



Reimagining Cemeteries: Climate Risk, Vulnerability, and Sustainable Urban Development

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- Legislative Framework
- Contextualising the Challenge
- Cemeteries as Green Infrastructure
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Legislative Framework



Kunming-Montreal Global Biodiversity Framework

- **Global Biodiversity Framework (GBF) Overview**

The GBF, adopted under the Convention on Biological Diversity (CBD), sets out targets to halt biodiversity loss and restore ecosystems by 2030. Key goals include:

- **Protecting and restoring ecosystems**
- **Integrating biodiversity into urban planning**
- **Promoting nature-based solutions**
- **Ensuring equitable access to green spaces**

Climate Change Act 22 of 2024

- South Africa's **Climate Change Act** (effective March 2025) establishes a legal framework for:
 - A **just transition** to a low-carbon, climate-resilient society.
 - Integration of climate risk into **spatial planning and land use**.
 - Obligations for municipalities to develop **Climate Response Implementation Plans**, which could include cemetery land use
- While the Act does not explicitly mention cemeteries, its provisions on **land use, environmental protection, and adaptation planning** are relevant for cemetery development and transformation.

Kunming-Montreal Global Biodiversity Framework – Local Government related Targets

- **TARGET 12:**

Significantly increase the area and quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by **mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature** and contributing to inclusive and sustainable urbanization and the provision of ecosystem functions and services.

Kunming-Montreal Global Biodiversity Framework – Local Government related Targets

- **TARGET 14:**

Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.

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 - Integration of climate risk into **spatial planning and land use**.
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Climate Change Act

- To provide for a coordinated and integrated response by the economy and society to climate change and its impacts in accordance with the **principles of co-operative governance**.
- To provide for the effective management of inevitable climate change impacts by **enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change**, with a view to **building social, economic, and environmental resilience** and an adequate national adaptation response in the context of the global climate change response;
- To make a **fair contribution to the global effort to stabilize greenhouse gas (GHG)** concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system;
- To **ensure a just transition** towards a low carbon economy and society considering national circumstances.
- To give effect to the Republic's international commitments and obligations in relation to climate change.
- To protect and preserve the planet for the benefit of the present and future generations of humankind.

Cemeteries and Crematoria By-law

- By-law provides detailed regulations on:
 - **Land allocation** for cemeteries and crematoria.
 - **Environmental considerations:** municipalities may request alternative disposal methods (e.g., cremation) if burial poses environmental risks or land scarcity issues.
 - **Public participation** in cemetery establishment.

Spatial Planning and Land Use Approach

- ✓ While it is important to integrate climate change into municipal IDPs, it is even more **important to ensure that spatial planning, land use management and land development** takes into consideration climate change and the causal factors thereof.
- ✓ The following preventative measures should be implemented at local government level:
 - i. **Prevention of heat islands** through environmental design
 - ii. **Stricter regulation of noxious industries** to reduce air, water and noise pollution.
 - iii. **Introduce development incentives for green technology use**
 - iv. **Stricter enforcement of bylaws, as well as spatial planning and environmental legislation.**
 - v. **support the establishment of stormwater attenuation points**
 - vi. ensure that **developments have proper (and functioning) stormwater drainage systems.**
 - vii. All **developments should have proper access routes (i.e. roads) and access points** that will ensure easy access by emergency services in the event of a disaster or emergency.
 - viii. All **developments should have adequate allocation of community facilities and, adequate allocation of land for the erection of temporary emergency accommodation (TEA).**

Cemeteries in spatial planning

- Spatial planning policy typically tends to focus on the recognition of existing cemeteries & crematoriums, not the development of future interment & memorialize space, irrespective of the capacity status of the community's existing cemeteries & crematoriums. (Rotrigues, 2018)
- **Few municipal planning documents provide policies intended to guide the consideration of the development of new cemeteries & crematoriums.**
- Typically, spatial policy documents provide guidelines governing the location, development and/or expansion of residential, industrial, commercial, institutional and recreational land uses, **cemeteries & crematoriums as a land use, however, are largely overlooked.**
- It is important in determining the layout of the burial precincts, buildings and infrastructure, that a longer term view is taken.

Cemeteries in spatial planning

- The longer planning horizon is required in order to accommodate multi-generational burial needs as well as for site maturation. The planning horizon accommodates community development by contributing to the social and cultural history of the area once they are established, providing an intergenerational link to the personal histories of the families that have interred their loved ones in the cemetery. (Rotrigues,2018)
- **Cemeteries represent an important cultural and social component of the structure of our municipalities.**
- Growth requirements are typically determined through demographic projections, and influence spatial plans with respect to the provision of adequate land and resources for residential, commercial, industrial (employment), social, institutional, transportation, parks and open spaces land uses. Along with these uses, **the provision of adequate land to accommodate a community's needs for the burial of the dead is required.** (Rotrigues,2018)

Contextualising the Challenge

- Cemeteries are often overlooked in urban planning, yet they:
 - Occupy significant land in cities.
 - Are vulnerable to climate impacts (e.g., flooding, heatwaves, erosion).
 - Hold cultural, spiritual, and historical significance.
 - Can either contribute to or mitigate urban environmental challenges.

Cemeteries as Green Infrastructure

**INCREASED
PROPERTY
VALUES**

RAIN GARDENS
catch water
from roofs

**BETTER
AIR QUALITY**

SWALES catch
water and filter
it slowly back
into the ground

**COMMUNITY
AESTHETICS**

RECREATION

**URBAN
TREE COVER**
Intercepts and
evaporates
rainfall

**COOLER AIR/
ENERGY
SAVINGS**

POROUS PAVEMENT
allows water to pass
through into the
native soils

**ECOLOGICAL
SERVICES**

**WATER
QUALITY**

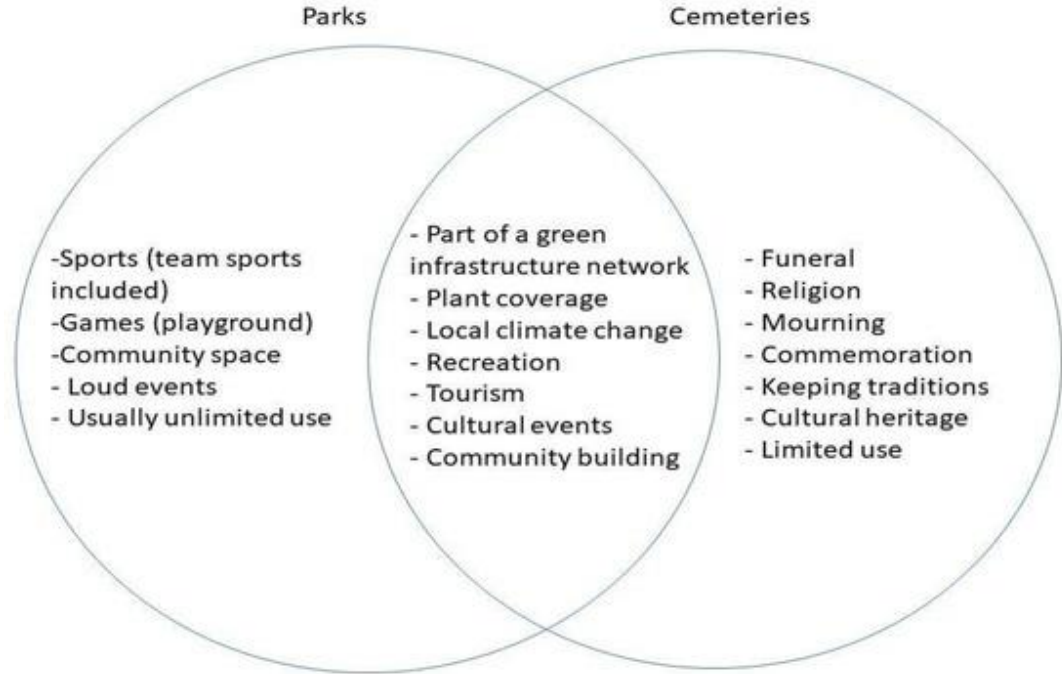
SOIL BUILDING with
mulch and compost
holds moisture

Green Infrastructure Network

Cemeteries, similar to urban parks, represent an important part of the urban ecosystem

Cemeteries perform an ecological function and are a permanent element of the landscape

Cemeteries offer a chance for survival to many species of plants and birds, especially in cities, and natural “monuments” are often found among the many trees



- Cemeteries are increasingly recognized as part of urban green infrastructure, offering ecosystem services such as:
 - **Flood risk mitigation**
 - **Air and soil quality improvement**
 - **Urban cooling and biodiversity support**
 - **Mental health and restorative benefits**

Climate Risks to Cemeteries

Home > News > Local news > Torrential rain results in flooding of graves and collapsed headstones in Johannesburg cemeteries

Local news Municipal News

Torrential rain results in flooding of graves and collapsed headstones in Johannesburg cemeteries

Torrential rain results in flooding of graves and collapsed headstones in cemeteries including Waterval Cemetery.

January 22, 2025

Content provided 1 minute read

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Flooding Hits Johannesburg Cemeteries: Families Urged to Inspect Loved Ones' Graves

Published 7 months ago on January 14, 2025

By zaghran

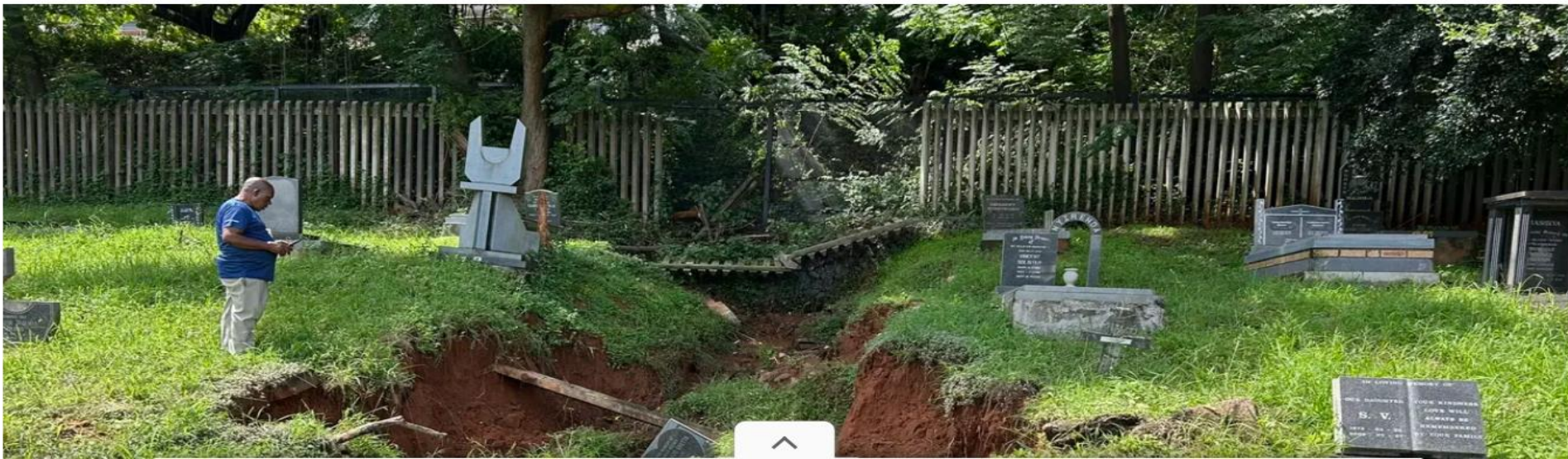


Durban officials plan to improve drainage systems at cemeteries to prevent graves being washed away

This comes after a number of graves at the Wentworth Cemetery south of Durban were washed away by the recent floods.

KZN flooding

KwaZulu-Natal (KZN)



- Urbanisation has become an irreversible global phenomenon, with a **majority of the world's population residing in cities.**
- Incorporating green spaces into these landscapes is important for environmental health.
- Urban green spaces play a crucial role in biodiversity preservation, acting as vital habitats for diverse plant and animal species. These spaces **contribute to the maintenance of urban ecosystems, fostering ecological balance in densely populated areas.**
- The presence of varied flora and fauna supports environmental health by enhancing biodiversity and promoting a more sustainable urban environment.

Sustainable Cemeteries and Open Space Management can help us **shape a greener future** together:

- **Biodiversity**

- By implementing sustainable practices, we **create habitats that support diverse flora and fauna**. From colourful butterflies to birds, these open spaces become sanctuaries for countless species.

- **Improved Air Quality**

- Open spaces act as the lungs of our cities, purifying the air we breathe. With sustainable management, we can **maximise the planting of trees and vegetation, reducing pollution and providing cleaner, fresher air for everyone**. Plants absorb pollutants and release oxygen, serving as an effective filtration system. Trees, in particular, act as natural air purifiers, reducing the concentration of airborne particles and pollutants. This contributes to enhanced air quality, mitigating the adverse effects of urban pollution on environmental health

Climate Resilience

- Sustainable open space management helps combat climate change. **Trees and plants absorb carbon dioxide, mitigating the greenhouse effect. They also reduce the urban heat island effect, keeping our cities cooler and more livable.**

Water Conservation

- Cemeteries and open spaces play a vital role in water conservation, allowing rainwater to infiltrate the ground, replenishing aquifers, and reducing runoff that can lead to erosion or flooding.
- Through sustainable practices, we can manage water resources more efficiently. Rainwater harvesting, smart irrigation systems, and natural water filtration methods preserve this precious resource.

Community Connection

- Cemeteries and open spaces provide gathering places for communities to come together, fostering social interaction, recreation, and relaxation. Sustainable management **ensures these spaces remain vibrant and accessible for all, nurturing a sense of belonging** and wellbeing.

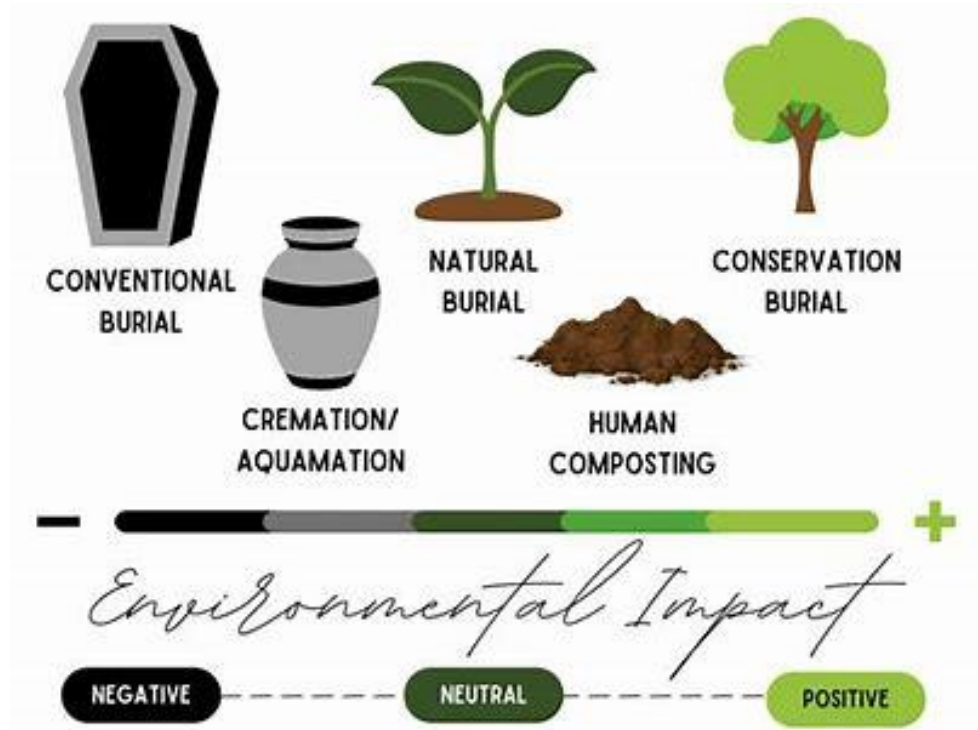
- **Flooding and Sea-Level Rise:** Especially in coastal or low-lying areas, gravesites and infrastructure are at risk.
- **Heat and Drought:** Affect vegetation, increase maintenance costs, and reduce biodiversity.
- **Soil Erosion and Contamination:** Can expose remains or leach embalming chemicals into groundwater.
- **Urban Heat Islands:** Traditional cemeteries with limited tree cover can exacerbate local warming.

- **Social Vulnerability:** Marginalized communities may have less access to well-maintained or climate-resilient burial spaces.
- **Infrastructure Vulnerability:** Older cemeteries may lack drainage, shade, or climate-adaptive landscaping.
- **Cultural Vulnerability:** Climate change may threaten heritage gravesites and traditional burial practices.

Reimagining Cemeteries for Sustainability

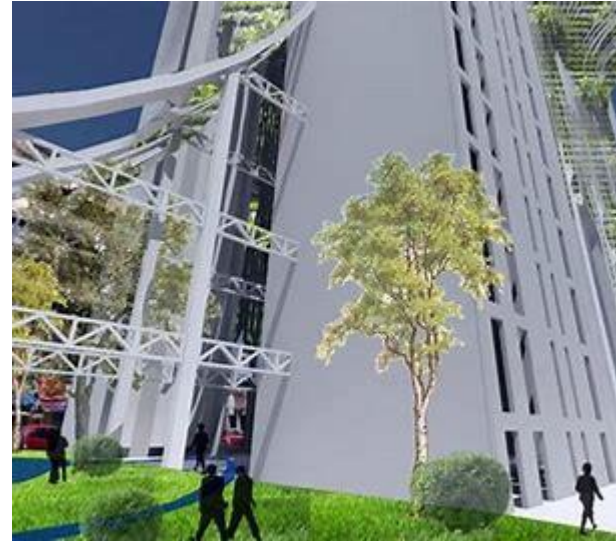
Green Burial Grounds

- Biodegradable caskets and natural landscaping
- Promote biodiversity and carbon sequestration
- Multi-use spaces that serve as public parks, biodiversity corridors, and places of remembrance
- Encourage community engagement and urban greening



Vertical or Urban Cemeteries

- Space-efficient designs integrated into urban architecture
- Rooftop memorial gardens or columbaria in high-density areas





Thank You



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