

GAUTENG PROVINCE ENVIRONMENT REPUBLIC OF SOUTH AFRICA

2024/25 ANNUAL REPORT

The 6th Annual Gauteng Environmental Research Symposium





REPUBLIC OF SOUTH AFRICA





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2024/25 ANNUAL REPORT

The 6th Annual Gauteng Environmental Research Symposium

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1. Purpose of this Report

This report aims to provide a comprehensive overview of the 6th Annual Gauteng Environmental Research Symposium, focusing on its objectives, key discussions, outcomes, and the strategic direction for future environmental initiatives in the province. The purpose of this report is to document the proceedings and reflect on the contributions made towards advancing sustainability and environmental research in Gauteng. It outlines the key themes, collaborative efforts, and research-driven solutions that emerged from the symposium. This report also serves as a resource to guide future environmental policy development, research priorities, and practical actions needed to address the pressing environmental challenges facing the region. By highlighting the critical insights from keynote addresses, panel discussions, and parallel sessions, this report aims to inspire continued engagement and innovation in environmental sustainability within the Gauteng City Region.

2. Background

The 6th Annual Gauteng Environmental Research Symposium, held on 22 October 2024, marked a pivotal moment in the province's ongoing commitment to advancing environmental sustainability. The symposium being elevated to the level of a Member of the Executive Council (MEC) event underscores the growing importance of environmental issues within the Gauteng Provincial Government's broader policy framework. Co-organized by the Gauteng Department of Environment (GDEnv) in partnership with the University of Johannesburg's Process Energy and Environmental Technology Station (UJ PEETS), the symposium served as a dynamic platform for addressing Gauteng's unique environmental challenges and fostering sustainable solutions across sectors.

The theme of this year's symposium, "Sustainability: From Policy to Practice" underscored the pressing need for transforming environmental research and theoretical policies into practical, actionable strategies. This theme resonated with the United Nations Environment Programme's (UNEP) 2024 World Environment Day theme, "Restore Our Earth: From Policy to Practice," which emphasizes the urgent need for ecosystem restoration and sustainability on a global scale. Innovative features, such as live interviews conducted by UJ TV before and during the event, provided real-time coverage and deepened engagement by offering insights into the key discussions. Additionally, the symposium featured exhibitors who showcased cuttingedge environmental technologies and solutions, further enriching the experience for participants and providing a tangible demonstration of practical innovations in the field.



3. Aim of the Symposium

The symposium was designed to address pressing environmental challenges and advance sustainability in Gauteng through the following key objectives:

- Foster Interdisciplinary Collaboration: Bringing together a diverse group of stakeholders including government officials, researchers, industry leaders, and academics — the event promoted collaborative approaches to environmental issues, building on the successes of international agreements like the Paris Climate Agreement.
- Bridge the Gap Between Policy and Practice: A core focus was on translating environmental policies into actionable, on-the-ground strategies to address Gauteng's challenges, echoing the outcomes of the African Climate Resilience Summit (Rockström et al., 2009) and the 2030 Agenda for Sustainable Development (United Nations, 2015).
- Promote Sustainable Innovations: The symposium served as a platform to showcase cutting-edge technologies and models for sustainability, such as renewable energy systems and circular economy approaches, inspired by global events like UNEP's Climate Action Symposium (Swilling & Annecke, 2012) and the World Economic Forum's Sustainability Summit.
- **Spotlight Research and Identify Gaps**: By discussing the latest trends and challenges in environmental research, the event highlighted gaps in existing knowledge and showcased groundbreaking research and technological innovations as practical solutions for environmental challenges.
- **Strengthen Stakeholder Networks**: The symposium aimed to enhance partnerships within the Gauteng City Region, fostering synergy and collective action to drive impactful sustainability initiatives, in alignment with the Gauteng Provincial Government's strategic priorities.
- **Encourage Dynamic Engagement**: Interactive sessions, including live polling and discussion forums, encouraged active participation and generated actionable recommendations for attendees to implement within their organizations.

These objectives collectively underscore the importance of integrating research into policy and practice while advancing innovative solutions to drive Gauteng's sustainability agenda. The discussions and outcomes from the symposium will guide future initiatives and ensure alignment with the province's long-term environmental goals.



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4. Attendance and Engagement

The symposium adopted a hybrid format, facilitating robust participation with over 180 in-person attendees and more than 300 virtual participants, thus broadening its impact and reach. Complemented by features such as UJ TV interviews and interactive exhibitions, this resulted in a high level of engagement, fostering a collaborative atmosphere among all attendees and ensuring widespread participation.

5. Proceedings

OPENING SESSIONS

Following a welcome by the Programme Director, UJ PEETS Technology Station Manager, Ms. Nickey Janse van Rensburg, the opening plenary session featured a series of keynotes that set the tone for the discussions, offering critical insights into Gauteng's landscape and the broader challenges facing South Africa. The speakers also emphasized the importance of policy frameworks, strategic collaborations between the public and private sectors, and the need for innovative solutions to address energy security, sustainability, and access. These speeches set the foundation for a dynamic and forward-thinking dialogue aimed at fostering a resilient and sustainable future.







OVERVIEW OF THE SYMPOSIUM

The 6th Annual Gauteng Environmental Research Symposium commenced with opening remarks by Mr. Blake Mosley Lefatola, the Head of Department (HoD) for the Gauteng Department of Environment (GDEnv), who gave an overview of the Symposium. In his speech, Mr. Lefatola extended a warm welcome to all attendees, underscoring the importance of this year's theme, "Sustainability: From Policy to Practice." This theme encapsulates a critical challenge facing environmental governance: ensuring that the policies we craft and adopt are translated into tangible, real-world actions that can produce measurable environmental benefits.

Mr. Lefatola highlighted the foundational role of this symposium in advancing environmental research and practice in Gauteng, drawing attention to the event's growing significance over the years. He reflected on the Research Competition held earlier in October, where emerging scholars presented their innovative research, providing a platform for the next generation of environmental leaders. This event, he emphasized, was an essential part of the symposium's commitment to fostering young talent and encouraging a future-driven approach to environmental sustainability.

The HoD's remarks also highlighted the symbiotic relationship between policy, research,

and practice, emphasizing that effective environmental governance hinges not only on crafting well-intentioned policies but on their rigorous implementation. Drawing from the United Nations Environment Programme's (UNEP) guidance, Mr. Lefatola emphasized that successful environmental outcomes rely on bridging the gap between policy and practice, an imperative for the realization of Gauteng's sustainability goals.

Mr. Lefatola noted the increasing engagement and participation in the symposium over the years. With over 300 participants attending last year's event and projections for even greater attendance this year, the growing recognition of the symposium's impact underscores the region's commitment to addressing environmental challenges through innovative, research-driven solutions.

Reflecting on the progress made since the first symposium in 2019, Mr. Lefatola underscored the invaluable partnerships that have been formed, particularly with the University of Johannesburg's Process Energy and Environment Technology Station (UJ PEETS). These collaborations, he emphasized, have facilitated vital research studies such as the Water-Energy-Food (WEF) biodiversity nexus and sustainable waste management strategies for townships and informal settlements. Such initiatives underscore the power of cross-



sectoral partnerships in generating solutions that are not only informed by research but are also grounded in practical application.

Mr. Lefatola also provided context to the urgency of translating policy into action by referencing recent environmental challenges. He pointed to the 2023 drought, which highlighted significant gaps between water conservation policies and the ability to effectively manage water resources. Similarly, he discussed the ongoing plastic waste crisis, noting that despite policies aimed at reducing plastic pollution, more effective waste management infrastructure and public awareness are essential to tackle the problem. These examples, he stressed, provide a clear call to action for everyone in the room to contribute toward bridging the divide between policy and practice.

In conclusion, the HoD reiterated the importance of the symposium in advancing Gauteng's environmental agenda and reaffirmed the commitment to collaboration, research, and practical action. Mr. Lefatola's closing remarks reinforced the need for sustained collaboration among government, academia, industry, and civil society to transform Gauteng into a model of sustainable urban living, emphasizing that together, we can build a more resilient future for the province and beyond.

MEC'S KEYNOTE ADDRESS

Recently elected to the Gauteng Provincial Government as Member of the Executive Council (MEC) for Environment, Ms. Shyla Mary Peters' keynote address at the 6th Annual Gauteng Environmental Research Symposium underscored the critical importance of translating environmental policy into actionable outcomes. The theme of the symposium, "Sustainability: From Policy to Practice," provided the backdrop for a comprehensive discussion on the challenges and opportunities inherent in bridging the gap between policy formulation and real-world application.

The MEC highlighted the pivotal role of effective policy implementation, stressing that well-crafted policies must be supported by practical, contextspecific strategies. While acknowledging the efforts of the Gauteng Provincial Government in setting ambitious environmental goals, the MEC pointed out that barriers such as resource constraints, inadequate infrastructure, and limited public engagement often hinder the effective execution of these policies. The address emphasized the need for local solutions that align with stakeholder needs and the importance of addressing logistical challenges in order to realize the province's environmental targets.

In addressing the historical context of environmental policy in South Africa, the



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MEC traced the evolution of key legislative frameworks, such as the National Environmental Management Act (NEMA) of 1998, and the influence of international agreements like the Paris Agreement and the United Nations Sustainable Development Goals (SDGs). These frameworks, the MEC noted, have shaped the province's policy landscape and set the stage for more localized actions aimed at environmental sustainability. By aligning local policies with global commitments, the MEC pointed out that Gauteng could make significant strides toward reducing carbon emissions, improving resource efficiency, and enhancing climate resilience.

Furthermore, the MEC focused on the Growing Gauteng Together (GGT 2030) Plan as a strategic guide for the province's environmental agenda. The GGT 2030 Plan, launched in 2019, was presented as a comprehensive approach to sustainable development that integrates environmental goals with broader economic and social objectives. The MEC acknowledged the plan's ambitious targets in waste reduction, water conservation, and air quality improvement, while also addressing the need for practical solutions to overcome implementation challenges.

The address also explored the importance of collaboration among key stakeholders— ranging from government entities to businesses and

community organizations—in achieving the GGT 2030's objectives. The MEC called for a coordinated effort that would involve robust funding, public awareness campaigns, and capacity building. Public-private partnerships, the MEC suggested, could play a crucial role in overcoming resource constraints and ensuring the success of environmental initiatives.

As the keynote address drew to a close, the MEC reinforced the vision for a sustainable and resilient Gauteng. The speech emphasized the importance of aligning policies with the global environmental agenda and the need for continued innovation and collaboration in the face of emerging environmental challenges. The MEC's words set a clear call to action for all stakeholders present at the symposium to contribute actively to the successful translation of policy into practice, ensuring that environmental goals were not merely aspirational but achievable.

KEYNOTE ADDRESS by Trilateral Research Chair in Transformative Innovation, the Fourth Industrial Revolution (4IR) and Sustainable Development

The presentation by Professor Erika Kraemer-Mbula, a representative of the Trilateral Research Chair in Transformative Innovation,





the Fourth Industrial Revolution (4IR) and Sustainable Development, focused on bridging the gap between policy formulation and practical implementation in achieving sustainable development¹. By emphasizing transformative innovation, place-based transformation, socio-technical systems, and co-created shared agendas, the presentation highlighted actionable strategies for fostering sustainable development. A case study from Catalonia, Spain, was used to illustrate how these concepts can be effectively applied in real-world scenarios. In the context of rapid technological advancements and urgent climate challenges, there is a pressing need for innovative approaches that can translate policy intentions into tangible outcomes. The interplay between academia, government, and various stakeholders is crucial for achieving sustainable development goals (SDGs). This address outlined key concepts and strategies that can facilitate this transition.

¹ This revision incorporates relevant literature with Harvard-style in-text citations to support the key points made throughout the address, without using Erika Kraemer-Mbula's own words directly.



KEY CONCEPTS

Place-based transformation refers to initiatives that harness the unique characteristics and resources of specific geographic locations to drive sustainable development. This approach recognizes that solutions must be tailored to local contexts, leveraging local knowledge and resources while addressing specific challenges faced by communities (Baxter & Sommerville, 2011). Related with this concept is the idea of socio-technical systems, which encompass the complex interactions between technology and social structures within a given context. These systems deliver essential services—such as energy, food, mobility, and waste management—and are influenced by various factors including regulations, policies, cultural norms, and stakeholder relationships (Ropohl, 1999; Davis et al., 2014). Understanding these dynamics is critical for identifying what is not functioning effectively



within a system and determining pathways for improvement.

Co-created shared agendas involve collaborative processes where diverse stakeholders come together to develop common visions and priorities. This participatory approach fosters engagement among government entities, academia, civil society, and industry, ensuring that multiple perspectives are considered in decision-making processes (Waterson et al., 2002). The socio-technical systems perspective emphasizes that both social and technical elements must be integrated to achieve effective outcomes; neglecting one aspect can lead to failures in initiatives to bring about change (Norman, 1993).

APPROACHES FOR TRANSFORMATIVE CHANGE

To achieve transformative change, a systemic approach is essential. This involves analyzing complex sustainability challenges holistically rather than in isolation. A systemic perspective encourages stakeholders to consider interconnections across various sectors and systems when designing solutions (Clegg, 2000). Engaging multiple stakeholders through participatory governance is also crucial for fostering inclusive decision-making. This engagement allows for diverse voices to be heard, particularly those of marginalized communities that may otherwise be excluded from policy discussions (Cherns, 1976).

Creating shared agendas requires identifying a "coalition of the willing", stakeholders who are committed to collaborative action towards common goals. This coalition can drive systemic change by aligning efforts across different sectors (Palmer et al., 2019). Analytical tools such as system mapping and transformative theories of change are vital for understanding existing systems and planning interventions. These tools help stakeholders visualize relationships among actors within a system and assess the potential impacts of proposed changes (Heydari & Pennock, 2018).

Taking an experimental approach allows stakeholders to test new ideas in real-world contexts while remaining flexible to adapt based on feedback and outcomes. Iterative processes encourage continuous learning and refinement of strategies over time (Wang et al., 2018). Additionally, building long-term trust among stakeholders—especially between academia and decision-makers—is crucial for sustaining collaborative efforts. Trust facilitates open communication and encourages stakeholders to invest in shared goals over time (Münch et al., 2022).

CASE STUDY: Catalonia, Spain

The provincial government of Catalonia serves as a compelling example of how place-based strategies and co-created shared agendas can lead to successful transformative change. Catalonia faced significant developmental challenges in rural areas characterized by high unemployment rates, low-income levels, and an exodus of young talent seeking opportunities elsewhere. In response to these challenges, local governments initiated pilot projects aimed at utilizing agricultural waste effectively.

The process began with small-scale pilot projects focusing on agricultural waste management. These initiatives aimed to explore how waste could be transformed into valuable resources rather than viewed solely as a problem (Carayon, 2006). To foster collaboration among stakeholders—including farmers, researchers, municipal leaders, and industry representatives—innovation camps were organized. These camps provided platforms for participants to share ideas, identify challenges, and co-create solutions.

Through these collaborative efforts, stakeholders developed a shared vision centered around establishing a bioeconomy in the region. This vision was rooted in leveraging local agricultural resources while addressing

environmental concerns. As the shared agenda gained traction, it was gradually institutionalized within regional governance structures. This included establishing observatories to monitor progress and maintain updated databases on bio-resources available in the region (Baxter & Sommerville, 2011).

The success of initial projects led to the expansion of shared agendas beyond pilot initiatives into broader regional strategies that encompassed new value chains related to bio-manufacturing and sustainable energy production. The institutionalized shared agenda facilitated the attraction of funding from various sources—local governments, European Union programs, and private investors—enabling further development of transformative projects (Davis et al., 2014).

RECOMMENDATIONS FOR FUTURE ACTION

To build upon these insights, several recommendations emerge for future action. First, stakeholders should prioritize transforming specific socio-technical systems (e.g., energy or food) while remaining open to broader systemic changes that may emerge through this focus (Clegg et al., 2000). Second, employing rigorous academic methodologies can guide co-creation processes effectively while ensuring credibility among diverse stakeholders involved in transformation efforts (Waterson et al., 2002).

Additionally, it is important to actively seek out previously marginalized groups during cocreation processes to ensure their perspectives are integrated into decision-making frameworks (Cherns et al., 1976). Encouraging sustained experimentation over extended periods allows for iterative learning processes that can adapt strategies based on emerging insights (Wang et al., 2018). Investing in capacity-building initiatives enhances skills across all stakeholder groups involved in transformative innovation efforts.

Finally, developing a shared language around transformative change facilitates understanding among diverse actors engaged in collaborative processes. This common language helps bridge gaps between different sectors and fosters effective communication throughout the transformation journey (Münch et al., 2022).

The insights presented underline the importance of adopting transformative innovation approaches that emphasize place-based strategies, socio-technical systems thinking, and co-created shared agendas as pathways from policy formulation to practical implementation in sustainable development efforts. Continued experimentation with these approaches will be essential for addressing complex sustainability challenges effectively while fostering inclusive growth across communities globally. Further contextual adaptation of these strategies will enhance their relevance in diverse settings while promoting systemic change aligned with sustainable development goals (SDGs).

Parallel Group Discussions

The parallel sessions provided a platform for deeper exploration of specialized topics, allowing participants to engage with diverse perspectives on critical issues such as environmental stewardship, climate adaptation, and the integration of technology in environmental conservation. Each session featured expert presentations and discussions that delved into practical solutions, case studies, and innovative approaches to addressing climate change and sustainability challenges. By focusing on specific themes, the parallel sessions facilitated targeted dialogue, fostering collaboration and knowledge sharing among stakeholders committed to driving positive change in environmental and energy management.

Waste Audit: Alexandra Litter Trap



Nature-Based Solutions for Climate Resilience: "Resilient Communities, Thriving Future"

The session on Nature-Based Solutions for Climate Change highlighted innovative approaches to tackling environmental challenges through sustainable practices. Experts shared their research on water and air quality, the revitalization of natural spaces, and climate adaptation strategies, demonstrating the potential of nature-based solutions in enhancing urban resilience and addressing climate change impacts in South Africa.



1. Ms. Mbali Zwane & Ms. Boitemogelo Kwakwa Environmental Stewardship Water and Air Quality

The presentation focused on the Jukskei River and the Alex Pilot project, aimed at addressing waste management and water quality. A key initiative involved testing a litter waste trap prototype and

performing a waste audit on materials found in the river. The findings revealed that plastic waste accounted for 64.1% of the river's waste. The team proposed involving a student from the Environmental Health department to test for bacterial contamination in the water. Additionally, there was engagement with industries whose waste products were found in the river to explore better waste management practices.

The air quality component involved passive sampling of hazardous substances such as HF, NO₂, SO₂, O₂, and dustfall. While some pollutants, like SO2, fell within the acceptable limits, others, such as NO₂ and O₂, exceeded safe thresholds. Outcomes of the project included: Raised awareness around waste management and pollution, capacity development for students and local stakeholders and the potential for replicating the model in other areas. Considerations for future efforts included understanding the role of human behaviour in waste management and exploring alternatives to Spekboom, which was planted to improve air quality. The team also discussed ongoing research on the effectiveness of Spekboom as a mitigation tool for climate change.

2. Ms. Ndivile Mokoena Scaling Urban Nature-Based Solutions for Climate Adaptation in Sub-Saharan Africa

This presentation focused on scaling urban nature-based solutions for climate adaptation in Sub-Saharan Africa, with a specific emphasis on the Jukskei River revitalization project. The work aimed to enhance climate adaptation, promote gender equality, and protect biodiversity within the City of Johannesburg (CoJ). Although the presentation was cut off, it underscored the importance of integrating nature-based solutions into urban planning to foster more resilient cities. Outcomes from this initiative included: Improved climate adaptation strategies for urban areas, support for gender equality through community engagement, and biodiversity protection efforts in CoJ.

Gender Equality and Social Inclusion (GESI) Strategy:

Key Constraints:

- Prevalence of social and gender norms that restrict women's access to resources and participation in NbS activities.
- Exclusion of women and other underrepresented groups from NbS decision making and implementation.
- Gaps in policies and underrepresentation of women and other underrepresented groups in local governance mechanisms.

3. Mr. Kopano Ntsoane Guidelines for Incorporating Nature-Based Solutions in City Planning and

Implementation Practices

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The presentation focused on integrating naturebased solutions into urban planning and city implementation practices. The presentation highlighted the importance of promoting green building initiatives, such as the Jozi Food Farmer project, and suggested priority research areas that could contribute to the growth of naturebased solutions in South African cities.





Typologies of Nature-based Solutions

Typology of NBS	Examples	
Restoration	Ecological Restoration	
	Ecological Engineering	
Issue Specific	Ecosystem-based adaptation Ecosystem-based Disaster Risk Reduction Climate Adaptation Services	
Infrastructure	Natural Infrastructure Green Infrastructure	
Management	Coastal Zone Management	
Protection	Area-based conservation approaches – protected area management	
	CitiesNetwork	

4. Dr. Masubelele & Dr. Samuels

Climate Resilience in the Indigenous Community of the Arid Zone of South Africa: Adaptation Journey of Nama

The final presentation explored the adaptation journey of the Nama people in the arid zones of South Africa. Although the initial study did not focus on nature-based climate change solutions, the research shifted towards this area during the course of the study. The presentation was cut off at the beginning, but it highlighted the importance of indigenous knowledge in developing climate resilience strategies in vulnerable communities.

Contribution to international, national to local level planning and strategie

Climate Change Adaptation Planningand Creationofa Local Early Action Plan





The discussions on nature-based solutions emphasized the value of integrating environmental stewardship into urban development, with specific attention to waste management, air quality, and water conservation. By leveraging green infrastructure and community engagement, South African cities are making strides in promoting climate adaptation and resilience. These presentations reaffirmed the need for continued research and collaboration across sectors to scale naturebased solutions and build more sustainable urban environments.

Artificial Intelligence for Predictive Analytics in Environmental Conservation: "Innovating with AI for a Greener Earth"

The session highlighted various projects that leverage AI, machine learning, and sensor technologies to enhance sustainability, optimize resource management, and foster proactive environmental solutions.

1. Mr. Marc Leroy

Environmental Impacts: Actual and Potential

Marc Leroy's presentation explored the integration of AI in predicting environmental impacts, specifically in Gauteng's natural wetlands. By utilizing predictive modeling, Mr. Leroy discussed how AI can forecast future environmental conditions such as flooding and climate change, offering valuable insights for policy adjustments and environmental management. Through a robust combination of AI, machine learning, and sensor technology, large-scale environmental data can be collected and analyzed to predict future impacts. Mr. Leroy emphasized that domain knowledge is crucial to ensure the reliability of AI-generated insights, and improving predictive accuracy requires increasing model runs. He also highlighted the importance of land cover data as a predictive tool for broader environmental issues like climate change and flood risks, underlining its potential for informing proactive environmental policies.





2. Prof. Tobias Barnard UbuntuBlu Mobile Laboratory: Real-Time Digitalized Water Quality Testing



Prof. Tobias Barnard presented the innovative UbuntuBlu Mobile Laboratory, a project that adapts drone technology for on-site, real-time water quality testing. This AI-driven approach involves deploying drones to collect water samples and deploy probes for data reading, which are then analyzed using machine learning models. Supported by the Water

Transformation – Broad Categories

Gauteng - Landcover change - Broad Categories





DESCRIPTION: Broad landcover transformation: Natural versus transformed.

Projection: Albers Legend 1990_2020 Landcover Category Natural to Natural Natural to Natural Natural to Transformed Transformed to Transformed No change: Natural No change: Transformed

> Produced by: Marc Leroy Directorate: EPPC Sub-directorate: Environmental Information Management DATE: 10 May 2023

DISCLAIMER Due to the fine scale of the data on this map, the map should only be used for display and not for interpretation. A full electronic version where one can zoom to specific arres should be used for interpretation.

Research Commission, the mobile lab operates independently with solar panels, a generator, and water supply, making it adaptable to diverse environments. The system enables realtime remote sensing and data access globally via mobile devices. Barnard emphasized the importance of a strategic, data-driven approach to environmental monitoring, ensuring focused data collection that enhances the effectiveness of AI applications in environmental decision-making.







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3. Prof. Innocent Musonda The Wood to Wood Project: Enhancing the Value of Wood Waste

Prof. Innocent Musonda's presentation focused on sustainable wood management through the Wood to Wood Project, which aims to address wood waste in construction, demolition, and old furniture. The project utilizes advanced separation technology and AI to optimize wood particle sizes for reuse. Musonda's team employs optical and spectroscopic characterization techniques, coupled with adaptive sorting systems, to enhance recycling efficiency. Additionally, the project explores the potential of reclaimed wood for energy and gas generation, supported by computer vision and digital technologies to prevent contamination and ensure selective material handling. This approach promotes resource recovery, minimizes waste, and supports the sustainable use of wood in various applications.



W2W Pillars and Technologies





4. Prof. Mpho Primus The Future of Conservation: Leveraging AI and Data for Sustainable Outcomes

Prof. Mpho Primus discussed the critical role of data in shaping the future of conservation amidst climate change. She emphasized that AI and predictive analytics, when coupled with highquality, standardized data, could help plan for and mitigate the impacts of climate change. Prof. Primus highlighted how AI can optimize water resource management and land use planning, ensuring that future conservation efforts are aligned with legal and regulatory frameworks. Predictive analysis plays a key role in anticipating environmental shifts, safeguarding resources, and creating resilient strategies in response to climate uncertainty. The session on AI for predictive analytics in environmental conservation demonstrated the power of technology in addressing complex environmental challenges. From improving flood and climate change predictions to optimizing water quality monitoring and promoting sustainable resource management, the presentations showcased the potential of AI to drive meaningful, data-driven environmental policies. Through innovative projects and strategic data application, AI is poised to play a pivotal role in advancing environmental sustainability and ensuring proactive responses to future challenges.





Decentralized Renewable Energy Systems and Microgrids: "Powering Sustainability with Renewables"

This session explored the role of decentralized renewable energy systems, particularly microgrids, in addressing energy challenges and ensuring sustainable, equitable access to electricity in Gauteng and beyond. The presentations emphasized the potential for innovation and policy reform to reshape the energy landscape, integrate renewable energy sources, and provide reliable power to underserved regions.

1. Rodgers C. Musiyarira Unlocking Gauteng's Energy Potential: The Role of a Provincial Energy Aggregator

Rodgers Musiyarira highlighted Gauteng's energy challenges, including a growing population, limited electricity supply, and issues with grid stability. He presented the idea of a "provincial energy aggregator," a centralized model to manage decentralized energy systems more effectively. This initiative aims to enhance grid stability and coordinate the integration of various renewable energy

Problem Statement									
Metro/ Municipality	Residential (<30kW)	Commercial and Industrial SSEG (30kW-1MW)	Commercial and Industrial large scale and utility scale (1MW-50MW)	Total (MW)					
City of Johannesburg	84.7	132.9	221.2	438.8					
City of Tshwane	130.6	73.9	131.8	336.3					
City of Cape Town	147.3	73.2	118.9	339.4					
Ekurhuleni	45.8	58.3	95.3	199.4					
eThekwini	17.2	25.3	42.6	85.1					
Nelson Mandela Bay	11.3	3.5	3.9	18.7					
Emfuleni	7	4.5	36	15.1					
Govan Mbeki	9.6	2	10	21.6					
Mogale City	6.6	4.7	9.7	21					
TOTAL	473.5	391.6	675.3	1540.4					

Solar PV MW by Municipal area for select Metros and Municipalities by installed capacity (source: (SALGA 2023))

sources such as rooftop solar, energy storage, and waste-to-energy projects. Mr. Musiyarira discussed existing energy strategies, including the Integrated Energy Strategy (2010) and the Energy Security Strategy (2016), while also addressing challenges posed by unregistered private solar installations that disrupt grid demand and municipal revenue.

Gauteng Energy Security Strategy

What are the levers/technologies to consider for energy mix taking into consideration profitability, energy footprint, time of use and availability? The energy mix available to us is PV, Energy Storage, Waste to Energy and Gas to Power, Green Hydrogen:







2. Prof. Sampson Mamphweli

The Future of the Power System: Distributed Energy and Microgrids

Prof. Sampson Mamphweli provided an in-depth look at South Africa's energy capacity and future plans, through the lens of the Integrated Resource Plans (IRPs). He highlighted the challenges in integrating renewable energy into the grid and the increasing role of microgrids as part of the country's energy transition. Prof. Mamphweli discussed Eskom's dominance in electricity supply and the efforts to reduce coal dependency, which is targeted to be 30% by 2030. He also pointed out the significant disruptors, such as climate change and energy storage advancements, and how microgrids are emerging as a solution for remote and underserved areas. He concluded with an exploration of future technologies like blockchain and AI, which are expected to help manage distributed energy sources more efficiently.



DISRUPTERS OF THE TRADITIONAL POWER SYSTEM







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3. Kate Joseph

Considering the Changing Energy Access Landscape in Joburg: Successes & Challenges Linked to PV

Kate Joseph discussed the role of municipalities in facilitating energy access through renewable energy solutions, particularly photovoltaic (PV) systems. She emphasized that local governments need to evolve their strategies to view renewable energy as a tool for combating energy poverty and fostering economic resilience. Ms. Joseph highlighted the importance of public-private partnerships in increasing renewable energy adoption, reducing reliance on Eskom, and ensuring decentralized

power generation. She also noted that implementing small-scale renewable energy solutions, such as PV systems with battery storage, can provide practical, communitycentered solutions, especially in informal settlements.





PROS ABOUT WHAT THIS LOOKS LIKE

- Only 4% of upper-middle (NLI 7-10) households have PV. Considerable potential for more to opt for PV.
- People want to contribute to a broader solution.
 47% willing to feed in even if they were not financially compensated (Off Grid Cities Survey 2023)
- Private PV on the grid is worth about four load shedding stages
- Tech NewGen: Wheeling, Microgrids = community participation & job creation

Over time, wealthier households have accessed alternative electricity substantially more than poorer households



Household access to alternative electricity in Gauteng. Source (GCRO 2023)







4. Dr. Peter Mukoma Paving the Way for the Implementation of Microgrids

Dr. Peter Mukoma focused on the practical implementation of microgrids in remote communities. He discussed the technical, socioeconomic, and logistical challenges associated with deploying microgrids, emphasizing the importance of community engagement and ownership for the success of such projects. Dr. Mukoma also shared case studies and recommendations to ensure that microgrid projects are economically viable and meet the local community's needs. He stressed that successful microgrid projects must incorporate sustainable financial models, tailored technical solutions, and active community participation.

The session focused on strategies to address energy access, sustainability, and the transition to decentralized renewable energy systems in Gauteng and South Africa. Key initiatives, such as the Integrated Energy Strategy and Energy Security Strategy, aim to enhance energy access, with Gauteng targeting 5000 MW of renewable energy capacity through decentralized systems. Challenges include unreliable grid access, unregistered solar installations, and the need for policy reforms to support renewable energy adoption. Microgrids and technologies like blockchain and AI were highlighted for their potential to improve energy distribution and efficiency, though stability and financial sustainability remain concerns. Successful microgrids require community involvement, clear ownership structures, and tailored solutions, with excess energy used to support local economic development. Publicprivate partnerships (PPPs) were emphasized as essential for funding projects and ensuring

OVERVIEW OF DISTRIBUTED ENERGY RESOURCES IN MICROGRID APPLICATIONS

- Microgrids are defined as small-scale distributed networks comprising autonomous energy systems, which can operate independently (off-grid) or be connected to the main power grid (on-grid). They are suitable for powering small residential or commercial consumers.
- On the other hand, mini-grids are larger configurations capable of supplying power to commercial outlets or hospitals.
- Implementing microgrids in remote communities can substantially create socio-economic and enterprise development as the community members (consumers) can become prosumers.



SOURCE: World Bank Group 2022







affordable access, particularly in underserved communities. Proposals for electricity market liberalization and innovative solutions like decentralized technologies were also discussed. The provincial energy aggregator concept was introduced to centralize energy management. The discussion underscored the importance of bridging policy with practical implementation, ensuring economic viability and affordability, and fostering community engagement to realize the potential of decentralized renewable energy systems in addressing South Africa's energy challenges.

Circular Economy Models in Urban Environments: "Building Green Cities for Tomorrow"

This session explored circular economy models as solutions for sustainable urban living, featuring a series of insightful discussions centered around advancing circular economy models in urban environments. These discussions, led by experts in green building, sustainable transport, timber construction, and waste management, illustrated how different sectors can contribute to building green cities for the future.



1. Ms. Bakang Moeng Circularity in the Built Environment

Ms. Bakang Moeng from the Green Building Council of South Africa, a non-profit organization formed in 2007 and part of the World Green Building Council, shared key insights into the circular economy and its role in sustainable urban development. The Council advocates for a green recovery and a sustainable future, with a strong focus on Sustainable Development Goal (SDG) 11. Ms. Moeng highlighted the importance of green infrastructure, waste management, and renewable energy in shaping urban environments. The Council provides various rating tools, including the Green Star rating and Net Zero certifications, to assess sustainability in buildings. The principles of the circular economy were discussed, such as reducing material consumption, sourcing materials locally, and using carbon-storing and responsibly sourced materials. Ms. Moeng also expressed the need for centralized policies and guidelines to further enhance the adoption of circular economy practices in the built environment.











2. Dr. Gordon Laing

Sustainable Transport: Affordable Access to Opportunity

Dr. Gordon Laing, from SEE Sustainability, focused on the critical role of sustainable transport in achieving the SDGs, particularly SDG 11. Laing pointed out that while sustainable transport is not explicitly prioritized in the SDGs, it is essential to their realization, especially in reducing carbon emissions. Sustainable transport, as Laing explained, is broader than just "green" transport and includes addressing the needs of people for mobility while minimizing environmental impact. He introduced the three key principles of sustainable transport: Avoid, Shift, and Improve. Avoiding involves reducing the need to travel, shifting encourages using low-carbon transportation modes, and improving focuses on enhancing vehicle efficiency and transitioning to renewable energy sources. Laing emphasized that less car-dependent infrastructure is crucial for long-term sustainability.

Existential Crisis: Planetary Boundaries



Sustainable / Resilient Cities



SUSTAINABLE CITIES AND COMMUNITIES



Real Costs of Current Approach









3. Dr. Schalk Grobbelaar

What would happen if we didn't increase the use of timber in construction

Dr. Schalk Grobbelaar, UP Graduate School of Technology Management, discussed the benefits of timber construction as a sustainable alternative to traditional materials like bricks, steel, and cement. Timber is a renewable resource, making it a viable long-term solution for addressing climate change and urbanization challenges. The speaker elaborated on various types of timber used in construction, including pine, eucalyptus, and wattle, noting that 60-70% of residential buildings are made with timber trusses. Grobbelaar also referenced key policies and guidelines related to timber construction, such as SANS 10082, SANS 10243, and SANS 10163. Timber construction projects in South Africa, such as the Green Block Group and XLAM South Africa, were highlighted as examples of successful initiatives promoting sustainability in the built environment. Dr. Grobbelaar called for continued research into South Africa's unique timber resources, which hold significant potential for environmental, social, and economic benefits.

SA Timber Industry





4. Prof. Isaac Rampedi

Understanding the characteristics and recycling knowledge amongst selected small businesses in the townships of the Gauteng Province, South Africa

Prof. Isaac Rampedi from UJ Geography, Environmental Management, and Energy Studies, presented on waste management, emphasizing the scale of waste generation in South Africa, which reached 542 million tonnes in 2017. He outlined several challenges, including uncollected waste, poor municipal services, and financial constraints. Prof. Rampedi introduced strategies to address these challenges, such as waste separation at source, diversion of waste from landfills, and waste minimization. The discussion also focused on the Township Informal Settlement & Hostel (TISH) Project, which aims to understand and improve waste management practices in townships, informal settlements, and hostels. Prof. Rampedi underscored the importance of creating systems for effective waste reduction, recycling, and disposal to contribute to a circular economy.



The session highlighted key areas essential to fostering a circular economy in urban environments. The Green Building Council of South Africa's focus on sustainable infrastructure, Gordon Laing's advocacy for sustainable transport, Dr. Schalk Grobbelaar's promotion of timber construction, and Prof. Isaac Rampedi's insights into waste management all contributed to a comprehensive understanding of how various sectors can work together to create greener, more sustainable cities. By integrating circular economy principles across these sectors, Gauteng can move closer to building resilient and environmentally responsible urban spaces.



6. Key Outcomes and Recommendations

The highlights from each parallel session were presented to the Symposium by the session facilitators, including some input from the floor.

Nature-Based Solutions:

Vhalinavho Khavhagali reported back that the discussion from this session highlighted key challenges, including gaps in research on



biodiversity corridors, land-use pressures, and the impact of climate change. Priority areas include community engagement, particularly in ecosystem restoration and waste management, and exploring alternatives for carbon sequestration beyond traditional methods like spekboom. The need to integrate biomimicry and nature-derived solutions in urban planning was emphasized, alongside addressing gender considerations in environmental strategies. Effective climate corridors for a hotter and drier Gauteng were proposed to balance development with ecological preservation. The integration of traditional knowledge and modern approaches was also deemed critical for sustainability.



Artificial Intelligence (AI): AI was explored as a tool for predictive analytics in environmental conservation. Prof Abel Ramoelo described how the discussions

emphasized using AI to analyze land-use changes, monitor water quality, and improve waste management. High-quality datasets, accessible data, and machine learning methods were identified as essential for tackling issues like pollution, biodiversity loss, and urban sprawl. The deployment of technologies such as drones for data collection in inaccessible areas and the need for Earth intelligence systems to synthesize diverse datasets were key takeaways. The conversation also highlighted gaps in research on socio-economic drivers of environmental change and emphasized collaborative approaches for addressing these challenges. Decentralized Renewable Energy Systems and Microgrids: Clarissa Muir reported back from the session focused on the potential of microgrids



and decentralized systems to address energy challenges. Policy enforcement, data management, and community engagement emerged as critical elements for success. Collaboration between governments, private sectors, and academic institutions was highlighted, alongside innovative technologies like blockchain for system integration. Barriers such as high costs, theft, and inadequate public awareness were discussed, with proposals for provincial energy aggregators to enhance implementation. Behavioral change and public education were deemed essential for transitioning toward more sustainable energy practices and integrating renewable systems into broader development strategies.





Circular Economy Models in Urban Environments: This session was facilitated by Anthony Kaziboni. Key insights included integrating circular economy principles in urban

planning, focusing on waste recovery and industrial symbiosis. Green building initiatives were highlighted as a priority, emphasizing affordable housing, lifecycle sustainability, and construction waste minimization. The role of sustainable transport systems, such as 15-minute precincts, was discussed as a means to reduce emissions and reliance on fossil fuels. Timber as a sustainable building material and improved municipal solid waste management were proposed to reduce environmental impact. Policies addressing informal settlements and fostering community-driven, bottomup solutions were identified as essential for equitable and sustainable urban development. The symposium thus generated several general recommendations, including:

- Enhancing public awareness campaigns to increase engagement on environmental sustainability.
- Strengthening interdisciplinary research collaborations to address complex environmental issues.
- Leveraging technology for environmental monitoring, enabling data-driven decisionmaking in policy implementation.



7. Prioritisation

The Symposium participants voted live via an online polling platform called Mentimeter regarding some of the proposals emerging from the sessions, and to establish a sense of priority for research projects in the future. The live results were displayed during the voting process. Proposals that received more votes included Green Infrastructure and River Ecosystem Management under the topic of Nature-based Solutions, Pollution Prediction and Management as an application for AI, the need for Policy Adjustments in the Renewable Energy sector and both Industrial Symbiosis and Sustainable Product Design under Urban Circular Economy Models.

Out of the 15 possible projects proposed for the near future, the top 5 priority projects for the next financial year are as follows:

- Water and Air Quality Monitoring Network (34% of votes)
- 2. Timber Construction Standards project (9%)
- 3. Sustainable Transport Pilot (9%)
- 4. Data-driven Policy Recommendations (9%)
- 5. Community-Led Restoration Projects (6%)

8. Conclusion

The 6th Annual Gauteng Environmental Research Symposium reinforced the importance of interdisciplinary collaboration, innovative solutions, and the practical application of research in addressing environmental challenges. By fostering a platform for dialogue and exchange, the symposium demonstrated Gauteng's leadership in sustainability, laying the groundwork for a more resilient and sustainable future for the province.

9. Annexures

- Report on Exhibition
- Report on Research Competition
- Results from Feedback form
- Menti meter results
- Concept note
- Programme
- Speakers Booklet
- Presentations

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GERS EXHIBITION

For the first time this year, the Gauteng Environmental Research Symposium featured a exhibition space, where participants could engage with a diverse range of exhibitors from civil society, social enterprises, government and research. The exhibition gave participants an opportunity to see the equipment, products and materials for themselves and even test them out, as well as to possibility of speaking with the exhibitors about their work and forming new relationships and collaborations.



Taking Care of Business (TCB)

At TCB, our vision is to eradicate poverty in South African families. We achieve this by equipping unemployed South Africans and aspiring entrepreneurs with the skills and resources they need to unlock their potential and access the circular economy. Our mission is to empower those raising the next generation through innovative programmes in reselling, repairing, remaking, and reskilling. We promise to empower South African families to escape the cycle of poverty, fostering sustainable economic growth and community resilience. Through our RESELL, REPAIR, and REMAKE programmes, we empower aspiring entrepreneurs to build sustainable livelihoods

RESELL: We equip unemployed mothers to become successful informal clothing traders in the circular economy. Their small businesses are fuelled by donations of excess stock from the retail sector, which reduces fashion waste.

REPAIR: We equip unemployed South Africans (mostly fathers) to run appliance repair and trading businesses, reducing e-waste and extending the life of products. They learn a lifelong skill: repairing small and large appliances. REMAKE: We equip unemployed seamstresses to generate income from their creativity through micro-manufacturing. Donations of excess fabric, trims, samples and deadstock fuel their businesses, reducing fashion waste.

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Water for the Future

Rehabilitation of the upper Jukskei River through community participation, green technology, and enterprise.

In a poor and neglected corner of Johannesburg city, at the backend of industrial blocks, the start of the Jukskei River has long been bricked up. Here, the fresh water of underground springs is contaminated by untreated sewerage from broken infrastructure, industrial waste, and rubbish. What should be an asset for the community is a hazard and a health risk.

Through restoring the ecological integrity of this waterway, Water for the Future is working to create a river-based economy and vibrant social identity. Our work, along a 7km stretch from the river's source in Lorentzville downstream to Bruma Lake, serves as a catalyst for implementing green ideas and communitybased sustainable design, creating access to opportunities through technical and creative skills development.

Founded in 2017, we are a citizen-led NGO concerned with improving the plight of the river and its surrounds. We establish and nurture relationships between City officials, local businesses and resident communities. With the support of interested role-players, Water for the Future envisions an accessible, walkable, green corridor along the waterway that enables a thriving ecosystem and the economic prosperity, health and well-being of Johannesburg's citizens.

ECOLOGY: As the city grew, the original springs and wetlands of the upper Jukskei were decimated. With science, partnerships and hard labour, we are slowly bringing the river function back.

ECONOMY: Every step of rehabilitating the river presents opportunities for enterprise development, skills training and jobs. Water for the Future collaborates to produce economicfocused outcomes.

COMMUNITY: Through the river restoration, we are promoting neighborhood reinvestment and equitable access. Our projects generate social interaction and creative cohesion.



Read more about the three prongs of our outcomes-based strategy to bring health, wealth and biodiversity to the Jukskei headwaters. You can also view all we are doing to establish and nurture relationships between stakeholders, businesses and resident communities, and explore current issues associated with our work and the river.

https://www.waterforthefuture.co.za/ https://www.instagram.com/waterforthefuture_ globalsouth/

Khepri Innovations

Khepri Innovations is an industry-leading company committed to sustainable waste management through advanced bioconversion technology. We provide onsite bioconversion systems that transform organic waste into valuable byproducts like protein-rich feed and organic fertilizer, aligning with our mission to minimize waste while generating economic value. Our systems are designed to serve diverse sectors, including agriculture, hospitality, food retail, healthcare, and municipal services.

Our flagship solution, developed in collaboration with the University of Johannesburg PEETS and the CSIR, enables businesses to process 1-3 tons of food waste per day with a conversion efficiency of up to 56%. By processing food waste onsite, our clients reduce disposal costs, comply with environmental standards, and contribute to circular economy initiatives. The data collected from our units can also be used for carbon credits, adding a revenue stream for our clients and further supporting sustainability goals.

For more information or to explore collaboration opportunities, please visit our website khepri. co.za or contact us at info@khepri.co.za. We are excited to participate in this event and look forward to connecting with those who share our vision for a sustainable future.

Wood2Wood

Wood2Wood (W2W) is a project with the ambition to redefine how wood waste is managed across the EU and globally, by developing scalable and replicable processes to recycle contaminated waste wood into highvalue products.

W2W aims to develop a comprehensive framework for the valorisation of wood from Construction & Demolition (C&D) and furniture waste through a multi-dimensional cascade involving digital tools and innovative upcycling technologies, and to validate its technical and economic feasibility in real use cases. The project focuses on significantly reducing the demand for virgin materials, cutting the amount of waste sent to landfill or incineration and supporting the transition to a circular economy, thus promoting closed-loop systems where materials are continuously reused and recycled over their lifetime.

Wood2Wood calls on the wood industry, waste management and recycling sectors, material suppliers, governments, researchers, engineers and the general public to feel inspired and consider new ways of thinking and consuming.

The University of Johannesburg has been tasked with establishing a broader network of stakeholders for the project, to disseminate information as well as create opportunities for collaboration and exchange of best practices and recommendations. Through our participation in the 6th annual Gauteng Environmental Research Symposium, we would like to invite interested organisations to join the Wood2Wood Network. For more information, please contact Prof Innocent Musonda (imusonda@uj.ac.za)



University of Johannesburg's Mobile Water Laboratory

The University of Johannesburg's Mobile Water Laboratory is a groundbreaking initiative by the Water and Health Research Centre designed to improve water quality monitoring and management in underserved and remote communities. This state-of-the-art, off-grid lab provides on-site water testing to identify contaminants and mitigate risks from waterborne diseases such as cholera, typhoid, and dysentery.

Equipped with cutting-edge technology, the lab includes an incubator, sample refrigeration, airconditioning, and operates sustainably through solar power, a generator, and batteries. Its versatility allows researchers to adapt to various testing needs, ensuring safe water supplies and protecting public health. By enabling rapid and precise analysis, the Mobile Water Lab supports communities in maintaining reliable water quality, reducing illness, and enhancing overall well-being.

The Water Lab was stationed outside the main venue at the Gauteng Environmental Research Symposium and participants, including the MEC and other officials, had the chance to engage with the technology and some of the scientists and engineers behind this innovative initiative.

Committed to driving innovation and improving lives, the lab is a testament to the University of Johannesburg's dedication to solving real-world challenges through research and technology. Visitors can learn more about the Mobile Water Lab and its impact on improving access to safe water by visiting universityofjohannesburg.us or following UJ on social media at @go2uj. For a visual overview, you can watch this video.

Empowering communities, one water sample at a time!

University of Johannesburg Institute for Intelligent Systems (IIS)

The Institute for Intelligent Systems (IIS) at the University of Johannesburg is at the forefront of integrating advanced technologies into educational and cultural preservation initiatives.

A notable project is the Virtual Reality (VR) reconstruction of Sophiatown, a vibrant Johannesburg neighborhood demolished during the apartheid era. This immersive experience allows users to explore the historic streets, engage with the community's rich cultural heritage, and gain insights into its significant socio-political impact. By combining historical research with cutting-edge VR technology, the IIS not only preserves the memory of Sophiatown but also offers an innovative educational tool that brings history to life. This project exemplifies the Institute's commitment to leveraging intelligent systems for societal benefit, bridging the gap between technology and humanities.

To delve deeper into the Sophiatown VR project, you can watch the following video: https://youtu. be/gMavUcvmRn0

For more information about the Institute for Intelligent Systems and their groundbreaking projects, visit their website at https://iis.uj.ac.za/

Design and layout: UJ Graphic Design Studio







GERS RESEARCH COMPETITION

The GERS Research Competition is one way in which UJ and GDEnv are promoting environmental research at university level, and giving upcoming researchers support and exposure. Researchers are invited to submit an abstract of their work for adjudication by a panel of experts. The criteria for evaluation are Purpose, Methodology, Findings, Contribution and Writing. The top 10 applicants then participate in an online event, which takes place three weeks before the Symposium, in which they present their research. From there, selected students are invited to participate in the Gauteng Environmental Research Symposium, alongside environmental professionals. There they have the opportunity to engage with researchers, policymakers, industry leaders, and community stakeholders about topics at the cutting edge of research in the sector of the environment. In addition, the winning student is awarded the chance to present their research to the Symposium delegates and receives financial support to the value of R10 000 to publish their full paper in a peer-reviewed, accredited journal.

For the Research Competition, any topic within the broad field of sustainability research is eligible, provided the research is located in or applicable to the Gauteng Province. Applicants may choose one of the following sustainability trends that are in line with GERS:

- 1. Water Quality and Management
- 2. Waste, Circular Economy and Resource Efficiency
- 3. Air Quality, Weather and Climate Change
- 4. Just Energy Transition
- 5. Socio-economic or Health-related Environmental Research
- 6. The Food System and the Environment
- 7. Any other Environmental research in Gauteng Province

The diversity of the submissions received for the GERS VI Research Competition was particularly impressive. Not only did they span across all these thematic categories, the applicants emerged from a great range of disciplines and levels of study. The following are the top 10 applicants, including the winner and 5 runner up positions

WINNER:

Sukumani Nicholus

(UJ Faculty of Science, Department of Geography, Environmental Management and Energy Studies, BSc Hons in Geography) Assessing the socio-economic and environmental impact of the weigh and pay model: A case study of Gcwalisa shop in Alexandra in Gauteng province.

RUNNER UP POSITIONS:

Timileyin Abiodun (UJ Engineering and theBuilt Environment, Electrical and ElectronicsEngineering, Master of Engineering)BIM: Blockchain, IoT and ML-Models forEnhanced Climate Change Prediction andTrustworthy Carbon Emission Control.

Mutshidzi Shillah Matshibi (UJ Faculty of Humanities, Sociology Department, MA in Social Impact Assessment)

Women Street Reclaimers: Existing Practices and Potential for Organising.

RT eng

Ndivhuwo Ramovha (UJ Faculty of Health Sciences, Department of Environmental Health, Masters of Environmental Health) Understanding the Co-Occurrance of Heavy Metals and Nutrients in Urban Stormwater Runoff in Johannesburg: Implications for Water Quality Management.

Mutavhatsindi Tshinakaho Shelva (UJ Faculty of Science, Biotechnology, Diploma of Biotechnology) *Investigating Landfills as Pathways for Alien*

Invasive Species: A Case Study in Gauteng Province.

Milan van Wyk (UJ College of Business and Economics, School of Accounting, PhD in Accounting (with a focus on climate change)) A value creation framework for intellectual capital to action climate change.

OTHER TOP 10:

Matioun Kedibone Maahlamele (UJ Engineering and the Built Environment, School of Urban and Regional Planning, Bachelors) Waste management practices in Gauteng: challenges and opportunities. Sibulele Patricia Mtshengu (Johannesburg City Parks & Zoo, SANBI, Botany, N/A) Ecological impacts and control strategies of Lemna minor in aquatic ecosystems.

Nkosinomusa Nomfundo Dladla (UJ Engineering and the Built Environment, Department of Chemical Engineering Technology, Bachelor of Engineering Technology in Chemical Engineering) Assessing the Impact of Urbanization on Air Quality and Climate Resilience in Gauteng: Bridging Policy and Practice.

Phetoho Rasebechele (UJ Faculty of Science, Department of Geography, Environmental Management and Energy Studies, PhD Geography)

The governance of renewable electricity shift in Johannesburg: a transition management framework analysis.

Those selected to attend the Symposium took advantage of the opportunity to participate in the sessions that were of interest to them and get involved in the discussions. They were handed their certificates and some small prizes by the Keynote Speaker, Prof Erika Kraemer-Mbula, and the Gauteng MEC for Environment, Ms Sheila Peters. Later that afternoon, the winner, Nickolus Sukumani, an Honours level student from Geography, presented his work in what is surely his first chance to speak at a forum of this level. He did a fantastic job, entertaining and impressing the delegates with his diligent fieldwork and insightful analysis. The subject of his work, Gcwalisa spaza, was also of great interest as a simple but innovative model for food security and circularity in the township context. We are confident that this opportunity will help kickstart his career and look forward to supporting him to publish.

GERS FEEDBACK

An online feedback form was circulated after the Symposium had taken place to give participants an opportunity to share their experience and suggestions. 24 responses were received, 4 of which were anonymous. Some respondents had been online participants. Half of the respondents (12 out of 24) had never participated in GERS before. Of those who have attended previously, the majority (9 out of 12) have attended twice or more. Response from the different organizations was fairly representative of GERS participation, with half of the respondents (12) being from local, provincial or national government, 50% of which were from the Gauteng Department of Environment (6). Approximately one third were from academia, mostly the University of Johannesburg. Four of the respondents were from civil society or enterprises.

A total of 14 feedback questions were asked in the form, many of which required the respondent to indicate their level of satisfaction with the event or an aspect thereof. There were also a number of free text questions.

All respondents indicated their satisfaction with the event overall, 17 giving it a 5-star rating and 7 giving it 4 stars to produce an average of 4.75.

Respondents were asked to indicate what had been of benefit to them through participating in GERS by selecting from a list. Only four

respondents selected all the available options – most selected one, two or three of the options. The most popular option (17 respondents) was, "A broad sense of what is happening in environmental research in the province." Many respondents (14) also benefited from, "Exposure to innovative projects addressing sustainability challenges". The options of, "Networking with people working in the environmental sector" and "Engagement on a topic of special interest to you" were also popular (13 respondents). The remaining options of, "A chance to hear from the MEC and other government officials about their plans" and "Deeper insight on how policy is translated into practice" were each selected by 10 respondents.

Respondents were also asked to describe any other benefits of participating. Many responses shared general insights and learnings such as awareness of climate change, the role of policy and government etc., whilst others made reference to specific topics like Artificial Intelligence (predictions modeling) or naturebased solutions. A number of respondents spoke of the opportunities and potential of the innovative ideas shared, including for networking and collaboration between stakeholders.

The following series of questions asked respondents to indicate their level of satisfaction with various elements of the event. In general respondents were satisfied or very satisfied. The greatest level of satisfaction was related to the Diversity of speakers (80% very satisfied), and Topics covered (70% very satisfied). Programme timing and Morning plenary session also scored highly (60% very satisfied). Facilities and catering, Breakaway discussions and Exhibition also had approximately 60% very satisfied but less than 40% somewhat satisfied, because at least some respondents indicated that they were neither satisfied nor dissatisfied. The only element for which a respondent was dissatisfied was Materials: programme, booklet – even in this case over 70% of respondents were somewhat or very satisfied.

We also asked participants how they thought the Symposium could be improved. Some indicated that they wouldn't change anything or didn't want to make suggestions because they were online participants, some reiterated room for improvement in the elements assessed in the previous question, but 10 respondents gave recommendations. One suggested that the event should remain hybrid, with both online and in-person attendance. Expanding attendance or themes in a specific way was something suggested by four respondents, i.e. more businesses, schools, local speakers external to the host organizations and the topic of environmental health. Three respondents said that the event could be more interactive, and two recommended extending it to two days in duration.

Gauteng Province Department of Environment

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