BODY DISPOSAL IN GABORONE AND ALDO LEOPOLD'S LAND ETHIC

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Abstract

Disposal of the dead differs across culture and times due to prevailing factors including traditional beliefs, normative worldviews, and resource availability. This paper sought to explore the views of the Batswana regarding disposal of the dead through a case study of Ledumang Ward in Gaborone. Interviews were conducted with 42 respondents who included 30 householders around Ledumang cemetery and 12 key informants who included persons in the funeral industry, clergy, and government or council officers. The findings reveal that burial is the most preferred method of body disposal among residents of Ledumang Ward with only a few having knowledge or being open to other forms of body disposal. Most household respondents (70%) cited religious beliefs and providing a resting place for the dead as the reason for their preference. Both residents and key informants expressed worry over negative environmental impacts of burials including them being an unsustainable land use practice. Shortage of land was the biggest concern for the largest portion of residents (40%). On the contrary, only 1% and 10% cited environmental degradation and biodiversity loss, and air pollution as the foremost concerns, respectively. The ethical evaluation using the land ethic shows the current burial practices to be morally wrong as they do not promote the integrity, stability, and beauty of the biotic community. The paper recommends some empirical research as well as philosophical research to establish and evaluate metaphysical and normative beliefs that undergird current burial practices.

Keywords: Botswana, land ethic, body disposal, environment ethics, Aldo Leopold

Introduction

"All men are mortal" is a trite premise of a textbook example of an argument. It is also one that most people take to be true. We fear, avoid, postpone, and prepare for death. From the inconvenient truth of death's inevitability follows other truths. Although there are vast variations across times and cultures on how the living dispose of bodies of dead humans, body disposal is a ubiquitous cultural element. How we dispose of the remains of humans has

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been a matter of religious[1], cultural[2], economic[3] and political[4] debate. However, the emerging of environmental ethics vis-à-vis proliferating and worsening environmental problems have led to ethical questions being posed regarding how human cadavers are dealt with. This study addresses such problems in the urban setting of the southern African country of Botswana. The study combines an empirical study whose findings are then subjected to ethical evaluation through Aldo Leopold's land ethic.

There are a several ways in which body disposal including internment, cremation, and aquamation, *inter alia.* Burial practices are based on religious, cultural, and sociological ideologies[5]. As da Cruz et al.[6] note, body disposal is a delicate subject because it involves beliefs and other cultural issues. According to Ekore and Laure-Abass[7], traditional African belief systems are based on an understanding that those who are dead are alive in a different world and can return to this world through new births. In many African traditions, the dead possess supernatural powers over those who are alive to bless or curse and to give or take life. It is therefore imperative for an individual to be given a proper burial after death for one to become a benign ancestor. Otherwise, the individual may become a wandering ghost, unable to live properly after death, and thereby constituting a danger to those who are still alive[8].

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[1] Cfr. R. Werbner (2018). *Ecumenical funerals in the making* in *Journal of Southern African Studies*, 2018, 44 (2), pp. 315-329.

[2] Cfr. L. Baloyi. and M. Makobe-Rabothata, *The African conception of death: A cultural implication* in L.T.B. Jackson, D. Meiring, F.J.R. Van de Vijever, E.S. Idemoudia, and W.K, 2014.

[3] K. Arhin, *The economic implications of transformations in Akan funeral rites. Africa*, 1994, 64(3), pp. 307-322.

[4] W.T. Kalusa, *The politics of the corpse: President Levy Mwanawasa's death, funeral and political contestations in post-colonial Zambia* in *Journal of Southern African Studies*, 2017, 43 (6), pp. 1137-1155; C. M. Kearl and A. Rinaudi, *The political uses of the dead as symbols in contemporary civil religions*, Social Forces, 1983, 61 (3), pp. 693-708.

[5] J.K.T. Biwul, *The African tradition of burial in the ancestral land and its implications for the African Church today*, TCNN Research Bulletin 61, 2014.

[6] Da N.J.T. Cruz and A.G.R. Lezana, P.D.C. Freire dos Santos, I.M.B. Santana Pinto,, C. Zancan and G.H. Silva de Souza, *Environmental impacts caused by cemeteries and crematoria, new funeral technologies, and preferences of the Northeastern and Southern Brazilian population as for the funeral process*, Environ SciPollut Res Int, 2017, 24(31), pp. 24121- 24134.

[7] R.I. Ekore and B. Lanre-Abass (2016), *African cultural concept of death and the idea of advance care directives* in *Indian Journal of Palliative care*, 2016, 22(4), pp. 369-372.

[8] E. E. Evans-Pritchard, *Burial and mortuary rites of the Nuer*. *African Affairs*, 1949, 48 (190), pp. 56-63.

Traditionally in Africa, including in Botswana, interment was the only known form of death disposal dating back from the Stone Age period[9]. Studying burial societies in Botswana, Chris Brown[10] claims that "the need for proper burial is eternal". The traditional African beliefs are buttressed by foreign religious influences of Christianity and Islam. Christians, for example, believe God created life as embodied life and the person is not simply a soul but a soul-body entity[11]. This means that the body is to be respected and the corpse is not a worthless container vacated by the essence of life.

However, internment can cause environmental problems. Most cemeteries were sited without thinking about potential environmental risks[12]. As Jonker and Olivier[13] note, little attention was given to cemeteries as sources of pollution. In many countries where burials are practiced, internment is proceeded by a highly chemicalised process involving embalming agents, such as formaldehyde, buffers, antioxidants, and dyes aimed at preserving the bodies and improving its appearance for the purpose of body viewing by mourners. Embalming became a dominant practice in US funeral rites during the American Civil War of the nineteenth century when Abraham Lincoln introduced the requirement to preserve the bodies to allow transportation of the Union dead to their homes in the North[14]. This is a widespread practice now in Botswana where there is the tradition of viewing of the corpse.

According to Harker[15], digging in a modern cemetery in the United States is much like digging through a toxic waste. Besides the chemicals used in preparing cadavers for viewing and burial, caskets contribute toxins in the

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[9] Cfr. S. Guttman, J. Watson and V. Miller, *Till death do we pollute and beyond: The potential pollution of cemeteries and crematoriums*, Trent University, 2012, accessed on 04.05.2020.

[10] C. Brown, *Kgatleng burial societies* in *Botswana Notes and Records*, 1982, 14, pp. 80-83.

[11] Cfr. W. Reville, 2018, *Which to choose, burial or cremation?,* www.irishtimes.com, accessed on 13.08.2020.

[12] Cfr. A.S. Ucisik and P. Rushbrook, *The impact of cemeteries on the environment and public health: An introductory briefing. WHO Regional Office for Europe*, Copenhagen, Denmark 1998.

[13] N. Jonker and J. Olivier, *Mineral contamination from cemetery soils: Case study of Zandfontein cemetery, South Africa* in *International Journal of Environmental Research and Public Health*, 2012, Vol 9, pp. 511-520.

[14] L. Canning and I. Szmigin, *Death and disposal: The universal, environmental dilemma* in *Journal of Marketing Management*, 2010, Vol 26, pp. 1129-1142.

[15] A. Harker, *Landscapes of the dead: An argument for conservation burial* in *Berkeley Planning Journal*, 2012, 25(1), pp. 150-159.

graveyard and surrounding environment. According to Harker[16], "conventional burials in the U.S. use nearly 30 million board feet of hardwood, 2,700 tons of copper and bronze, 104.272 tons of steel, and 1,636,000 tons of reinforced concrete". These toxins and pollutants are not limited to the area in which they are buried. This was confirmed by Spongberg and Becks[17]. Their study showed that soil samples taken at coffin depth had elevated concentrations of metals used in making caskets, including copper, lead, zinc and iron. In addition, flowers used to decorate graves sometimes contain pesticides which could escape into the water and air and cause health effects for nearby animals[18]. Lastly, the decomposition of interred bodies releases nutrients such as nitrogen and chemicals like mercury[19]. After these chemicals are released into the environment, they make their way up the food chain all the way to humans.

Land use through burial creates a competition for land between the dead and the living. There is a looming problem in many parts of the world over what to do with dead bodies as pressure on burial space intensifies. Human has continued to grow rapidly. Botswana's population, for example, grew to 2,024904 by 20.5 percent during the 2001 and 2011 intercensal period. A larger population requires more land for housing, agriculture, public social facilities, and burial of the dead. Although people die daily, pandemics such as AIDS and COVID-19 add to the demand and scarcity of burial spaces. For example, the United Nations reported 26,000 AIDS-related deaths in 2001 in Botswana when the population was 1.6 million people[20]. This would be expected to put more pressure on limited burial spaces. Consequently, infrastructure for the living have steadily advanced on cemetery areas because of population growth and this is evident in the increase in the number of

[16] Ivi, 151.

[17] A.L. Spongberg and P.M. Becks, *Inorganic soil contamination from cemetery leachate. Water, Air and Soil Pollution,* 2000, 117, pp. 313-327.

[18] Cfr. K. Mathews, 2015, *5 reasons why burying dead people is bad for the environment,* http://www.care2.com/causes/5-reasons-why-burying-dead, accessed 19th August, 2019.

[19] Cfr. S. Guttman, J. Watson and V. Miller, *Till death do we pollute and beyond: The potential pollution of cemeteries and crematoriums*, Trent University, 2012, accessed on 04.05.2020.

[20] Cfr. R. Rollnick, 2002, *Botswana's high-stakes assault on AIDS. Africa Renewal*. (September issue) https://www.un.org/africarenewal/magazine/september-2002/botswanas-high-stakes-assault-aids.

houses in areas not previously occupied[21].

Another concern from cemeteries is deforestation. Forests and trees in general are important for the wellbeing of humanity and the country's development. Forests provide foundations for life on earth through ecological functions by regulating the climate and water resources and by serving as habitats for plants and animals. According to the Sida-EEU report, fuel wood from forests and woodland accounts for 70% of net energy supply in Botswana, and high reliance of wood for fuel has resulted in significant depletion around towns and major settlements. As the human population continues to grow, the planet is exposed to increased risks. According to FAO[22], it is estimated that 420 million hectares of forest has been lost to deforestation since 1990. Burials contribute to deforestation through clearance of trees for burial spaces as well as through raw materials for coffins. According to Mathews[23], the amount of wood needed to create caskets in the U.S. is equivalent to four million square acres of forest which contains enough trees to confiscate 65 million tons of carbon dioxide a year. It is believed that ten acres of cemetery contain enough coffin wood to build 40 houses[24]. According to an FAO report, deficit of wood raw materials in Botswana is beginning to occur partly due to indiscriminate cutting of trees[25].

Methodology

Methodology involves what the research will actually *do* to achieve their specific research objectives and answer research questions[26]. It is made up of all the procedures and steps undertaken including sampling, data collection, and data analysis. Below, we outline the components of methodology in relation to this study. The study adopted he qualitative case study design.

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[21] A. Neckel, C. Costa, D.N. Mario, C.E.S. Sabadin and E.T. Bodah, *Environmental damage and public health threat caused by cemeteries: A proposal of ideal cemeteries for the growing urban sprawl* in *Brazilian Journal of Urban Management*, 2017, 9(2), pp. 216-230.

[22] Cfr. FAO and UNEP 2020, *The State of the World's Forests 2020. Forests, biodiversity and people*, Rome, https://doi.org/10.4060/ca8642en , accessed on 05.10.2020.

[23] Cfr. K. Mathews, 2015, *5 reasons why burying dead people is bad for the environment,* http://www.care2.com/causes/5-reasons-why-burying-dead , accessed 19th August, 2019.

[24] Cfr. W. Reville, 2018, *Which to choose, burial or cremation?,* www.irishtimes.com, accessed on 13.08.2020.

[25] Cfr. M. Sekgopo, 2020, *Forestry outlook for Africa – Botswana. FAO,* https://openknowledge.fao.org/server/api/core/bitstreams/2300f3d3-5b55-4bbc-8944-63ad011ed390/content , accessed on May 2, 2024.

[26] Cfr. A. Bryman, *Social research methods*, Oxford University Press, Oxford 2012.

Qualitative research stresses the understanding of lived social experiences through focus on words, narrations, and observations from which insights can be drawn. A case study design was adopted as a way to gain in-depth and focused understanding of the specific case of environmental dimensions of current burial practices in Ledumang Ward of Gaborone.

Description of the Study Area

The study was carried out in the South-eastern part of Botswana in Ledumang ward which is one of the locations within Gaborone city which contains a cemetery. The country's land surface area is estimated at 582,000 square kilometres with a population of approximately 2.8 million and people having an average life expectancy rate of 58 years. According to CIA World Factbook (2011), the birth rate of the country is approximately 22 births per 1,000 and the death rate is 10 deaths per 1,000. Almost half of the population live in urban areas with Gaborone having the largest at 208,411 people. Gaborone city is bordered to the east by Notwane River which serves as a structuring element and natural boundary between the city and Tlokweng (Batlokwa Tribal Territory); to the west it is bordered immediately by Mogoditshane (Bakwena Tribal Territory); in the north the city abuts Kgatleng district (Bakgatla Tribal Territory) boundary; and immediately to the south, the city is bordered by freehold farms which fall within the jurisdiction of the South East District.

It is noteworthy that Gaborone City is enclosed with no available land for future special expansionary needs of the city. As Gaborone is the capital city, it is the only place in Botswana with many cemeteries due to its large population. Currently, there is a serious shortage of land, and the city has nowhere to expand because it is surrounded by other villages which some people have now come to think are locations within the city.

Sampling

Purposive and systematic sampling techniques were used for this study. Purposive sampling was used to select key informants for in-depth interviews. These comprised 12 key informants as follows: the local chief, an official from an environmental organisation; an official from the Gaborone City Council planning department; an official from a funeral parlour; an official from a coffin manufacturing company; an official of memorial park which houses a cemetery; a member of the Village Development Committee and 5

members of the clergy from local churches. Systematic random sampling was used to select the 30 householders. There are approximately 1,000 households in Ledumang ward, and the researcher interviewed one person from every 33rd household.

Data Collection

Data collection was conducted by the first author between January and February 2021. Interviews were conducted using semi-structured interview schedules with 30 households in Ledumang area. In-depth interviews were conducted with 12 key informants. These included the local chief, a member of the village development committee, an environmentalist, an official from Gaborone City Council planning department, an official from a funeral parlour, an official from the coffin manufacturing company, an official from the memorial park, 5 members of the clergy. The total of interviews conducted was thus 42. Data was collected from the households until saturation was attained. According to Newing[27], saturation is reached when the researcher can make sense out the data collected thus far, and any additional data collected adds little or negligible new information.

Data Analysis

Data was analysed by identifying common patterns and themes of thought that emerged from the interviews concerning the disposal of bodies. Aldo Leopold's land ethic was used to make an ethical assessment of the environmental impact of current burial practices in Ledumang Ward, Gaborone.

Results and Discussion: Perceived significance of current death disposal practices

Thirty householders were asked for their views on the benefits of the current death disposal method, the responses are shown in Table 1. The most numerous responses focus on religious beliefs and giving the dead a permanent place of rest. Such responses imply an adherence to the traditional belief in the spirit world of ancestors and/or the Christian belief in resurrection. Burial practices also allow people to mourn the loss of their loved ones and letting them go. In the words of one householder:

[27] H. Newing, *Conducting Research in Conservation Social Science Methods and Practice*, Routledge, London 2011.

> The mere fact of witnessing a coffin being lowered into the ground and pouring the soil in the grave makes people see that the person is gone and thereby giving them the closure they so much needed.

He argued that it is often difficult to believe in someone's death until you see the person being lowered in the grave. The traditional chief of Ledumang felt that burial gives

Table 1: Views of households on benefits of burial

Allows mourning of a loved one	4
Provides a permanent place of rest	9
Helps with the grieving process	2
Acts as a situation for introductions	1
Supports religious beliefs	10
Acts as a sign of remembrance	3
Cemetery is a source of employment	1
Total	30

one a chance to be buried amongst one's loved ones. For example, if a husband passes away and is buried, his wife can choose to be buried beside him so that they can be together for eternity. This is done by reserving the space beside the grave so that no one else occupies it. This was also confirmed by the operations manager of Memorial Park who disclosed that their mandate was to sell graves to the community.

Distinct types of plots are available for sale in Memorial Park. There are single plots, companion plots which are meant for a married couple, or family plots where a small area of the cemetery is reserved for a whole family. This is a service which is not available at the city council cemeteries so that many people are opting to reserve grave sites. The selection of a grave site enables the fostering of an emotional connection with the final resting place and provides a sense of permanence in that people know where they will be

buried[28]. This trend is growing because customers "people come for well-maintained graveyards" as community graveyards are not being taken care of properly. They even come from as far away as 100 km from Gaborone to access the services of Memorial Park. This trend was also mentioned by Wilson and Chiveralls[29] who noted that "memorial parks and lawn cemeteries tend to be much greener than traditional burial areas and, rather than presenting a gloomy vista of ranks of tombstones, they are characterised by manicured gardens and lawns."

Of the 30 householders interviewed as seen in Table 1, nine said that the burial method is good because it provides a permanent place for the dead which can be visited by the living at

any time when they feel like it. Ten insisted that their traditional and/or religious beliefs were in support of it. For example, the majority of those belonging to Christian churches and who believe in the doctrine of the resurrection of the body feel that they have no other option than burial. The male pastor from the ZCC pointed out that "one day the body of those who have died in Christ will be resurrected and reunited with their souls". Others gave varied reasons for observing current burial practices. One said that for those who may not be present at the time of burial, it helps with the grieving process by visiting the grave and finding closure. Visiting the grave is considered to be a sacred ritual which allows the living to feel closer and connected to their loved ones. Another interviewee pointed out that even those who are not yet born can be introduced to their ancestors by going to the grave site. She gave an example of a woman whose husband had died after she had become pregnant, and she was able to take the new-born child to the grave later to be introduced to the father. Auger[30] also noted that cemeteries and burial practices represent a place for meeting with the dead and for remembrance for loved ones.

In the Christian understanding, the soul and the body are two inseparable dimensions of the person and are temporarily separated at death. The Catholic Church believes that whereas the body decays, the soul goes to meet God while awaiting its reunion with the glorified body (Catechism of

[28] Cfr. M. Klaassens and P. Groote, 2010, *Natural burial ground Bergerbos: An alternative place of burial in the Netherlands*, Annals of the University of Alba lulia-History Issue: 2, pp. 311-327, on www.ceeol.com., august 2024,

[29] Cfr. L. Wilson and K. Chiveralls (n.d.)., T*radition and contemporary burial practices: Cemeteries and sustainability,* University of South Australia, accessed on 13.03.2020.

[30] Cfr. J.A. Auger,. (2000). *Social perspectives on death and dying*, Fernwood Publishing, Halifax 2000.

the Catholic Church). The resurrection of the body emphasises that the material body of the one who has died will be transformed into a resurrected body and united with the spirit dimension. Kearle noted that as the body is considered the dwelling place of the Holy Spirit and a living temple of the divine, cremation is considered to hinder the body's resurrection and represent a lack of care.

The grave in which one is buried acts as a sign of remembrance to the living. One woman pointed out that people always remember their dead whenever they go to the cemetery for other burials.

We always see them scattered around the cemetery checking their relatives' graves. This shows that they have not forgotten them.

She elaborated that some wealthier people erect tombstones as a way of creating a lasting memory to their descendants. A beautiful tombstone is seen and admired by everyone who comes to the cemetery, and this makes the person lying there to be remembered. Auger[31] noted that people construct tombstones as symbols of remembrance and comfort for the living. Similarly, Scalenghe and Pantani[32] stated that cemeteries are places where memories of the dead are supported by enduring funerary monuments. Auger also noted that cemeteries play a role in helping the living to grieve and to remember. This clearly shows that cemeteries are more than just a disposal site for the dead but are rather an important place for the living and, as such, express the connection between the living and the dead.

A woman in her mid-seventies pointed out that the cemetery can also be is a source of employment. She stated that her son works at the cemetery as a security guard saying "*rona re a ja re jeswakemabitla*," meaning, we can survive because of the cemetery. Wilson and Chiveralls also noted that burying the dead created employment for grave diggers and gardeners to maintain the cemetery grounds.

Furthermore, burial practices have given rise to the development of thriving funeral industries. According to Northcott and Wilson[33], the funeral industry has become a large employer providing both direct and indirect forms of employment such as the construction of caskets, building funeral homes, embalming the dead, maintaining cemetery grounds, supplying

[31] Cfr. J.A. Auger, *Social perspectives on death and dying*, Fernwood Publishing, Halifax 2000.
[32] Cfr. R. Scalenghe and O.L. Pantani, *Connecting existing cemeteries saving good soils (for livings). Sustainability*, 2020, 12(93).
[33] Cfr. H.C. Northcott and D.M. Wilson, *Dying and death in Canada*, Broadview Press, Toronto 2008.

flowers, printing obituaries, and providing for travel. For these reasons, Guttman, Watson, and Miller[34] pointed out that in view of the profits made by this industry, there would resistance to changes that would limit these practices. However, as shown in Table 1, only one out of the thirty respondents viewed cemetery employment one of the benefits of current death disposal practices which suggests that the creation of employment is not a major factor in attitudes concerning burial practices.

Environmental considerations

Most people look at death disposal as sacred and deeply rooted in religious and cultural beliefs such that they do not take time to question the way things are done. However, some people's preferences may be because they are still unaware on the negative impacts of current death disposal practices simply because they are not evident to the average person who is attending the funeral. The invisible negative impacts include those impacts which affect the environment (see Table 2 for views of householders). These include the following which are discussed below: air pollution, contamination of underground water, loss of biodiversity and deforestation, defacing the natural beauty of the environment, implementing a questionable use of land, and contributing to the spread of COVID-19. This section will present and discuss the findings on these environmental considerations.

Table 2: Views of households on the greatest negative effects of current burial practices

Air pollution	3
Contamination of underground water	5
Deforestation and loss of biodiversity	1
Defacing the natural beauty of environment	6
Shortage of land	12
Contributing to spread of covid-19	3

[34] Cfr. S. Guttman, J. Watson and V. Miller, (2012). *Till death do we pollute and beyond: The potential pollution of cemeteries and crematoriums*, Trent University, 2012, accessed on 04.05.2020.

Total	30

Air Pollution

Air pollution refers to "the contamination of the indoor or outdoor environment by chemical, physical, or organic substances that alter the natural characteristics of the environment". This largely due to anthropogenic activities but can also result from non-anthropogenic phenomena. Mostly cited anthropogenic causes are related to industrial developmental activities. However, there are signs that current death disposal practices can cause air pollution. Two householders living adjacent to the funeral complained of an unpleasant smell coming from the direction of the cemetery at times. One of them confirmed that she once felt a strong smell coming from within the cemetery when she went for a burial. She was concerned about the effect that these smells might have. According to Cieśla et al. decomposition of corpses releases volatile organic compounds that are dispersed into the atmosphere by wind. Dent (2002) noted that the body is made up of 64% water, 20% protein, 10% fat, 5% mineral and 1% carbohydrate which decompose into different substances and potential pollutants. Protein decomposition in particular releases gases like purine and cadavarine, both of which are toxic with a foul smell. According to Bachelor, "gases hovering over cemeteries were suspected of causing anything from tarnishing silver to deadly disease like cholera and typhus."

In addition to air pollution from decomposing bodies, air pollution is also caused by chemicals used in processing corpses for body viewing and burial. The Operations Manager of Lynn's Funeral Parlour also narrated that the liquid that they use for embalming has formaldehyde which is very strong. It lingers around the space even after use. He said that the smell makes one to cough which is why it is necessary to wear protective clothing when performing the procedure and not allow anyone in the room except those carrying out the procedure. This is done to protect the health of the employees. Mao and Woskie[35] found this out in their study after collecting air samples from six funeral homes. They noted that the average formaldehyde concentration in the air in embalming rooms was 0.74 ppm with a peak of 5.26 ppm which caused eye and upper respiratory track irritation in some employees.

[35] Cfr. C. Mao and S. Woskie, *Formaldehyde Use Reduction in Mortuaries. Technical report No. 24*, Toxics Use Reduction Institute, Massachusetts 1994.

Furthermore, air pollution is caused from transportation involved in burial funerals. A householder, a male in his early fifties, complained of car exhaust from the increased traffic on the road related to funerals, especially in the mornings when they go to work:

> Traffic has always been there, but nowadays it is worse because of the increased numbers of funerals at Ledumang cemetery which is due to COVID-19 deaths. Some of these cars are not roadworthy as they are smoking. As we have to wait a long time in the traffic, we are inhaling the smoke from these cars which is endangering our health and the health of the environment[36].

According to Krzyzanowski et al.[37], transport-related air pollution contributes to an increased risk of death, particularly from cardiopulmonary causes. This is because traffic contributes to a range of gaseous air pollutants and to suspended particulate matter. Transport air pollution has been found to adversely affect human cardiovascular and respiratory systems[38]. The business manager of Somarelang Tikologo (ST) opined that car pollution is one of the major causes of global warming because of the many cars found on the roads. He said:

> Normally when there is a funeral, relatives and friends come from afar to bid farewell to the deceased. These people come with their cars, increasing the ones found in the locality and thereby emitting more carbon dioxide and other greenhouse gases which contribute to air pollution and global warming[39].

He further pointed out that people rarely want to share a car during funerals.

Contamination of underground water

Of the 30 householders interviewed, five were of the view that burying people

[36] Ibidem.

[37] Cfr. M. Krzyzanowiski and B. Kuna-Dibbert and J. Schneider, *Health effects of transport-related air pollution. World Health Organization*, 2005.

[38] Cfr. E. Long, C. Carlsten, 2022, *Controlled human exposure to diesel exhaust: results illuminate health effects of traffic-related air pollution and inform future directions. Part Fibre Toxicol 19, 11*, https://doi.org/10.1186/s12989-022-00450-5 . august 2024.

[39] *Ibidem.*

underground can somehow affect underground water if it happens that the cemetery is sited on top of the water table. Ground and surface water are a source of potable water for both human and non-human life forms. If it happens that it is contaminated, all the life forms found within that area can be threatened. Their argument was that as the body decomposes, the contents in the coffin seep into the ground and then into the ground water which is later used by people, animals, and plants. Soil contamination can also occur making the vegetation within the area harmful to human and animal health as the poison can run into the food chain. This finding is well-corroborated by existing literature.

Oliveira et al.[40] have noted that cemeteries can be harmful to the health of people living nearby. They explained:

> Cemeteries represent a source of environmental liability due to their potential to accumulate and release large quantities of contaminants generated by the decomposing of corpses. Effluents can carry microorganisms and heavy metals through the soil to water resources. Since these environments have concentrated potential polluters, populations living close to cemeteries may be exposed to elevated levels of highly harmful contaminants to human health.

This is in line with what was confirmed by Ucisik and Rushbrook[41] when they said that there is seepage of decay products percolating into water during putrification of the human corpse. According to them, this seepage contains bacteria, viruses and organic and inorganic chemical decomposition products which could be a cause of local epidemics from waterborne diseases where the groundwater is used as a water source. The business manager of ST agreed that both the decomposing body which is sometimes embalmed and the coffin materials themselves produce chemicals and toxins that move through the soil and contaminate the environment including the underground water. He argued that the treated timber used to make coffins may kill termites that come into contact with it. Over a prolonged period, these treatment chemicals leak to the underground water aquifers contaminating them. He pointed out that the chemicals are harmful to the environment both under and above the soil when they leak over time. He acknowledged that due to the lack of adequate

[40] *Ibidem.*

[41] Cfr. A. S. Ucisik and P. Rushbrook, *The impact of cemeteries on the environment and public health: An introductory briefing. WHO Regional Office for Europe*, Copenhagen, Denmark 1988.

standards or monitoring authority, funeral parlours use whatever they can manage to accomplish their objectives. Guttman, Watson, and Miller[42] noted that the main sources of pollution from cemeteries are human bodies and embalming fluids which primarily contain formaldehyde. Wood caskets also pose a threat if wood preservatives which can contain arsenic are used[43]. Spongberg and Becks noted further that the abundance of corpses in cemetery soil provides an obvious source of organic contamination, and the fluids from decomposing bodies in graveyards can leak into underlying groundwater unless leak-proof caskets are used.

The Operations Manager of Lynn's Funeral Parlour testified that:

> If this substance has these effects on people, then it means it can be harmful to the soil underneath and also to the groundwater if there is any at the cemetery[44].

He acknowledged that the company has never bothered to investigate the effects that the embalming liquid (formaldehyde) might have on people as well as on the natural environment. This is because the Waste Management policy is silent about pollution from the cemeteries. Cemeteries are managed by the Gaborone City Council by-law and body disposal is not considered as waste. However, a decade-long (2007-2018) study in Brazil found little to no contamination surface or groundwater[45]. This difference can however not to be said to refute the views expressed in this study because various burial and environmental factors may lead to different levels of contamination.

Uslu et al.[46] noted that formaldehyde is a volatile organic compound, a potential carcinogen known to cause comas, internal bleeding, and death. Guttman, Watson, and Miller (2012) stated that formaldehyde had been listed for future banning by the European Union as it had proved to be a risk to those working with the substance. In addition, Cogliano et al.[47] drew attention to the fact that in environments where formaldehyde is manufactured, death

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[42] Cfr. S. Guttman, J. Watson and V. Miller, 2012, *Till death do we pollute and beyond: The potential pollution of cemeteries and crematoriums,* Trent University.

[43] A.L. Spongberg and P. M. Becks, I*norganic soil contamination from cemetery leachate. Water, Air and Soil Pollution,* 2000, 117, pp. 313-327.

[44] Ibidem.

[45] E.D.Saba, J.M. Saba, T.A. Mendes, A.E. de Oliveira, *Evaluating the impact of a cemetery on groundwater by multivariate analysis. Environ Monit Assess,* 2023, 195(2), pp. 270.

[46] A. Uslu, E. Bariş and E. Erdoğan, *Ecological concerns over cemeteries. African Journal of Agricultural Research*, 2009, 4(13), pp. 1505-1511.

[47] V.J. Cogliano, Y. Grosse, R.A. Baan, K. Straif, M.B. Secretan and F.E. Ghissassi, 2005.

rates from nasopharyngeal cancer were significantly increased. Furthermore, they highlighted the fact that a relationship had been confirmed between the development of cancer and formaldehyde. Neckel et al.[48] pointed out that at present, there is the danger of lack of management and treatment of highly pathogenic effluents released by corpses during the decomposition process. Allemann et al., who had collected coffin materials from one of South Africa's oldest and largest funeral suppliers, found that coffin materials such as handles and ornaments were made of materials such as aluminium, copper, mild steel, zinc and its alloys, as well as silver and bronze. The use of plastic handles in coffins has recently become more common. Motlatsi[49] has noted that, in the material safety data sheets of these materials, the plastics are comprised of polypropylene and contain traces of formaldehyde. Traces of formaldehyde were also found in the varnish used on coffins. Jonker and Olivier[50] have similarly pointed out that the fabrication materials of coffins may contain harmful and toxic metals that could permeate the soil.

Sixty years ago, Rachel Carson's *Silent Spring* helped to start the modern ecological movement. Carson[51] highlighted the pervasive environmental effects of chemicals including pesticides and detergents on the terrestrial and aquatic system. Dead birds were found to have ingested vast amounts of chemicals such as DDT. Although most of these chemicals were used in agriculture and did not include those in the treatment of dead bodies of humans, there is ample evidence on the harmful environmental impacts of chemicals such as formaldehyde through contamination of ground water and cemetery vicinities[52] (Allemann et al. 2018; Guttman, Watson, and Miller, 2012; Holness and Nethercott 1989).

Loss of biodiversity and deforestation

[48] A. Neckel, C. Costa, D.N. Mario, C.E.S. Sabadin and E.T. Bodah, *Environmental damage and public health threat caused by cemeteries: A proposal of ideal cemeteries for the growing urban sprawl* in *Brazilian Journal of Urban Management*, 2017, 9(2), pp. 216-230.
[49] M.S. Motlatsi, *Material safety data sheet: Polypropylene*, Sasol, Sandton 2007.
[50] N. Jonker and J. Olivier, *Mineral contamination from cemetery soils: Case study of Zandfontein cemetery, South Africa* in *International Journal of Environmental Research and Public Health*, 2012, Vol 9, pp. 511-520.
[51] Cfr. R. Carson, *Silent Spring*, Penguin, London 1962.
[52] S. Guttman, J. Watson and V. Miller, 2012, *Till death do we pollute and beyond: The potential pollution of cemeteries and crematoriums,* Trent University, accessed on 04.05.2020; D. Holness and J. Nethercott, (1989), *Health status of funeral service workers exposed to formaldehyde*, Archives of Environmental Health, 1989, 44(4), pp. 222-228.

The business manager of ST identified loss of biodiversity as another one of the effects of death disposal practices. He noted that every species has a role to play in creating harmony in the ecosystem irrespective of its size so that by destroying the forest, many life forms living there are destroyed. This can end up causing species extinction as some may fail to adapt to the changing conditions. He pointed out that the location of cemeteries tends to destroy the vegetation of the site thereby causing deforestation because trees must be removed. Consequently, many of the species found in that area are destroyed. He went further to say that "the forest is a home to ecosystems which interact with one another so that by destroying the habitat, we are destroying their home". Figure 1 shows the levelled ground where graves are going to be dug. Trees and vegetation which were housing life forms there were removed. According to Lipper (2000:26), biodiversity took many millions of years to evolve, and there is no possibility of getting back the estimated 50,000 species that go extinct every year.

When quizzed about how the coffin-making business is affecting the environment, the workshop manager of Lynn's Funeral Parlour said that it does not affect the environment because they procure the materials from China and South Africa. He emphasised that it is not the trees in Botswana that are being cut and that they cannot be held responsible for causing deforestation. This may be true, but the need for wood in coffin-making still raises the problem of deforestation and its effects on the natural environment. Deforestation has a significant impact on global warming because trees act as sinks, and they absorb carbon dioxide in the soil.

Figure 1: Trees and vegetation removed at Ledumang cemetery
Source: Field Data, February 2021.

When asked about how the coffin-making business is affecting the environment, the workshop manager of Lynn's Funeral Parlour said that it does not affect the local environment because they procure the materials from China and South Africa. He emphasised that it is not the trees in Botswana that are being cut and that they cannot be held responsible for causing deforestation. This may be true, but the need for wood in coffin-making still raises the problem of deforestation and its effects on the natural environment.

Deforestation has a massive impact on global warming because trees act as sinks, and they absorb carbon dioxide in the atmosphere through the process of photosynthesis. Forests therefore play an important if not indispensable part in preserving the health of the natural environment. Greene (2001) has convincingly shown how problems affecting the natural environment in any one country affect other countries as well so that countries need to work together. Moreover, as Botswana shares boarders with South Africa, if South Africa is going to experience problems by the cutting down of its trees for wood, Botswana is going to be affected as well.

Defacing the natural beauty of the environment

The chairperson of the Village Development Committee (VDC), the physical planner of Gaborone City Council, and six of the householders expressed an acute awareness of the unpleasant appearance of the cemetery in Ledumang. They complained that the cemetery is not well taken care of and that this has caused the area to look spooky. One lady in her sixties pointed out that formerly people used to visit the graves of their loved ones almost every month to keep them in good condition. However, she went on to say, "*Nowadays is like people are throwing away a dead dog! They never come back to see how the grave is, let alone to clean the surroundings."* She blamed the untidiness to the fact that as people come from afar to bury their loved ones in Ledumang, it becomes too cumbersome for them to keep on checking the graves because of the distance involved (see Figure 2).

Figure 2: Unkempt cemetery at Ledumang
Source: Field Data, February 2021.

The business manager of ST stated that there are instances where the burial results in the soil sinking. When this happens, the coffin also sinks, and the soil can be carried away during the rainy season thereby affecting many life forms in the soil. The chairperson of the VDC said that the cemetery makes the overall environment look particularly ugly because it is located between houses and schools. The physical planner of the Gaborone City Council also agreed that the cemetery is not properly looked after, and that it is dilapidated and unattractive. She continued:

> It is high time that town planners consider making use of cemeteries, not only as burial sites but as active parks with supporting activities like florist shops, snacks and beverage units, shaded sitting areas and Wi-Fi spots. This would attract people to the place, and it would come alive and no longer be seen as a spooky area where people are afraid to even pass nearby[53].

This is supported by Maddrell et al.[54] who stated that the future planning of cemetery spaces needs to consider the functional, symbolic, social and leisure aspects of a diverse multicultural society. It needs to take account of the comfort and safety of visitors and the mediation of different user needs and

[53] Ibidem.
[54] Cfr. A. Maddrell, Y. Beebeejaun, K. McClymont, D. McNally, B. Mathijssen and S.A. Dogra, 2018, *Diversity-ready cemeteries and crematoria in England and Wales*, www.deathscapesanddiversity.org.uk .august 2024.

interests. They suggested building a café, an information point or a flower shop which would also increase personnel on site to enhance the social aspect of the cemetery.

A questionable land use practice

The most common form of body disposal is in-ground burial, and this requires a significant amount of space. Of the thirty householders interviewed, 12 commented that due to the increase in population, there has been a greater demand for land for development, housing, agriculture and recreation. One woman noted that she has been applying for land for twenty years but still has not been allocated any. She believed that cemeteries were taking up the spaces that could have been given to herself and others for residential purposes. Tafira[55] highlighted that for Africans, land is everything so that depriving them of land meant robbing them of their personhood, being and identity. The chairperson of the VDC expressed similar sentiments. She was of the view that a police station could have been placed where the cemetery is as there is no police station in Ledumang, even though the crime rate is high there. She said that they had to travel a long way to access policing services at Broadhurst.

Population increases in urban areas such as Gaborone has resulted in an increased demand for land such that houses, and other developments are now closer to the cemetery which used to be very far from people. Lauwers[56] (2015) noted that building houses near cemeteries is a result of population growth which poses the social need to occupy those areas. Furthermore, the proximity of a cemetery decreases the value of the real estate nearby. Scalenghe and Pantani[57] drew attention to the fact that the way in which land is being used today is a serious contemporary issue. They claim that the practice of inhumation is a contributory factor. Land used for burials is land taken away from other urban developments.

Changing attitudes?

Given the environmental problems associated with traditional burial favoured by most Batswana, it is imperative that alternative body disposal methods are

[55] K. Tafira, 2015, *Why land evokes such deep emotions in Africa*, august 2023.
[56] Ibidem.
[57] Cfr. R. Scalenghe, O.L. Pantani, *Connecting existing cemeteries saving good soils (for livings). Sustainability*, 2020, 12(93).

considered. One obvious candidate is cremation. According to the findings of the study, most people have little or no knowledge about methods of death disposal other than burials. Although they may have heard about cremation from the Indian (Hindu) community, they do not know anyone who has ever been cremated. One lady in her late sixties acknowledged that she had heard about cremation when she was working for an Indian couple whose son had passed on. Because this is not a popular method, there is no crematorium in Gaborone except the one for the Hindus community which is only used by Hindus. On the other hand, the physical planner at Gaborone City Council noted that cremation can be a way of saving land in urban areas, especially in Gaborone where there is no land for expansion. She said: "*Gaborone has run out of land and the only option would be to consider cremation*." She pointed out, however, that the council and the relevant stakeholders would have to work hard to sensitise people about the problem of land shortages together with the benefits of cremation in relation to land. This was also confirmed by the Methodist pastor who acknowledged that cremation used little or no land at all as the cremains (cremated remains) can be kept in the home, scattered, or stored in a small columbarium that can hold many urns in a comparatively smaller area than ones needed for burial cemeteries.

Furthermore, if surviving family members move away, they can easily take cremated remains with them unlike with burial where the grave is permanent. She said: "*I want to do my part to save the planet, so I am definitely having myself cremated after I die*." She then went on to emphasise that cremation can also be much less expensive compared to a traditional funeral as it allows one to eliminate many costs associated with burials which include a casket, a cemetery fee, a grave cover, a headstone, and a tombstone. Not to mention the graveyard maintenance.

An interview with the business manager of ST revealed that cremation is environmentally friendly and can be viewed as a "green option" compared to burial. He argued, as was already discussed above, that burials use strong chemicals to embalm the remains which can contaminate the environment. They take up land space and disturb the earth when digging is done to bury the casket. He also noted that coffins are usually coated with preservative paints and varnishes containing dangerous chemicals such as mercury that can contaminate underground water systems.

For these reasons, he believed that cremation could be an important mechanism in the elimination of viruses, germs, and bacteria, thereby helping to improve sanitary conditions for humanity. According to Decker Junior et al. (2018), as the body is composed of 75% liquid and 25% solid, cremation

reduces the body to dust through intensive heat and evaporation which results in the decomposition of the body. The business manager of ST acknowledged, however, that "although cremation uses fewer resources than burial, it does have an environmental impact because it involves the burning of fossils." However, a fuller discussion of cremation as an alternative method of body disposal is beyond the scope of this paper. An important alternative to current burial practices and cremation is green or natural burial.

Asked whether he was aware of another method called green or natural burial, the manager of ST said that he has read about it and acknowledged that it could be a good method because it does not involve the use of embalming chemicals and the clearing of land for the cemetery. Hence, it gives priority to nature above burial or the scattering of ashes.

Klaassens and Groote[58] were of a similar view that natural burials provide a solution to problems associated with the costly maintenance at conventional cemeteries and they preserve the natural habitat. Natural burials place much value on trees and the way they may embody aspects of personal and cultural memory thereby facilitating and sustaining relationships beyond the grave[59]. However, although natural burial can be seen to be a solution to the problems caused by traditional burials, it does not address long-term land capacity constraints unless plots can be reused. As Pawlett and others[60] posit, although natural burial has several ecosystem benefits including enhanced biodiversity and carbon sequestration, it poses some risks of greenhouse gas emissions and groundwater contamination.

Having presented and discussed findings of the study, we turn to applying to the finding an environmental ethic proposed by one thinker widely considered the father of environmental ethics – Aldo Leopold.

The land ethic

Aldo Leopold's land ethic is apposite to this study because it emphasises respect for nature and for the value of the ecological community. The land

[58] M. Klaassens and P. Groot, 2010, *Natural burial ground Bergerbos: An alternative place of burial in the Netherlands,* Annals of the University of Alba lulia-History, Issue 2, pp. 311-327, www.ceeol.com . august 2024.

[59] *Ibidem*.

[60] Cfr. N.T. Pawlett, L. Girkin, D.L. Deeks, R. Evans, P. Sakrabani, K. Masters, N. Garnett, Márquez-Grant, 2024, *The contribution of natural burials to soil ecosystem services: Review and emergent research questions. Applied Soil Ecology,* 194:https://doi.org/10.1016/j.apsoil.2023.105200 . august 2024

ethic has been used by other authors as an ethical evaluative framework[61] albeit not to primary data as in the case of this study. However, the land ethic has not been used to evaluate the disposal of human bodies in cemeteries. The application of this theory to Ledumang cemetery will focus on the following four central concepts: biotic community, integrity, stability, and beauty. Before application, let us first explicate the land ethic through Leopold's environmental maxim.

Leopold[62] gave expression to what was the first formulation of an environmental ethic in the following maxim: "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". According to the *Oxford English Dictionary*, integrity means "the condition of being whole and undivided." Integrity connotes the idea of intactness, maintaining originality and remaining uncorrupted by external influences. For Warren[63], integrity "had to do with parts of nature that were necessary for land to keep its stability and its health…. [It] meant that species needed to keep land stable, and it meant the full range of self-organized native plants and animals that had inhabited the place before industrial civilisation arrived". Integrity thus entailed "maintaining all the original species in the community and not exchanging them with new ones"[64]. It therefore meant that native species of plants and animals should be left to thrive in their natural habitats as a matter of biotic right.

Although stability can mean something static and unchanging, Leopold understood that as ecosystems naturally undergo gradual and mild changes, members of the ecological community should adapt to those changes without unduly disturbing the natural environment. Therefore, according to Millstein[65], "rather than referring to an unchanging system, stability should be seen in terms of sustainability and resilience of the natural environment to external forces." Leopold was referring to the threat of human-induced

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[61] Cfr. R.L. Millstein, *Debunking myths about Aldo Leopold's land ethic. Biological Conservation*, 2018, 217, pp. 391-396; D. Simberloff, (2012). *Integrity, stability, and beauty: Aldo Leopold's evolving view of non-native species, Environmental History,* 2018, 17, pp. 489-511.

[62] A. Leopold, *A Sand County Almanac*, Oxford University Press, London 1949, pp. 224-225.

[63] J. L. Warren, *Aldo Leopold's Odyssey: Rediscovering the Author of the Sand County Almanac*, 10th Anniversary Edition, Island Press, 2016, p.340.

[64] D. Simberloff, I*ntegrity, stability, and beauty: Aldo Leopold's evolving view of non-native species, Environmental Histor*y, 2012, 17, pp. 489-511, p.504.

[65] R. L. Millstein, *Debunking myths about Aldo Leopold's land ethic. Biological Conservation*, 2018, 217, p.394.

instability to the health of the land rather than to natural changes which even contribute to land health. Stability thus refers to 'land health', a term that by the early 1940s had become the "centrepiece" or "cornerstone" of Leopold's thinking about the conservation of nature[66]. The concept of land health referred to "the ability of the land to cycle nutrients efficiently and continuously over long periods of time, via long and diverse food chains, so that land continues to sustain life over time and is capable of self-renewal"[67]. Leopold therefore objected to an attitude to land which saw it as a commodity for human exploitation that resulted in instability of the health of the land.

For Leopold, what was natural was beautiful. He had a negative view of the introduction of non-native plants and animals into the ecosystem. Simberloff noted that just as you cannot beautify the Mona Lisa by adding a necklace, you cannot beautify nature through artificial measures. Beauty, for Leopold, was thus not something merely subjective in the eye of the beholder; it was rather "an objective ecological attribute that could endure. It was "a characteristic that arose when the parts of nature were linked harmoniously into a whole promoting land's stability and long-term flourishing"[68]. This was not to deny the beauty that can be created by humans in an artificial way but rather that such beauty should not be at the expense of the deeper beauty of the natural environment. Therefore, maintaining the beauty of a place referred to conserving as much as possible the interconnections of the ecosystem that had been arrived at naturally. The land ethic has been used recently to evaluate land-use and conservation practices such as the Yolo River bypass project in the US and the introduction of non-native species in ecosystems[69].

It would be a mistake to interpreted Leopold's use of the concepts of integrity, stability and beauty as distinct or separate from one another. He is focusing on one reality, namely, the ecosystem which is a holistic reality. These three concepts are interlinked and interconnected with each other although they can be discussed separately.

Having explained Leopold's maxim, we will proceed to apply it to the

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[66] Cfr. D. Simberloff, I*ntegrity, stability, and beauty: Aldo Leopold's evolving view of non-native species, Environmental Histor*y, 2012, 17, pp. 489-511; J.L. Warren, J. L., *Aldo Leopold's Odyssey: Rediscovering the Author of the Sand County Almanac*, 10th Anniversary Edition, Island Press, 2016.

[67] R.L. Millstein, *Debunking myths about Aldo Leopold's land ethic. Biological Conservation*, 2018, 217, p.394.

[68] J.L. Warren, J. L., *Aldo Leopold's Odyssey: Rediscovering the Author of the Sand County Almanac*, 10th Anniversary Edition, Island Press, 2016, p.343.

[69] Cfr. D. Simberloff, I*ntegrity, stability, and beauty: Aldo Leopold's evolving view of non-native species, Environmental Histor*y, 2012, 17, pp. 489-511.

findings of the study.

Ledumang biotic community

A biotic community, also known as a biota, is the group of organisms that live together and interact with each other within an environment or habitat. Together, the biotic community and the physical landscape (or abiotic community) make up an ecosystem. The land ethic is concerned about the entire ecosystem rather than about its individual constituents *per se*. In this study, Ledumang community is an ecosystem with humans, nonhuman animals, flora, and non-living physical features. The land ethics encourages human beings to realise that they are dependent on other members of the ecosystem for their well-being thereby acknowledging their responsibility towards both living and non-living beings present. According to Leopold, everything is connected to everything else such that he can use the image of "the land pyramid." The depositing of foreign and toxic substances into the soil which comes from the embalming substances and coffin materials can disrupt food chains which in turn can lead to the moving out, decimation or extermination of certain species. The plants and trees growing within the cemetery where soils are contaminated absorb toxins from the seepage which can be affecting the animals that feed on them. Hence, before we think of using a piece of land as a cemetery, we must not only think about human land use but also use of that land as a habitat for non-human organisms as well.

Most people are not thinking in line with the land ethic because they think of human beings as the only beings endowed with intrinsic value such that other things are only instrumentally valuable for human ends. This violates the notion of the biotic community as conceived by Leopold in which humans are members of that community. Hence, in the context of Ledumang cemetery, people have a moral responsibility to care for the animals and plants in the cemetery and affected vicinity. Although the biotic pyramid shows energy flow with humans at the apex, the energy flow is cyclical. When humans die, the energy from their bodies is returned to the soil for absorption by microorganisms and plants. However, polluting substances in dead bodies shows a lack of respect for non-human life forms in the soil. The cutting down of tree and removing other forms of vegetation which help to absorb toxins from the soil also shows a lack of respect for the health of the ecosystem. Hence, the land ethic would consider the disposal of dead bodies in the soil in a manner which can destroy life forms to be unethical.

The definition of the land ethic as given by Leopold was: "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"[70]. Although Milstein debunks the myth that this maxim summarises the land ethic, it is nevertheless a central idea in the land ethic. It can therefore be justifiably employed to assess the ethics of body disposal among the residents of Ledumang ward.

Integrity

The term "integrity" connotes wholeness and the unimpaired state of the environment. Usually, integrity is juxtaposed with corruption. A person or thing has integrity if she or it is not corrupted. Leopold seems to use the term integrity in this sense[71].

Ledumang ward and the cemetery is not in a healthy state because of the negatives impacted it by the prevailing burial method. There is evidence that our burial system can cause air pollution as confirmed by the two interviewees who complained of an unpleasant smell coming from the direction of the cemetery at times, thereby affecting the purity of the air inhaled by humans and other life forms found within the area. In support of the above assertion, Bachelor pointed out that gases hovering over cemeteries were suspected of causing anything from tarnishing silver to deadly disease like cholera and typhus. The interviews also revealed that interment can somehow affect underground water if the cemetery is sited on top of the water table. If it happens that it is contaminated, all the life forms within that area can be threatened. The business manager of ST alluded to the fact that a decomposing body which is sometimes embalmed, and the coffin materials themselves, produce chemicals and toxins that move through the soil and contaminate the environment including the underground water. He argued that the treated timber used to make coffins may kill termites that come in to contact with it resulting in the loss of the functional role of these species.

Integrity reminds people not to corrupt or pollute the environment by introducing foreign species or substances into the natural environment. The practice of body disposal in Ledumang cemetery involves introducing harmful chemicals such as formaldehyde and non-biodegradable synthetic

[70] A. Leopold, (1949). *A Sand County Almanac*, Oxford University Press, London 1949, pp. 224-225.

[71] Cfr. D. Simberloff, I*ntegrity, stability, and beauty: Aldo Leopold's evolving view of non-native species, Environmental Histor*y, 2012, 17, pp. 489-511; Cfr. J.L. Warren, J. L., *Aldo Leopold's Odyssey: Rediscovering the Author of the Sand County Almanac*, 10th Anniversary Edition, Island Press, 2016.

materials and metals. These cause some animals to flee the area while others become decimated. Conversely, some alien species occupy the cemetery. The biotic pyramid is altered, and species can be displaced in the ecosystem to which they belong.

Stability

It is well known that biodiversity plays a key role in the stability of an ecosystem. “Stability” refers to preserving the overall harmony and balance of the biotic community. From the findings of the study, the current death disposal method that is carried on within the community of Ledumang results in many disadvantages to the ecosystem. One of the disadvantages is the species loss. Species play an essential role in the ecosystem so that species losses can threaten the stability of the ecosystem services on which humans depend (McCann, 2000). This was mentioned by the business manager of ST when he identified loss of biodiversity as one of the effects of death disposal practices. He pointed out that the removal of trees in the cemetery tended to destroy the vegetation of the site because some trees, especially the deep rooting trees, can help decrease the water level beneath the cemetery thereby helping to contain seepage within the vicinities of a cemetery. This also helps to reduce the quantity of the seepage water that mixes with the groundwater. Areas with high levels of species are more likely to return to a stable state after a disturbance because the ecosystem has more ways to respond to a disturbance and fix problems.

Leopold understood stability, not as the absence of change. Rather, it is allowing change to happen at a slow pace to allow members of the land community to adjust, adapt and continue to flourish. However, the burial practices at Ledumang cemetery interfere with the stability of the ecosystem in question, by the introduction of materials and chemicals which are harmful to life forms there. Furthermore, the considerable number of vehicles that enter the cemetery destroy the topsoil causing it to be easily carried away by wind and water. This affects plant growth, especially grass, thereby affecting the small animals that live and feed on the small vegetation disturbing the life support system and the equilibrium of the ecosystem.

Consequently, the natural environment is deprived of its sustainability and resilience. It can no longer support the biotic community sustainably, and it becomes helpless to withstand external forces such as heavy rains and

floods when they come. As Millstein[72] has pointed out, stability should result in a win-win situation for members of the biotic community by "providing good outcomes for humans, nonhumans, and the land community as a whole". In other words, the current disposal methods tend to change the land too drastically, quickly, and completely to everyone's detriment.

Beauty

In ordinary usage, beauty refers to the inherent value of the environment which can be aesthetically appreciated by humans. Inherent value is the value that human beings attribute to objects such as a rainbow on account of their beauty and unique characteristics that are appreciated. This value is attributed to an object on account of its perceived, recognised or discovered worth. However, this was not the beauty that Leopold had in mind. For Leopold, the natural was beautiful as such. It is not for humans to alter the landscape, to introduce artificially flora or fauna to a natural habitat. Natural beauty is to be maintained by leaving natural habitats as much undisturbed as possible. Beauty refers to the sophisticated interdependence and synergies among the members of the biotic community in the ecosystem. The beauty of the ecosystem cannot be separated from the integrity and stability of the ecosystem. They are all referring to the value of the one ecosystemic reality.

Conclusion

This paper combined a qualitative empirical study with an ethical evaluation of the findings through the lenses of Aldo Leopold's land ethic. Influenced by pre-colonial African traditional worldview and the Christian conceptions of death and body disposal, burial of the dead in cemeteries is the commonest form of body disposal. However, due to Western influences, burial of the dead among Batswana often involves embalming, caskets made from chemically treated wood and other non-biodegradable materials. Consequently, current burial practices pose numerous environmental problems and risks. The current burial practices are found to be wrong as they do not promote the integrity, beauty, and stability of the Ledumang biotic community. However, there is some indication that attitudes among Batswana are pliable, and they can thus potentially adopt alternative body disposal methods.

[72] R.L. Millstein, *Debunking myths about Aldo Leopold's land ethic. Biological Conservation*, 217, pp. 391-396, 2018, p. 395.

Much empirical research on ecological impact of current burial practices have been conducted elsewhere. However, due to different soils, hydrology, and environmental factors which may mitigate or exacerbate negative ecological impacts, there is need to conduct such research in Botswana as well. Lastly, there is need to carry out social science and philosophical research to ascertain and evaluate metaphysical and axiological systems sounding death and body disposal.