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Peter Singer's Speciesist Notion of Animal Conservation Vis-a-Vis Genetic Manipulation

Ochrona zwierząt w świetle gatunkowizmu Petera Singera, wobec modyfikacji genetycznych

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Abstract: This paper shows how human activity through genetic engineering causes pain to non-human animals. It primarily deals with an evaluation of the phenomenon of animal rights (specifically animal conservation) from the view of Singer's notion of speciesism. Singer's notion of speciesism frowns at all forms of animal maltreatment and emphasizes that animals are sentient, and they are capable of suffering and feeling pain. The central problem here is whether animal's life has intrinsic value and whether they can be used for experiment. Among the several ways by which speciesism is practiced, this work identified genetic engineering as a major obstacle to animal conservation because humans will invade the animal space to look for various animal species to carry out experiment on. Using the method of critical analysis, evaluation and prescription, the paper argues that animals have life and belong to the environment and as such, the environment should be conserved also for their sake and if humans continue to exploit the environment by using animals for genetic manipulations, there will be negative consequences to humans and extinction of some species.

Keywords: speciesism, conservation, genetic engineering, animal rights, Peter Singer

Streszczenie: Artykuł prezentuje w jaki sposób ludzka działalność w obszarze inżynierii genetycznej powoduje cierpienie u zwierząt. Autorzy skupiają się na ocenie zjawiska praw zwierząt (w szczególności ochrony zwierząt) z punktu widzenia pojęcia gatunkowizmu Singera. Pojęcie gatunkowizmu Singera potępia wszelkie formy znęcania się nad zwierzętami i podkreśla, że zwierzęta są istotami świadomymi, zdolnymi do cierpienia i odczuwania bólu. Głównym zagadnieniem jest kwestia czy życie zwierząt jest wartością samą w sobie i czy zwierzęta mogą być wykorzystywane w eksperymentach. Spośród wielu obszarów ludzkiej działalności krytykowanych przez gatunkowizm, artykuł koncentruje się na inżynierii genetycznej jako głównej przeszkodzie w ochronie zwierząt, ponieważ ludzkie działania w tym zakresie wkraczają do przestrzeni zwierząt w poszukiwaniu różnych gatunków potrzebnych do przeprowadzania eksperymentów. Korzystając z metody analizy i oceny krytycznej, autorzy niniejszego artykułu twierdzą, że zwierzęta posiadają życie i należą do środowiska, i tak jak środowisko, powinny być chronione dla ich własnego dobra. Ponadto, jeśli ludzkość będzie kontynuować eksploatację środowiska naturalnego wykorzystując zwierzęta do modyfikacji genetycznych, będzie to miało negatywne konsekwencje dla ludzi oraz spowoduje wyginięcie niektórych gatunków.

Słowa kluczowe: gatunkowizm, ochrona środowiska, inżynieria genetyczna, prawa zwierząt, Peter Singer

Introduction

Speciesism has attracted much attention of many scholars especially in the field of environmental ethics. Many erudite scholars have written lots of scientific articles, books, essays and papers on speciesism. Central to the debate on speciesism is the question of whether animals have moral rights. Both those who argue for and against the morality of animal rights make use of different arguments to justify their position. Those who argued for animal rights emphasized that animals have interest, feel pain and pleasure hence have intrinsic moral worth, while those who argue against rights to be given to animals hold that these animals have no moral worth or intrinsic values but just to serve man's needs.

Based on the foregoing, Tom Regan holds that animals feel pain. According to him, "There can be no doubt that animals sometimes appear to be in pain" (Regan 1994, 383). Jeremy Bentham is of the view that animals can suffer (Bentham 1994, 364), David Hume holds that animals can think and reason (Hume 1994, 360). These views are non-anthropocentric and point to the fact that animals should be given moral consideration. On the other hand, Rene Descartes argues that animals have no reasoning abilities. R.G. Frey is of the view that animals do not have desire because they cannot have belief and cannot speak. These views are anthropocentric: encouraging the traditional notion that animals were made for man's use as seen in the creation story instructing humans to dominate the earth.

Conservation, therefore, is an ethics of use, preservation, protection and maintaining the health of the natural world and all in it. Animal conservation has to do with protecting the animal species and their habitats. This is because animals contribute to the ecosystem. The main consequence of not conserving animals is extinction. In the afterword to the book titled *The Ethics of Killing Animals* edited by Tatjana Visak and Robert Garner it is noted that, "... the extinction of our species would be one

of the greatest possible tragedies... however, extinction is a tragedy only if it harms existing humans, or those who would exist anyway (Singer 2016, 232). This means that, if humans do not conserve animals, the unborn generation might not be privileged to see or know some animal species. In Africa and particularly in some cultures in Nigeria, it is forbidden to kill some non-human animals. For instance, in some places in Anambra State of Nigeria, killing a particular snake called *Eke* (python) is prohibited as anyone caught doing so will perform normal burial rites as for a human being. This snake welcomes strangers or visitors and newborn babies to the community. This is another way of conserving some snake species in Anambra State, Nigeria. Also, in some places in Enugu State killing a monkey is culturally not accepted because it is believed that once upon a time, a monkey gave a sign on the ground that saved the Enugu people from attack, hence, they value and appreciate monkeys. This is another way of conserving some animal species.

Genetic engineering which is also called artificial manipulation or genetic manipulation, or genetic modification is one area in science that is making waves and has caught the attention of many scholars and specifically philosophers. Several articles have been written on genetic engineering with major focus on its importance ranging from increasing plant and animal food production, diagnosing disease condition, improving medical treatment, and producing vaccines and other useful drugs. Methods in the techniques involve selective breeding of animals and plants, hybridization (reproduction between different strains or species), and recombinant deoxyribonucleic acid (rDNA). However, these benefits are not without peril.

Satyajit Patra and Araromi Adewale Andrew gave a brief account on the effect of the principle and practice of genetic engineering on the biosphere together with several controversial issues that accompany the acceptance of this technology despite

its benefits in medicine. According to them, "However, critics of rDNA fear that disease-producing, organisms used in some rDNA experiments might develop extremely infectious forms that could cause worldwide epidemics" (Patra and Andrew 2005, 1).

In this work, the focus is to discuss in detail what Singer's notion of speciesism is all about especially as it concerns genetic engineering because animals are involved, and these animals live in the environment. The paper begins with an exposition of Peter Singer's notion of speciesism, and then it discusses the idea of animal rights and animal conservation. The last section will be concerned with the analysis of the notion of genetic engineering as it affects animal rights and conservation.

1. Singer's Notion of Speciesism

English philosopher, Richard Ryder first used and introduced the term speciesism in the 1970s. Australian philosopher, Peter Singer, popularized the term. Those who oppose speciesism believe that it is likened to racism and sexism, and thus, it stands for a bias, prejudice and discrimination. As a result of this, speciesism is situated in the area of applied ethics and presents viable arguments in favour of animal rights. Speciesism has to do with seeing another species as less important morally than members of one's species and giving justification for such practice.

Singer's view of speciesism, therefore, stresses that "Sentient beings have interests, and we should give equal consideration to their interests, irrespective of whether they are members of our species or of another species (Singer 2001b, 417). For Singer, "Speciesism – the word is not an attractive one, but I can think of no better term-is a prejudice or attitude of bias toward the interest of members of one's own species and against those of members of other species. It should be obvious that the fundamental objections to racism and sexism made by Thomas Jefferson and Sojourner truth apply equally to speciesism" (Singer 1997, 460).

What Singer means is that speciesism has to do with a favouristic mindset that promotes the interests of one's own species against the interests of other species. He likens speciesism to racism and sexism by emphasizing that their attitudes have no difference. Singer believes that "The racist violates the principle of equality by giving greater weight to the interest of members of his own when there is a clash between their interests and the interests of those of another race. The sexist violates the principle of equality by favouring the interest of his own sex. Similarly, the speciesist allows the interest of his own species to override the greater interest of members of other species. The pattern is identical in each case" (Singer 1997, 461).

The inequality that exists with the racist, sexist, and speciesist made Singer stress that all animals should be treated equally. This equality, as Singer advocates for, does not mean that non-human animals and humans should be treated in the same way, but that they should be considered as equal because they also have life and feel pain like humans. One of the examples Singer gave to explain his position is that while it is women's right to vote in an election because they can decide rationally, dogs for instance do not know the importance of the process of voting.

Using utilitarianism to buttress his point, Singer avers that "If a being suffers, there can be no moral justification for refusing to take that suffering into consideration" (Singer 2001a, 31). Suffering becomes the main argument for giving animal's moral consideration. It is not their reason or the question if they can talk. For him, the principle of equality should be applied because suffering is what is shared by humans and non-humans. There is no suffering without pain. It is through pain that we know that a being suffers. Therefore, Singer holds that "Pain is a state of consciousness, a 'mental event,' and as such it can never be observed" (Singer 1997, 462). Singer is of the view that not attributing pain

to animals because they cannot communicate or talk like humans is unjustified. This is because a newborn baby for instance cannot speak but feels pains. Thus, language should not be used in judging whether non-human animals feel pain as the degree of pain may vary. A clear example he gave is, slapping a child and slapping a horse with the same force as the child, the horse might feel lesser pain because of its tick skin. The child will feel more pain because of the light skin. For Singer, "There is no good reason, scientific or philosophic, for denying that animals, feel pain. If we do not doubt that other humans feel pain, we should not doubt that other animals do so too. Animals can feel pain... there can be no moral justification for regarding the pain (or pleasure) that animals feel as less important than the same amount of pain (or pleasure) felt by humans" (Singer 1997, 464).

Pain and suffering that animals feel is the essence or reason for arguing for the rights of non-human animals and this shows what Singer means by speciesism – the view that human beings should not have a bias or prejudice that animals do not experience pain. Hence, Singer emphasized that humans should try and end their attitude of maltreating animals in experimentation and research, starving animals, and factory farming them, etc. This therefore calls for animal rights.

2. What are Animal Rights?

The main aim of calling for animal rights is that animals have capability to feel pain and to suffer, there could be extinction of some species, and animals are co-existent beings with humans and the environment. According to Peschke: "Animals may be regarded collectively as species or individually as beings capable of feelings and suffering. In debates about the environment, questions about the threat of extinction for certain species of animals and the urgency of measures for their preservation stand in the foreground... societies for the prevention of cruelty to animals can look back

on a comparatively long history already... The mass breeding of livestock in the narrowest space in the agro-economy gives rise to ever more emphatic criticism" (Peschke 2009, 812).

This implies that, animals were cruelly handled in the past and they are still being cruelly handled today. This must have been informed by the Judeo-Christian tradition which believed that God gave humans dominion over the fish of the sea, birds of the air and everything that moves on the land (Gen. 1:28-28). Many philosophers have rejected the idea that non-human animals do not possess rights. Descartes is one of such philosophers who argued that animals do not think or use language and because of that they do not have reason. In his *The Difference between Men and Animals* he posits that "And this does not merely show that the brutes have less reason than men, but that they have none at all, since it is clear that very little is required to be able to talk" (Descartes 1994, 359). Ritchie also in *Only Humans have Right* holds that "if rights are determined solely by reference to human society, it follows that the lower animals, not being members of human society, cannot have rights" (Ritchie 1994, 362).

Many philosophers on the other hand have stressed that animals possess rights. For instance, Hume believes that since humans are guided by reason and hence act consciously for their preservation through deriving pleasure and trying to avoid pain, animals also perform such actions. This means that, animals possess reason (Hume 1994, 310). On the other hand, Bentham stresses that one day animals will be given rights just as slaves were once given their freedom (Bentham 1994, 362). For Feinberg, animals should be given rights for the benefit of future generations. He asserts that "...there will still be a world five hundred years from now, ...we have it within our power now, clearly to affect the lives of these creatures for better or worse by contributing to the conservation or corruption of the environment in which they

must live” (Feinberg 1994, 364). He advocates the importance of the conservation of the environment.

Animal rights constitute that main branch of environmental philosophy and particularly environmental ethics respectively. Animal rights are therefore concerned with the moral obligation humans owe to non-human animals. The following obligations are never to abuse, misuse or treat animals cruelly. This is because they are aware of the environment in which they live, they have desire for pleasure and have interest not to suffer pain. Interest, desire, and suffering they undergo in experimentation etc., become the reason for animal rights. Animal rights, therefore, mean advocacy against starvation, experimentation and suffering, etc. on non-human animal. Animal rights mean advocacy with regards to sentientism – that a being is conscious of pain and pleasure. Animal rights mean advocacy with regards to speciesism – the prejudice and bias against animals like that of racism and sexism. Animal rights call for animal liberation from pain, suffering, and cruelty. They rather call for the need to care for animals proving all their welfare.

The book, *Animal Liberation* by Singer is seen as the bible for advocates of animal rights and it has been used as a basis for animal liberation movements that are a counter-reaction against the Judeo-Christian belief which permits dominion over animals and allows to use them according to human needs. However, another important essence of animal rights is, namely, protection, preservation and conservation of the environment. When the environment is preserved, protected and conserved, possible extinction of animals will be reduced and stopped. Animal rights advocate the need for humans to realize that they have a duty to care for animals, provide for them, protect them, preserve them, respect them and accept them as part of the ecosystem or environment. In other words, animal rights advocate justice towards animals and oppose their cruel treatment, prejudice

or bias towards them and suffering they undergo. Animal rights advocate that some animals are social beings that need our continuous care and attention.

3. Notion of Animal Conservation

Over the years, movements such as the gay movement, women movement and black movement had preoccupied the world, and the struggle for equality emerged. Nobody thought about conservation of the environment in which plants, humans and nonhuman species live and depend on. Humans, for instance, depended on and exploited the environment so much that it brought about glaring boomerang effects. Based on these negative effects, concern has been shifted towards protecting the ecosystem in which plants, animal and humans live.

One of such ways of protecting the environment is through animal conservation. What is conservation? Conservation refers to preservation from loss, wise use of earth's resources, management of human use of the biosphere, and protection of natural environment to achieve the highest quality of living for mankind, involving the planning and control of human uses of environment (Ukwatang, Akpan-Abasi and Agba 2014, 147). This implies that conservation has to do with widely understood protection of the environment and animals in particular.

Conserving animals, therefore, are methods and techniques of defending, preserving and caring for the environment and ecosystem with the aim of protecting, preserving and caring for the animals that live there. It involves living and fighting for animals and the environment they live in. By animal conservation, we do not specifically mean protection of animals only. Protecting and preserving other aspects of the environment also help to protect and preserve animals. Some areas that need protection directly or indirectly, that conserve animals include nature, waste, forests, grasslands, parks and nature preserves, etc.

With regard to nature conservation, Ukwatang, Akpan-Abasi and Agbe observe

that “nature conservation becomes the most important challenge of the present century, nothing affects the quality of our lives more than the welfare and state of nature and no future can be quite so black as one in which the living resources are increasingly being destroyed by human carelessness” (Ukwang, Akpan-Abasi and Agba 2014, 151). What this implies is that if nature is carelessly used, animals will be destroyed, and some animal species will become extinct.

In terms of waste minimization and resource conservation, the concern is minimizing the amount of waste through recycling. This recycling has to do with use and reuse where “the waste is returned to the originating process or to another process where it is used as raw materials” (Das and Behera 2008, 186). Reclamation involves “Recovery of valuable product from waste...” (Das and Behera 2008, 186). Waste could also be conserved to avoid depositing it into waters where aquatic animals live. This is another crucial way of conserving aquatic animals. Energy conservation is another way waste can be minimized in order to conserve animals and other species because due to industrial revolution, emission of energy into the atmosphere causes a lot of harm. “Conservation of energy increases efficiency and productivity” (Das and Behera 2008, 188).

Conservation of forests is another way of conserving animals in that when avoiding deforestation for our use and hunting, we will also avoid things like extinction of some animal’s species, loss of animal habitats, etc. With regards to grassland conservation, it is a truism that most animals that are raised on grassland through pasture and grazing also contribute to desertification and degradation of the habitat. Hence, rotational grazing and ranching are encouraged. As regards parks, they safeguard important cultural raw materials that are valuable they are heavens for animal, plants and fungi not domesticated, as well as places for rest and recreation; however, some are over-crowded, misused or are not cared for or attended to.

Several philosophers of environment have expressed their thoughts and worries as regards the need for conservation of the environment. Kyrian A. Ojong in his “Environmental Sustainability in Nigeria: Challenges and Prospects” argues that, in Nigeria population growth and massive urbanization, cause environmental degradation through economic development and needs of humans and thus it challenges environmental conservation and sustainability. Hence, his paper advocates for environmental sustainability because of the benefits the present and future generation will derive from it. He emphasized that in order to achieve this, there is need to educate Nigerians with regard to the environment. This education should include ethical principles that will restrict humans from exploiting the environment negatively. Based on this, Ojong adopted two ethical theories that can help. They include “...land ethics and ... moral obligation to future generation...” (Ojong 2018, 17).

With regards to land ethics, Ojong emphasizes that “land ethics enlarges the boundaries of human communities to include soils, water, plant and animals” (Ojong 2018, 22). With regards to moral obligation to future generation, Ojong holds that “...the mismanagement of the environment today and the worst effect of the environmental problems and human actions in the present will be felt only in generations to come” (Ojong 2018, 23).

In the book titled *Our Environment: Awareness and Management* John Okpa Ukwang, Edidiong Okon Akpan-Abasi and Peter Ukwondi Agba dedicated a chapter titled “Forest Conversation and Environmental Sustainability” where they hold that the transformation of the environment from simple to complex one is a result of men’s conquest of nature. This is a result of an increase in population and the need for people’s survival on Earth. While the authors presented the importance of the forest resources to include production of food, fuel wood, provision of industrial

raw material, generate revenue, employment opportunity foreign exchange and supply of protein (meat), they also lamented that: "Nature conservation became the most important challenge of the present century, nothing affects the quality of our lives more than the welfare and state of nature and no future can be quite so black as one in which the living resources are increasing being destroyed by human carelessness" (Ukwetang, Akpan-Abasi and Agba 2014, 151).

The authors explain that human carelessness results from of poor educational standards, poverty, lack of environmental awareness, population growth, poor government policy or unsustainable government policy and cultural practices. The authors further suggest strategy for effective forest conservation and community management. They include establishment and implementation of forest law, environmental awareness/campaign strategy, selective exploitation strategy, protection and maintenance of traditional practices, establishment of institutional strategy, environmental impact strategy, educational strategy, agro-forest strategy, etc.

R.C. Das and D.K. Behera in the book titled *Environmental Science: Principle and Practice* in a chapter "Waste Minimization and Resource Conservation" they emphasize that "waste is the by-product of a process, which has very little economic value for which it is let into the environment through solid, liquid or gaseous routes. This causes pollution" (Das and Behera 2008, 183). Benefits of waste minimization include improvement of the environment. But the environment is continually polluted with waste. Solid waste can be minimized through recycling. That is, through use, reuse and reclamation. Conservation of water is necessary because it is a common property resource that is used in agriculture, industry and for domestic purposes, and all are very crucial for improving quality of life, hence, "This calls for a planned action for water conservation, and consequently, reduced wastewater generation in industries" (Das and Behera 2008, 187). The authors hold further

that "Energy Conservation increases efficiency and productivity" (Das and Behera 2008, 188). According to them, "the first step of energy conservation is to strictly follow the consumption norms. Regular monitoring, checks, analysis and immediate rectification helps to achieve the norms on a continuous basis" (Das and Behera 2008, 188).

The authors presented the following ways to promote waste minimization and resource conservation which include economic instruments, control methods, raising public awareness and sound management policies. If the following is done, we will not be guilty of speciesism.

William P. Cunningham and Mary Ann Cunningham in the book titled *Principles of Environmental Science: Inquiry and Applications* included a chapter titled "Environmental Conservation: Forest, Grassland, Parks, and Nature Preserves" where they emphasize that forest and grassland are heavily dominated by humans. With regard to forest, the authors hold that the area which forests occupy is approximately half the area throughout the world that they did before humans became the major species in the world, and a large proportion of these forests still constitute a great treasure. They emphasize that trees play a very significant part in modern economy, and more than half of all humans depend on the firewood and charcoal for cooking and heating. The authors hold that those who maintain natural areas or protect threatened species are concerned especially with removing all trees or vegetation from large area that results in extinction of wildlife and causes soil erosion.

In the book *Conservation and the Use of Wildlife-Based Resources: The Bushmeat Crisis* Robert Nasi, David Brown, David Wilkie, et al., emphasized that the main source of livelihoods in tropical forest is wildlife and when the forest is empty, it will have an immediate damaging and unfavourable impact on dependent communities. They noted that "Hunting for food in tropical forest... poses a real threat to many tropical

forest species...” (Nasi et al. 2018, 6). Consequently, they believe that the bush meat crisis is a reminder of humankind’s dependence on biodiversity. More so, they worry that if wildlife disappeared in our forests, it would pose serious cultural and spiritual threat to the identity of many local and indigenous communities and communities that depend solely on forest. They insist that “wildlife and hunting are intimately linked to many cultures throughout the world’s tropical forest even if in some cases the meat is only of minor nutritional importance. Important social and cultural values are linked to foods, and medicines derived from wild resources” (Nasi et al. 2018, 16).

To address this crisis to meet up the 2010 Millennium Development Goals Robert Nasi, David Brown, David Wilkie, et al emphasized and recommended that “Parties need to assess local and transboundary priorities for conservation among the species harvested for bush meat for example, species that are endangered, species with restricted ranges, species in declining habitats etc. these species require priority action by and among governments” (Nasi et al. 2018, 36). This work is very useful to this research because Nigeria is not an exception in the involvement of eating bushmeat but this work using Singer’s notion of speciesism will emphasize that those who do not conserve wildlife are guilty of speciesism.

In “Wildlife Conservation and Animal rights: Are they Compatible?” Michael Hutclins and Christian Wemmer hold that the history of Western Civilization presents to us the situations whereby untamed or not domesticated animals were sources of transportation, food and clothing. This use follows biblical teaching from Genesis 9. But within the century, perception started changing as individuals and organization dedicated their time and resources to the preservation rather than exploitation of animals.

Michael Hutclins and Christian Wemmer identified the existing conflicts between conservationist/environmental ethics and

humane/animal rights ethics. While the former is concerned about the preservation and protection of the naturally biological diversity, “...it is naturally occurring diversity that is important here, rather than absolute numbers of species... it does not support the characteristics assemblage of species, and, according to the environmental/conservation ethics, it is this naturally occurring biotic community which should be preserved” (Hutclins and Wemmer 1987, 112). The latter, on the other hand, focuses on the fact that animals have the capacity to feel pain. Thus, “They contend that if non-human animals have the capacity to experience pain, then their suffering should be as important a matter of ethical concern as that of our fellow humans” (Hutclins and Wemmer 1987, 112).

Despite this conflict of interest, both the conservationist/environmental and humane/animal rights ethics have a common objective. That is, “the welfare of animals has been a concern of both... both ethics favour saving endangered animals...” (Hutclins and Wemmer 1987, 113). It is crucial at this point to know the various types of animal conservation to enable us to understand the meaning of animal conservation.

4. Types of Animal Conservation

Animal conservation could be divided into Ex-Situ conservation and In-Situ conservation. In chapter 17 of the book titled *Environment: Problems and Solutions*, D.K. Asthana and Meera Asthana included a chapter titled “Ex-Situ Conservation” where they see Ex-Situ conservation as “...maintenance and breeding of endangered plants and animal species under partially or wholly controlled conditions in zoos, gardens, nurseries and laboratories” (Asthana and Asthana 2012, 244). The scientists observe that in Ex-Situ conservation, there is no ultimate freedom in natural habitat as “Wild animals have always to be alert, compete for food, water, and space have to die a lingering death due to diseases, injuries, starvation or

thirst. They are often unable to breed due to absence of a mate" (Asthana and Asthana 2012, 244). They further observe that if human activity keeps expanding in the ecosystem, wildlife habitats will shrink and eventually many life forms will be lost. But no matter how we try to conserve wildlife, species will continue to disappear naturally but "No doubt it is impossible to preserve all of the species thus affected but prudence demands that we should intensify our efforts for ex-situ conservation as well since it shall save at least some of the fragments of once extensive wildlife for the future."

D.K. Asthana and Meera Asthana's book *Environments: Problems and Solutions* includes a chapter titled "In-Situ Conservation" where the authors hold that "In-Situ conservation involves conservation of species in its natural habitat-in place where the species normally occur" (Asthana and Asthana 2012, 265). They hold that the practices of establishing protected areas, forests reserves or Sanctuaries where wildlife could grow and multiply has been the concern of various societies and governments. According to the authors "We do not have to isolate a few individuals of species, create artificial habitat for their maintenance, feed them and provide a mate for their reproduction. We simply have to eliminate factors which are detrimental to existence of species concerned and the rest is left to nature which takes care of its own self" (Asthana and Asthana 2012, 265).

That is to say, one of such advantages of In-Situ conservation is that it "is a cheap and convenient way of conserving biological diversity as we play a supportive role only" (Asthana and Asthana 2012, 265). While the disadvantage In-Situ conservation according to the authors is that "...it requires large areas of earth's surface if we have to preserve the full complement of biotic diversity of a region" (Asthana and Asthana 2012, 266). One of the important points noted by the authors with regard to In-Situ conservation is that "human activities like, hunting, firewood collection,

timber harvesting, etc., are restricted in these areas so that plants and animals could grow and multiplying in protected environment" (Asthana and Asthana 2012, 266).

5. Notion of Genetic Engineering

Over the past 35 years or so, science has been revolutionized in a spectacular way by the emergence of genetic engineering. It is necessary to note that progress in any scientific discipline is dependent on the availability of methods and techniques that extend the range and sophistication of experiments that may be performed. This field has grown rapidly to the point where, in many laboratories around the world, it is now a routine practice to isolate a specific DNA fragment from the genome of an organism, determine its base sequence, and assess its function (Nicholl 2008, 3).

The term "genetic engineering" is often thought to be rather emotive or even trivial, yet it is one that most people would probably recognize. However, there are several other terms that can be used to describe the technology, including gene manipulation, gene cloning, recombinant DNA technology, genetic modification, and the new genetics. There are also legal definitions used in administering regulatory mechanisms in countries where genetic engineering is practised (Nicholl 2008, 3).

What is particularly striking about the technology of gene manipulation is that it is readily accessible to individual scientists, and there is no need for complex equipment or resources outside of the means of a reasonably well-funded research laboratory. The technology is now used also in many other applications, including forensic analysis of scene-of-crime samples, paternity disputes, medical diagnosis, genome mapping and sequencing, as well as in the biotechnology industry. Although the technology has become much more large-scale in recent years as genome sequencing projects have been established, it is still accessible to almost all of the bioscience community in some form or another (Nicholl 2008, 3).

Although there are many diverse and complex techniques involved, genetic manipulations are reasonably simple. Genetic material provides a rich resource in the form of information encoded by the sequence of bases in the DNA. The premise on which the technology is based is that genetic information encoded in DNA and arranged in the form of genes, is a resource that can be manipulated in various ways to achieve certain goals in both pure and applied science and medicine. There are many areas in which genetic manipulation is of value, including the following: (Nicholl 2008, 3-4)

- Basic research on gene structure and function
- Production of useful proteins by novel methods
- Generation of transgenic plants and animals
- Medical diagnosis and treatment
- Genome analysis by DNA sequencing.

In the article titled “Enhancing the Ethical Conduct of Genetic Research: Investigating Views of Parents on Including Their Healthy Children in a Study on Mild Hearing Loss”, L. Gillam, Z. Poulakis, S. Tobin, M. Wake posit that clinical genetic research is often regarded as more ethically problematic than other forms of research, and in some countries is subject to specific regulations, requiring researchers to follow specialised guidelines. The authors note that an approach to enhancing the ethical conduct of genetic research is proposed, which is believed to be more effective than simply attempting to follow general guidelines. The potential concerns that are likely areas of misunderstanding and negative reactions of the participant group are systematically investigated before starting a study on genetics. This would constitute, in effect, an ethical pilot study, like a feasibility pilot study to test equipment, procedures and logistics. The findings of the ethical pilot study would be used to help in designing ethically important aspects of research protocol, such as recruitment procedures, written and other information for potential participants,

informed consent processes and reporting of results including ambiguous or uncertain results (Gillam, Poulakis, Tobin and Wake 2006, 537).

The article “Ethical Judgements in Genetic Engineering: The Implications for Technology Education” by Ruth Conway holds that design and technology education aims to prepare young people for living in a rapidly changing technological society which will involve them in making many value judgements, some involving complex ethical dimensions. Key aspects of ethical judgements in relation to genetic engineering are examined: the hidden assumptions, the inevitable unpredictability when dealing with life processes highly interactive with the surroundings, commercial and political pressures, and the underlying “worldviews” and values. It is argued that responsible judgements therefore require wide consultation, sensitivity to social, cultural and moral issues, acknowledgement of the political and economic context, and above all, critical reflection on the beliefs and commitments that are shaping genetic engineering. Teaching and learning strategies are needed that highlight the social and environmental context of technological activity, that encourage pupils to consider what determines the quality of their own lives and those of others, and that stimulates reflection on the values and beliefs which influence the priorities when value judgements are being made (Conway 2000, 239).

6. Speciesism, Animal Conservation and Genetic Manipulation: Singer's View

Genetic engineering, as noted above, is the process of directly manipulating the genes of an organism either to enhance or alter certain traits. It is also called genetic modification. Animals are the greatest victims of this practice. They are usually used to transfer beneficial genes from one animal species to another either to increase resistance to diseases, or to alter and enhance their certain characteristics. In this process, animals are subject to crossbreeding, that

is, two different species of animal are used to produce a new species. The common cross-bred animals include mule (female horse and male donkey), geep (goat and sheep), grolar bear (polar bear and brown bear), beefalo (buffalo and cow), hinny (female donkey and male horse), coywolf (coyote and wolf), leopon (male leopard and female lion), etc. This is a proof of the ingenuity of science. But the processes make these animals go through severe pain. More so, the process disrupts the naturalness of creation. "This is a moral disservice to nature as the effect of such science is predictably worrisome. Why should anyone try to introduce new species to the vast biodiversity?" (Omoogun 2009, 73). Genetically modified animals possess suffer from serious health issues as the new diseases from new animals could spread to non-genetically engineered animals and humans and plants. Singer will still emphasize that there is no moral justification for not taking their interest into consideration (Singer 2001a, 31). Although crossbreeding and genetic manipulations aim at bringing new species into existence, sometimes these animals suffer pain in the process. Genetic engineering speciesism as Singer notes "Genetic engineering, revolutionary as it may be in one sense, is in another sense just one more way of bending animals to our purposes. The real need is that attitudes and practices change fundamentally" (Singer 2015, 236). He recommends a change of attitude because the purpose of genetic manipulation and crossbreeding of animals is anthropocentric.

Conclusion

This work has noted that animal conservation has to do with protecting the animal species and their habitats. The work further notes that Singer's view of speciesism stresses that animals are sentient beings because they feel pain and have a desire for pleasure. Most importantly, they live (have a vital force). Depriving animals of their interest through genetic engineering, infringes on their rights. Animal rights,

therefore, mean an advocacy for the protection against killing and experimenting carried out based on the fact that they are of a different species.

Nonetheless, genetic engineering presented intriguing and difficult challenges for the 21st century scientists, ethicists, educationist environmentalist, and conservationist. Meaningful, respectful discourses are just the starting point of what is required to tackle such complex issues especially as it? concerns continued animal experimentation. Singer was against any form of animal maltreatment "Because they are capable of suffering and are conscious of pleasure and pain..." (Ojong 2015, 12). Undoubtedly, it appears that humanity at the present century, seems to have been overtaken by the apparent advantages of genetic manipulation of some animal species, that has assisted in the field of agriculture through increased food production ranging from poultry, pigry, fishery and lots more, not taking cognizance of its devastating consequences to human health and life. Animals should be protected because they are part of our environment. If we conserve animals, we conserve the environment and we will be free from speciesism. Unfortunately, one major factor that hinders conservation is deforestation. It is important to note that "...deforestation is a major threat to nonhuman animal's survival because the forests are homes for most non-human animals. More so, conservation of some non-human animal species becomes difficult because of cutting trees and destroying forests" (Ojong 2022, 58). We wish to conclude by asking the questions posed by Ojong: "What if animals use humans for experimentation and factory breeding? What if humans stay in the forest and animals destroy the forest for their interest?" (Ojong 2019a, 65; 2019b).

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