Ecocentrism for the Sustainable Conservation and Management of Elephants in Southern Africa.

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Abstract

Elephant population management in Southern Africa has been an issue of concern for over 50 years now and continues to be an issue as their rate of reproduction is exceeding the carrying capacity of the land and the resources available in the ecosystems for their survival. Ecocentrism is a philosophy that advocates for the respect of non-human nature in that decisions making about nature should not be human-centered (anthropocentric) or done just for the benefit of humans. The land ethic and deep ecology are also divisions of ecocentric ethics and they also put out views that make ecocentric based decisions more understandable. These are such as the inclusion of soil, water, plants, and geology into the community of our ecology, and also gives leeway to say, if humans are to use nature for their benefit, it should be for survival and not luxury. With many methods of elephant population management available, it is important for conservationists and wildlife management authorities to consider an ecocentric ethic stance as to the reasons why interference with the elephants would occur and the methods they would use to manage and control the population. This paper tries to show the necessity of elephant population management in Southern African countries, namely: Zimbabwe, Botswana, Namibia, and South Africa, in an ecocentric based manner, be it through culling, translocation or birth control. This paper reviews a number of published materials to make its arguments. It concludes that if elephant management is carried out following the concepts of ecocentrism, it will most certainly yield better results for the sustainability of our environment and the ecological community as a whole.

Key words: Anthropocentric, Ecocentric, ethics, Elephants, culling, conservation, management, ecosystem, ecology, environment, translocation, birth control.

1. Introduction

Environmental ethics have generally been classified into two main categories, the human centered (anthropocentric) ethics and the ecosystem centered (ecocentric) ethics. Anthropocentrism values life in many forms and ecosystems as according to the benefits that they provide to human beings, whilst ecocentric ethics find value in all of nature, despite their given value or preference by humans. [1]. Intrinsic value is given to all nature when talking about ecocentrism. Philosopher Holmes stated that nature and life on earth are inherently good, implying that nature has intrinsic value, regardless of the value humans may place on it. For us to successfully practice sustainable development in all aspects of our lives, each part of the ecosystem would have to satisfy these two goals of ecocentric ethics as given by Patrick Curry as stated below. [1]

1) "*It must be able to recognize the value, and therefore support the ethical defense, of the integrity of species and of eco-systemic places, as well as human and non-human organisms*. So it is holistic, *although not in the sense of excluding considerations of individual value."*
2) "*Within nature-as-value, it must (a) allow for conflicts between the interests of human and non-human nature; (b) allow purely human interests, on occasion, to lose. (It is hardly a level playing-field otherwise.)"*

The land ethic does not prevent alteration of 'resources', their management and the use of resources is not prohibited, however the right to continue existing is acknowledged; soils, waters, plants and animals are included in this community.[2] This is the best given illustration of how land ethics under ecocentrism should best be applied. For the best sustainability of our animals, geology and the natural resources (soil, water, plants) it is most appropriate to apply the land ethics concept, which we will base our argument for this paper on. The main emphasis is however, that whatever action is taken by humans should be separate from any anthropocentrism or human benefit but solely of intrinsic value of the ecosystem. Giving intrinsic value to our ecosystems is just as important as managing them and guaranteeing the availability of the resources in the present life and future generations to come.

In Southern Africa Elephants (*Loxodonta Africana*) populations exceed the carrying capacity of the ecosystems and pose a threat not only to the ecosystems but also to the whole community of the land ethic (soil, water, plants and animals). [3]In West Africa and some Southern African countries, elephant populations have been declining due to poaching for acquirement the elephant's task, however in most of Southern Africa, the populations are quite stable or in contrast increasing such as in South Africa. [4] Botswana still holds the most elephants, currently estimated at 131,626 although the numbers have slightly declined, whilst Zimbabwe is second, being home of approximately 82,630 elephants.[4] In the past decade these countries have seen a 10% or less drop in the elephant populations. [5] Elephants exert great influences on the structure and function of the African Savanna ecosystem because of to their ability to uproot and consume entire plants and topple or otherwise alter the physical structure of the flora.[6]. Their size, browsing habits and even their reproduction and population growth rates are all issues of concern to the environmental protection and conservation authorities of especially Southern Africa. This being as the elephant populations in the region have long surpassed the carrying capacity of the breeding land available for them.[7] The current conservation status of African Elephants is that they are listed as vulnerable under the IUCN Red List, and as Endangered animals in the CITES Appendix 1[8], apart from the populations in Botswana, Namibia, South Africa and Zimbabwe that are listed under CITES Appendix II [8]. In Zimbabwe and Botswana, African elephants are not included on the list of "specially protected animals" because their population is so large.[8]

It has been said that no species, other than man, can modify habitats as rapidly and extensively as an elephant [9]and without any action to control the breeding and reproduction rate for a species their breeding and browsing routines would be detrimental to the whole ecosystem affecting sympatric water sources, plants and animals too.[3] This paper therefore tries to assess methods of elephant populations control in Southern Africa basing from an ecocentric ethics stand point. The methods usually applied for elephant population control are culling, trade and birth control.[10] Conclusions will be drawn on how effective, necessary or ethically considerable these actions are for the sustainable development and management of our ecology, and ecosystem; all for their intrinsic value.

2. Background

Ecocentric Ethics

The subject of ecocentric ethics has been there for centuries now, although it keeps evolving and its definition is getting broader with more scholars having different or extended views on the concept. Ecocentrism goes far and above bio-centrism which focuses on the intrinsic value of all living things, as it takes account of environmental systems and their abiotic characteristics. The fauna and flora are also put into the context of the ecological balance with organisms. Zoo-centrism is another ethical point ecocentrism in-cooperates and it focuses on the value of animals and their well-being. Gray[11] pointed out that all life depends upon geology and geomorphology to sustain it, hence it is very necessary to consider it whenever ecocentric based decisions are being considered or being made.

The Land Ethic

Aldo Leopold wrote an essay in the book, *A sandy Country Almanac*, where he presented his vision of the land ethic, which he defined as the relationship between people and the land. He states that they were intertwined and their relationship had to be strengthened as care for people could not be separated from care for the land.[12]. With this concept of ethics, the community is not limited to humans only, but all the other parts of Earth such as soils, water plants, and animals. Leopold wrote that "we can only be ethical in relation to something we can see, understand, feel, love, or otherwise have faith in."[12]

Deep Ecology

There is an acknowledgment that making decisions that satisfy both ecocentrism and anthropocentrism is difficult and this is classified under the inelastic principles of ethics.[2] Anthropocentric based decisions have been observed to be detrimental to our environment, other animals as well as the human race itself. Conditions such as climate change now exist due to human-induced activities and are affecting the availability of resources and the survival of humans, other species and of fauna and flora too. The making of ecocentric based decisions tends to take time and is usually not easy to implement, especially in situations where the society has been reliant on the resources, either for primary use or secondarily as a source of finance.[13] Deep Ecologists' claim that justification is made upon people only when their intervention in natural wildlife is vital for human needs. i.e. For survival not for luxury.[13] The basic principles of deep ecology encircle anthropocentrism and ecocentrism through acknowledgment of intrinsic value in everything and allowing humans to benefit from the natural resources that are available to satisfy the vital needs. Consequences still have to be weighed before every decision is made, as some things may appear necessary or vital at a given time, however, they have non-reversible, detrimental effects to us and our ecosystems in the future.

Elephants (*Loxodonta Africana*)

Elephants are large herbivores that spend approximately 16 hours a day eating plants and vegetables. Their diet primarily consist of leaves, bark, fruits from trees and shrubs. [14]The African elephants are long lived and the largest land mammals on Earth with an average shoulder height that can grow up to 11feet, weighing 6 tonnes and 19-24 feet in length. [15]. Southern Africa has the largest population of the African elephant in the world. Botswana, South Africa, Zambia, and Zimbabwe, relatively have large elephant populations and show either increasing trends or mild and non-significant declines recently [4] Botswana is home to the largest elephant population with and estimated at 165 000km² of elephant range followed by Zimbabwe which has the second largest elephant population occupying approximately 82 000 km². [9] These habitats that can support only about half those populations. Zambia's elephant populations have seen an 11% decline over the past decade, mainly caused by poaching activities.[9, 16] This does not indicate successful conservation, but failure of the conservation authority to preserve natural values. These countries' natural long-term ecological productivity is destroyed, there is a posed danger on the environment, i.e. soil. Who then is responsible for the management of the intrinsically valued ecosystems and the whole land ethics community?

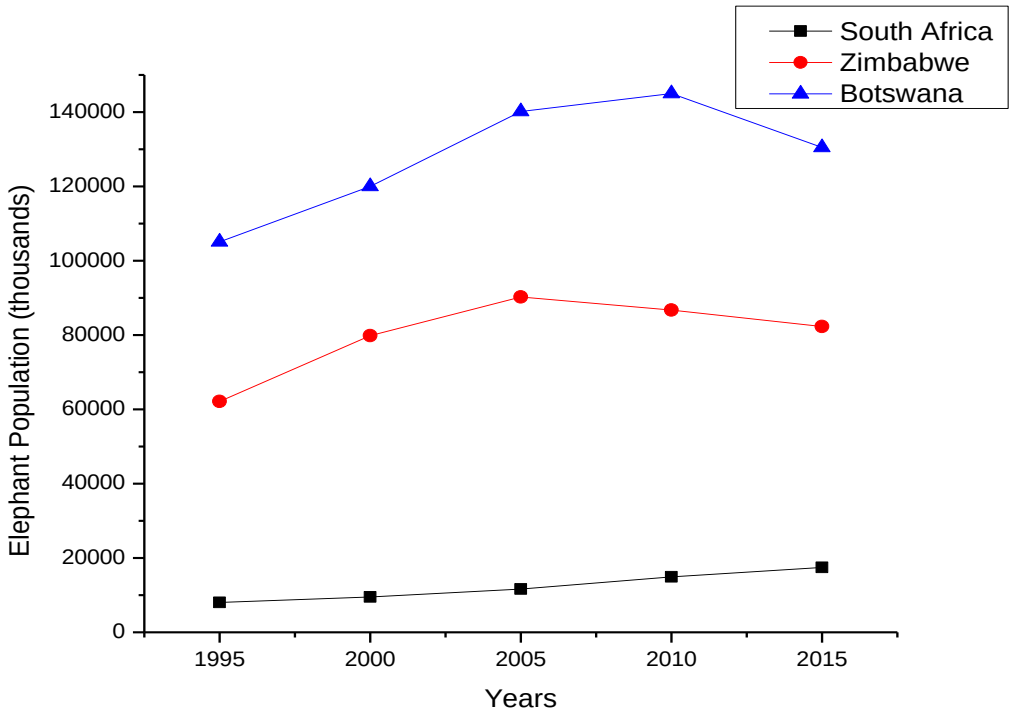

Fig 1. Elephant population trends in South Africa, Zimbabwe and Botswana from 1995 to 2015. Source:[5]

Elephant populations in Zimbabwe and Botswana were said to be at a sustainable capacity in the 1940s with a population density of one elephant per three square kilometers in Hwange and the adjacent Deka Safari Area, when the dispersal started. [9]. The original given carrying capacity for Elephants in Hwange and Deka Safari was between 3800 and 5000 before habitat changes. With alterations to their habitats through extension and human influence, the elephant populations grew exponentially.

Abundance and Overburden?

The Africa Elephants (Loxodonta Africana exert prevailing effects on the structure and function of Africa's Savanna ecosystems. Elephants can uproot and consume entire plants or even break down and alter the physical structure of trees and plants. Their water needs are also quite high and hence need to reside in a good watered place.[14] In 2014 a fixed-wing aerial survey was carried out, of elephant populations in relation to rainfall in the Greater Mapungubwe Transfrontier Conservation Area (GMTFCA), Botswana, Zimbabwe and South Africa. It showed that elephant group size is correlated to rainfall. [17]. The elephants have been observed to move or to relocate to areas where water is abundant just as they did in 2014 when the rainfall in the other areas was as low as 434mm but the Limpopo had abundant water, causing overburden in the area. [17]. Climate change has led to droughts which have had an impact on the annual rainfall received in Southern Africa[17] and also contributed to the slow growth of vegetation and forest cover is one big issue of concern too. With insufficient resources to live on, the elephants would be subjected to harsh survival conditions and later death. It is then very imperative that ecocentric ethics are the base when decisions are being made about the sustainability of our environment and resources.

Elephants do not have absolute negative ecological impacts, in fact they have been shown to be of benefit to other animal species. The damaging of tree canopies, breaking of tree trunks and toppling of adult trees[14] increases local landscape is said to enhance food and shelter availability for co-occurring species.[18] Smaller herbivore mammals are said to benefit by having more access to high-canopy browse and maintaining open habitats that reduce predator threats.[14] The inter-dependency that exists within ecosystems serves as a major theme for science and environmental ethics and this has been observed and acknowledged that elephants do serve a significant role in the Savanna forest ecosystems, just as other species do too. Elephants have the ability to alter the canopy architecture and tree structure, soil structure and surface water resources structure.[19] As part of an ecosystem, this only becomes a problem when the negative effects on the environment are outweigh the positive effects on the ecosystem. This usually occurs when there is overburden of a specie in one area, such as the trends of Elephant populations are in Zimbabwe and Botswana.

According to Leopold

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."[2]

The overburden of elephants in Southern Africa places a stress on the ecology as a whole and this then contradicts the preservation of the environment and the stable balance the biotic and abiotic community both need. It has been mentioned that the loss of perennial grass lands has led to the loss of grazing species such as the Roam, Sable, Tsessebe, whilst the increase in population of animals such as Impala and Kudu occurred due to the replacement of grasslands by thickets.[3] Such imbalances in the ecosystem are what need to be managed under the guidance of ecocentric ethics. Soil capping usually concurrently occurs with excessive numbers of elephants dwelling in one place reducing infiltration of rain water into the ground hence increasing runoff. All these processes lead to slower recovery of the ecosystems destroyed and naturally it is said that it can take up to hundreds of years to replenish the soil, grass and tree cover that can be degraded by excess elephants in one area.

3. Conservation and Management Methods

Elephant's size allows them to be not be preyed upon by other animals and this factor alone increases their life expectancy, which is then mostly determined by resource availability, which can lead to high localized elephant populations. [10] It is therefore very necessary to intervene in the management of elephants for curbing the populations. How then can the elephant numbers be controlled for sustainable resource distribution, use and a balanced ecosystem in an ecocentric manner? The topic of elephant population control has been a debatable matter among conservationists and wildlife agencies for many years now. Other activists and authors argue that there is no need for humans to try and control the high concentration of elephants in localized areas and that biodiversity is always in flux.[20]. However, some conservationists and ecologist have been agreement that for the ecosystem to remain balanced and the land ethic to be observed, humane control of the elephant populations is necessary. [10].

The most popular control measures that have been used in Southern Africa are culling and trans-location of the Elephants. Culling is when the elephants are killed to reduce their numbers and trans-location refers to the elephants being moved to a different breeding area or exporting them to other countries.[10] In the past decade there have been development and promotion of other control methods such as immunocontraception (PZP) vaccine in female animals, vasectomy in male elephants and immunocastration with GnRH.[10] These are going to be discussed in consideration of ecocentrism and a conclusion will be drawn on the seemingly most non-anthropocentric conservation and management method as it is reasonably difficult to separate the two, in a an economy driven world, however it is of vital importance.

3.1. Culling

Culling is defined as the killing or hunting of animals as a measure of population control.[9] In Zimbabwe between 1960 and 1988 a total of 44,500 elephants were shot all over the country as a culling action. Populations of elephants still grew from 32,700 to 51,097 head in spite of the culling that had been done. Zimbabwe's then Director of National Parks and Wildlife ordered more culls to ease the environment after realizing that the despite removing 4,000 elephants in three years, the population index had increased by 2,650head. [9].

The option to not cull would have resulted in detrimental destruction to the environmental resources and led to local extinction of some animals and plants too. With ecocentric ethics in mind, every species deserves just as much a chance to breed and continue to exist just as any other. It is therefore crucial to maintain species diversity and allow anime, fauna and flora every chance they can get at life by regulating the environments that they exist in. This action is in no way of intrinsic consideration, as humans do not solely benefit from regulating the ecosystem and maintaining a steady balance among the animals available and the necessary survival needs such as water, food and breeding surface area.

Arguments exist that elephants are highly emotional animals and that culling leaves the survived elephants emotionally scarred and also that it is not a humane manner to control the populations.[21] This being should be considered before the decision to cull is made. In the case of Zimbabwe and Botswana, it has been a matter of urgency of controlling already existing land overburdening elephant populations, which needs imperative action then that birth control cannot fix. [9]

3.2. Birth Control

The immunocontraception with porcine zona pellucida (PZP) vaccine for female elephants has been developed in the past decade to suppress of elephant populations by reducing reproduction rates. This is a non-hormonal vaccine that prevents the pregnancy of the elephants by stimulating antibodies against proteins that are necessary for fertilization. [22] It is said to not affect the hormonal balance of the female elephants, which is one aspect most animal activists and zoology ethics practitioners feared would be a problem. From the year 2000 success rates of the PZP vaccine have been studied and observed to be 95% efficient. The study and use of vaccines as a birth control methods is still being carried out, effectiveness, safety and long term effects being monitored and recorded. It has been shown that the vaccine's effects are reversible over a 16 year period, which is quite a long time to consider if there be need to reverse the vaccine's action.[23] It however has been observed to not cause any side effects on the histology and pathology behavior of the elephants.[22] The PZP vaccine has not been licensed by the Medicines Control Council to be used in Southern African as research on it is still being carried out. It is an elephant population management option most animal conservationists, are advocating for. It will take a few years before elephant scientists, veterinarians and environmental and ecosystem managers come to a feasible agreement on the use of vaccines as there still exist some lack of clarity on the function and utility of this method. [10]

The use of vaccines as a contraceptive method for elephants is a preventative measure which would be ecocentric in consideration and management of the carrying capacity of the land habitat available. For already existent, excessive numbers of elephants this form of management would not come in handy, hence Zimbabwe and Botswana in the past have resorted to culling and trans-allocation of the elephants, in-order to control the overburden that was happening and affecting the ecosystem as a whole.

3.3. Translocation

With excessive elephant populations existing in Southern Africa, trans-allocation and trading have been accepted as viable options that help alleviate the burden on the land and ecosystem. According to CITES [24] from 1990 to 2015, a total of 1666 elephants have been exported across the world, majority being for circus and zoo purposes or reintroduction into the ecosystem. Trans-locations can be across international borders or sometimes within the same country, just from area to another more suitable for these mammal animals. This method of elephant population control is ecocentric based, as the action helps by protecting both the wildlife and the environmental resources.[7]

In August 2017, Malawi carried out one of the largest trans-location of elephants of a total of 520 elephants from Liwonde National Park and Majete Wildlife Reserve in Malawi to Nkhotakota Wildlife Reserve. This was a local trans-location mainly done to relieve the pressure on the ecosystem from elephant surplus in Liwonde and Majete, as well as to add on to the elephant populations at Nkhotakota[25]. This "human-assisted migration" was needed so as to provide the best chance of a long-term and sustainable future for these elephants. These Reserves are managed by African Parks along with the Malawi Department of National Parks and Wildlife (DNPW) and had the elephants' security for the future as well as restoration of the ecological system at interest during the induced wildlife migration.

4. Acknowledgement of Intrinsic value existing in other Elephant management methods

Ecocentrism is not an 'anti-human' ethical argument neither does it argue that all life is equal. There is also no denying that a lot of homocentric (human centered) problems already exist that would push us to conserve our ecosystems and use the resources sustainably. Ecocentric ethics try to present the ecology as a system that is made up of individual species, that are inter-dependent and co-habitat together to build a functioning ecosystem. With that being said, the importance of each specie, be it fauna, flora, human or geological environment is to be recognized and each one allowed the chance of survival accordingly, not only because it would be of benefit or good use to the human beings. In elephant conservation and population controlling, some methods used have been argued to have been of intrinsic value, as the humans have some gain out of it. This could be through physical protection from the excess elephants after culling or economic gain from trading the elephants, or even by their physical presence which attracts tourists to visit the Reserve and Game ranges in Southern Africa.

Under the CITES Appendix II, Elephants in Zimbabwe, Botswana, Namibia and South Africa have been listed on the "Schedule of Animals with High Economic Value."[8] This means that dead or alive, elephants are of great economic value to these nations. Inasmuch we cannot utterly deny the benefits of elephants' existence to the human populations in the mentioned countries, it is vital to show that the well-being and protection of the elephants comes first, before the consideration of the economic benefit they may

have for the people. The trading of elephants calves in May 2016 from Zimbabwe to Dubai and China, for example was only done due to the fact that Zimbabwe's environment could not support the populations of elephants that were currently in the country. [26] Having too many elephants constricted in a breeding area tends to accelerate the rate of reproduction, which would not be ideal as the food resources and water would then be insufficient, leading to starvation and dehydration.[24] This goes on to show that the ecosystem's balance and survival of more than the elephant species is what is first considered when the trading of elephants is done and that the economic benefit is not the focal drive of the action.

The trade of elephant trunks has been a controversial issue because of their economic value and the need for elephant trunks has caused high poaching records in the region. Countries such as Kenya have taken a stand on the trade of elephant trunks for their ivory by burning the trunks. In April 2016 they burnt a stockpile of elephant trunks and rhino horns which were estimated to have been worth about 150 million. The Kenyan President Uhuru Kenyatta said they did this in solidarity to show that elephant trunks are worthless to them unless they are on their elephants.[27] The stand shows that the country elephants are kept and protected not for their intrinsic value and that ecocentric ethics are being considered for the breeding, protection and survival of these species. Such value given to our fauna, flora, geology and everything else in the ecosystem is what ecocentrism tries to achieve.

5. Conclusion: Why Ecocentrism is an essential solution

Ecocentrism recognizes humanity's duties towards nature, which is why we believe it should be central to solving most of our extraordinary environment issues, such as the issue presented in this paper of overabundance of elephants in an area where they exceed the carrying capacity by almost double, as in Southern Africa. The roles ecocentrism plays are described briefly below:

Ethically, ecocentrism allows the moral community to focus on other members of the ecosystem, other than the humans. Respect, care and concern is given to all life as well as other parts of the ecosystem such as land and geology. [2] Moral concern should be extended to all ecosphere, biotic and abiotic components. This respect and concern can be through the control of elephant population in Southern Africa's Savanna ecosystems, which are not equipped to support as many elephants as there currently are. Methods of population control are still carried out in a humane manner to still show that the elephants are important creatures as they are.

Ecologically, ecocentrism goes on to show the inter-dependency relationship that exist between humans and non-humans and how both are reliant on the ecosystem services nature provides. This can be applied to our management of elephant populations in that, without the trees, grass and adequate water resources, the elephants would not survive, whilst the toppling down trees by Elephants allows smaller species to access food too and by their simple existence, they are of economic value to the humans through tourism. Elephants play an important role in the dry Savanna climate influenced forest structure in maintaining the ecology balanced and regulated. It goes on to portray the importance of existence of each and every specie, not intrinsically but for their individual role in the ecosystem.[2] The geology, water bodies and flora are just as well important because without them there would be little to no life. Precaution should then be taken to make sure there is no specie facing extinction due to another being given higher value or preference in the ecosystem neither should our environment be destroyed because of poor management or failed regulation of the ecosystem.

In conclusion, elephant populations in Southern Africa, especially Zimbabwe and Botswana definitely need human management so as to maintain a well-balanced productive ecosystem. Ecocentric ethics should be at the core of the decisions made in order to achieve sustainability, and in this case for the methods of population management, the purpose of control. With all decisions made in humility and respect to all forms of life abiotic aspects too.

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