freedom in expressing natural behavior (Bousfield & Brown, 2010). Therefore, to increase success in breeding all animals in cages must comply with standards so that animal welfare is met, so that it can support the contribution of conservation organizations as a place for original genetic reserves in the population (Triastusi, 2015).

The requirement for achieving animal welfare in zoos is not only adding to the collection of animals, but the most prioritized is the fulfillment of animal welfare physically and mentally, as well as the fulfillment of all the natural needs of animals (Bousfield & Brown, 2010) Apart from that, the animal conservation aspect is also supported by the exchange of animals with other Conservation Institutions (LK). The goal is to avoid interbreeding (inbreeding) to preserve offspring. Then the aspect of animal conservation is also supported in the program to release wild animals into their natural habitat (in situ). according to Forestry Minister Regulation No.31/Menhut-II/2012 article 2 (2), release can only be carried out if suitable habitat and resources are available for the animal.

**Table 1**  
*the Five Animal Freedoms (Appleby, 2004)*

No	Animal Welfare Principles	Description
1	Freedom from hunger and thirst	With the availability of clean water and naturally suitable feed to maintain the health and strength of animals
2	Free from discomfort	With the availability of a suitable environment, facilities are by the needs of animals, especially shelter and resting places.
3	Free from pain, injury, and disease	With early prevention or proper diagnosis and observation
4	Free to express natural behavior	With the availability of appropriate room areas, proper facilities, and interaction between species
5	Free from fear and depression	Guaranteeing the treatment and condition of animals by avoiding mental stress

### Zoo Management

The word management comes from the verb "to manage" or in English, namely "management". An activity that systematically follows each other to achieve the goal is called management. Broadly speaking the management functions are a) planning (planning) namely preparing all the needs of the goals and preparing the steps that will be used to achieve the goals,

b) Organizing (Organization) namely gathering people by placing them according to their expertise and abilities in the work that is planned, c) Actuating, namely moving the organization so that it runs according to their respective plans and expertise, and d) Controlling, namely monitoring whether it is difficult according to plan or not (Santania, 2016)

Based on the results of Miradona's, research (2013) zoo management at TMSBK has not yet referred to a modern zoo management system. The income earned is proportional to the optimal application of animal welfare principles. So to improve animal welfare it is necessary to apply the principles of animal welfare, complete animal facilities and infrastructure in zoos, and conduct outreach to staff regarding the principles of animal welfare and conservation.

According to Masy'ud & Ginoga (2016) managers must meet the needs of animals in the form of food and water as well as adequate nutrition, such as; the provision of food and drink, provision of vitamins, administration of drugs, control of animal behavior and condition, cleaning of cages and availability of other facilities. In addition, animal cages must comply with PKBSI standards with the aim that animals are free to express natural behavior. To improve animal welfare, it is necessary to control animal behavior, at least twice a day, in anticipation of good and safe animal conditions by recording and documenting these activities. There are several enclosure facilities such as animal nameplates providing information about the animal, both in Indonesian and scientific, and the area of origin, and distribution of the animal as an education for visitors. Providing sign systems (prohibition/warning boards) providing information in the form of prohibitions and warnings that must be obeyed by visitors while in the zoo area (Masy'ud and Ginoga, 2016). In addition to adjusting the facilities needed by animals in cages such as trees, branches, perches, nests and places for reproduction, resting places, digging areas, and equipment that stimulates the natural behavior of animals in cages (Bastari, 2018; Maylina, 2021).

Animal welfare assessment is based on the animal management system and the availability of facilities. Good management

can be achieved if managers understand the main needs of the animals being managed. This aims to achieve the implementation of animal welfare with animal welfare evaluation tables issued by the Association of Indonesian Zoos (PKBSI). Zoo managers, especially Animal Keepers, must have the appropriate expertise and extensive knowledge of the needs of the animals under their management. So it is necessary to conduct animal training by Animal Welfare standards (Miradona et al., 2013; Teguh et al., 2010).

### **Animal Feed**

Feed is also defined as "feed" which is a source of energy in the form of a single or mixed food ingredient, both processed and unprocessed, consumed by animals as a means of survival because it is a very important factor for growth, reproduction, and reproduction. Everything that can be eaten and does not harm the health of animals is called feed (Angelina et al., 2019; Dalimunthe et al., 2020).

Assess animal welfare, it can be done by optimizing and improving the management of care for animals in zoos. the assessment uses several parameters such as type, amount, time, frequency of feeding, the nutritional content of the feed, fulfillment of nutrients, and places where animals are fed, as well as interviews, this can be done directly as well as other supporting literature Increasing animal production and reproduction depends on availability the quality of feed needed by animals in their natural habitat and in captivity (Dalimunthe et al., 2020; Schmidt, 2004).

The method of feeding animals must be considered first so that the feed given can meet nutritional needs such as body condition, health status, body preferences, and activity level of the animal. Quality feed is feed that contains carbohydrates, fat protein, minerals, and vitamins (Angelina et al., 2019). Feed ingredients are divided into

feed raw materials as a source of protein (vegetable and animal), feed raw materials as an energy source, feed raw materials as a mineral source, and feed raw materials as additional supplements (supplements/feed additives). In general, animal feed ingredients in captivity are grouped into types of concentrated feed, coarse feed, vitamins, additional feed, and minerals (Angelina et al., 2019; Ward et al., 2020).

### **Animal Ecology**

One branch of ecology that studies animals is animal ecology. Animal ecology is the science that studies the interaction between animals and their environment. Part of animal ecology is behavioral ecology, also known as "ethology", which is the study of animal behavior in evolution and the natural environment (Sumarto & Koneri, 2016).

The basics of ethological development are a) adaptation (function) is an animal that has behavior for reproductive success as a preservation of its kind, b) phylogeny (evolution) is a mechanism or process of changing behavior from its ancestors to present-day species, c) causation (a mechanism) is a stimulus received by the receptor, passed on to the nervous system or hormone, then to the effector system in the form of glands or muscles, and d) autogeny (development) is a change in animal behavior from hatching or laying eggs to death, both in imprinting, learning behavior, and innate behavior (Angelina et al., 2019; Sumarto & Koneri, 2016).

Compatibility between animal ecology and animal welfare is interrelated with environmental enrichment (enrichment) because it has an important role in maintaining and supporting natural animal behavior patterns and improving the overall quality of life to survive, by international animal welfare standards (Animal Welfare) (Yustian & Lestari, 2013).

### **SWOT Analysis**

According to Hartawan and Afrilian (2021), a SWOT analysis is an analysis that obtains useful strategies that can be implemented or recommendations based on results that can maximize strengths and opportunities and can minimize weaknesses and threats. Every decision made with a strategy is always accompanied by the development of the mission, goals, strategies, and policies within the company. Therefore, it must consider and analyze the influencing factors in forming a "strategic plan" (Sari, 2016; Suherlan et al., 2020).

SWOT analysis is divided into 2 factors, 1) internal factors, namely strengths, and weaknesses, included in the Internal Strategic Factor Analysis Summary (IFAS) matrix, and 2) external factors, namely opportunities, and threats, including in the External Strategic Factor Analysis Summary (EFAS) matrix. Then the analysis of the two factors will be compared to find out the output in the form of directions and solutions in zoo management (Suherlan et al., 2020). The strategy formulation is (Sari, 2016);

1. The S-O strategy, namely the application to take advantage of the strengths of the zoo with the attractiveness of the opportunities it has,
2. The S-T strategy is a strategy that seeks the strengths of the zoo to overcome threats,
3. The W-O strategy, namely the implementation of minimizing the weaknesses of the zoo by taking advantage of opportunities, and
4. The T-W strategy is a strategy that can overcome the weaknesses of the zoo to avoid the threats it is facing.

### **Conclusion**

The potential that zoos have in Indonesia is a tourist attraction for visiting, apart from

being used as a conservation place for education. However, in reality, the management of zoos in Indonesia is very below the Animal Welfare standard. The principle of animal welfare has the Five Freedoms of Animals, namely being free from hunger and thirst; free from pain, injury, and disease; free from environmental discomfort, abuse, and violence (persecution); freedom from fear and depression; and free in expressing natural behavior. Efforts to manage zoos in Indonesia can develop according to animal welfare standards, so strategy implementation is carried out. The implementation of the strategy uses the SWOT analysis method which is a systematic identification of various factors and evaluates a problem in the zoo to minimize negative impacts and threats so as to maximize the benefits and opportunities that exist in the zoo.

It is recommended that zoo management in Indonesia implement the principles of animal welfare, place management officers according to their expertise, pay attention to making cages according to the needs of the animals to be placed, it is necessary to carry out scientific studies on the ecology and behavior of these animals if the manager is unable to do so, it is recommended to close them.

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