SSAG

Society of South African Geographers

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Society of South African Geographers Student Conference 2022

15-16 September

(Hosted virtually by the University of Pretoria)

Table of contents:

Welcome message:

Welcome to the Society of South African Geographers (SSAG) 2022 student conference. We are delighted to welcome you to the conference hosted virtually this year by the University of Pretoria. The student conference offers an important platform for post-graduate students and recent graduates in Geography and the Environmental Sciences to present their research and network with peers from across southern Africa. We have received abstracts from a diverse range of institutions across southern Africa. The topics are broad and include interesting papers from the various sub-fields of Geography. We are pleased to have a keynote speaker at the conference. We welcome Dr. Kanosvamhira, a former recipient of the SSAG Bronze Medal award for the best Master's Dissertation. Dr. Kanosvamhira will deliver his keynote address on Thursday 15 September 2022.

We look forward to hosting you online!

Dr. JJ Gregory (SSAG Student Conference Organiser)

Keynote speaker:

Tinashe P. Kanosvamhira recently graduated with a Ph.D. in Geography and Environment at the University of the Western Cape (UWC). Tinashe's current research interests include urban poverty and livelihoods, urban food systems, and urban transformation. He obtained a BSc in Geography and Environmental Studies in Zimbabwe and a Master's in Geography and Environmental Studies from UWC. Tinashe is also the regional country coordinator (Zimbabwe) of the Young African Statisticians Interim Coordinating Committee and is a member of the Society of South African Geographers. The topic of his keynote address explores:

Urban community gardens in Cape Town, South Africa: Navigating land access and land tenure security.

Land tenure security presents challenges regarding the sustainability of urban community gardens in global South cities. However, a few studies have explored the mechanisms urban gardeners employ to facilitate land access and variations in land tenure security arrangements made with land owners in South African cities. This paper employs a mixed-methods research approach involving quantitative and qualitative techniques to examine how urban community gardens access land and land tenure security arrangements thereof in Cape Town. The study is based on questionnaires, semi-structured interviews, and observations from 34 urban community food gardens selected through a combination of purposive and snowball sampling methods across selected low-income urban neighbourhoods. The findings reveal that gardens employ various mechanisms to access land but land tenure security poses a sustainability threat to community gardens. Moreover, there is a mismatch between policy directives that seek to promote land access and land tenure security with the lived experiences of urban gardeners on the ground. The paper recommends that while formalising land tenure arrangements may prove to be an effective solution, supporting institutions need to adopt a bottom-up approach to understanding gardeners' needs and build on perceived and de jure land tenure security options to promote the sustainability of community gardening projects.

Programme:

Day 1 – 15 September 2022				
9h00-10h00	**Welcome by Dr. JJ Gregory (15 minutes)** **Keynote address by Dr. Tinashe P. Kanosvamhira (45 minutes)**			
	Room 1 (Chair: JJ Gregory)	**Room 2 (Chair: Mathabo Lifero)**	**Room 3 (Chair: Francois de Bruyn)**	**Room 4 (Chair: Allan Rikhotso)**
10h00-11h00	*Assessment and Application of Land Administration Concepts to South Africa for All Forms of Land Tenure.* **Presenter: Sam Motswenyane (University of Pretoria)** *Improving community resilience in South Africa through rural revival and revitalisation.* **Presenter: Claire Fordred (University of South Africa)** *Exploring the perceptions of rural communities towards rural-urban migration and their influence on the realisation of migration: the case of KwaNokweja, KwaZulu Natal, South Africa.* **Presenter: Buhle Adorable Lunika (University of Zululand)** *Assessing the impact of land redistribution approach on small-scale farmers livelihood in Vuwani Township in Limpopo province, South Africa.* **Presenter: Vhugala Mashau (University of Free State)**	*Spatio-temporal patterns of heatwaves across the Northern Cape Province, South Africa: 1979-2021.* **Presenter: Jacobus Kruger (University of the Free State)** *Land Equivalent Ratio of Cowpea-Sorghum Relay Intercrop as Affected by Different Cattle Manure Application Rates Under Smallholder Farming System.* **Presenter: Trust Antony Chinyama (University of South Africa)** *Modelling surface water availability using water resources simulation model.* **Presenter: Aluvuyo Bixa (University of the Witwatersrand)**	*Used disposable diaper disposal practices by parents whose babies receive post-natal services at Rosenkrantz clinic in Ga-Matlala.* **Presenter: Ramokone Lamola (University of Pretoria)** *An Investigation of E-Waste Management in South Africa: A Case Study of Mbombela Local Municipality.* **Presenter: Mthunzi Qulo (University of Mpumalanga)** *The assessment of factors that contribute to illegal waste dumping among residents of Ipelegeng, Schweizer-Reneke.* **Presenter: Kgomotso Mokoduwe (University of the Free State)** *Household solid waste management perception and practices.* **Presenter: Tsakani Germina Selomo (University of Limpopo)**	*Developing a process for automated data cleaning: A case study for cleaning of data for informal roads detection in South Africa.* **Presenter: Ruve Benadie (University of Pretoria)** *Flood Impact Assessment at Hennops river using GIS and Remote Sensing.* **Presenter: Matilda Mbazo (University of the Witwatersrand)** *Probabilistic Supervised Classification approach to the mapping of wetland ecotones.* **Presenter: Daniëlle Seymour (Stellenbosch University)**
30 min comfort break				
11h30-12h30	*Multi-purpose use of cemetery land through community design and planning.* **Presenter: Thandazile Mnguni (University of Pretoria)** *Can city planning instruments measure up to urban resilience indicator norms? A multi-criteria analysis of IUDF nominated sites in the Western Cape of South Africa.* **Presenter: Edroy Christians (University of Stellenbosch)** *Beyond Procedural Planning: Advancing the exploration of placemaking for urban public space improvements in South Africa.* **Presenter: Thendo Mafame (Stellenbosch University)**	*Investigating the impact of LULC in the Vaal river.* **Presenter: Yanga Ndamase (University of the Witwatersrand)** *Possible land management strategies for storage of soil organic carbon in the western Free State.* **Presenter: Nolusindiso Ndara (University of Cape Town)** *Analysis of the Impacts of Amatola Forest Cover Changes and Rainfall on Surface Water Resources in the Upper Parts of the Keiskamma Catchment, Eastern Cape, South Africa.* **Presenter: Thandeka Evelyn**	*Assessing urban transformational strategies through innovative agricultural practices in Johannesburg metropolitan area.* **Presenter: Nobukhosi Sithole (North West University)** *An investigation of environmental sustainability knowledge, attitudes, and practices amongst high school students in Mbombela, Mpumalanga province.* **Presenter: Payal Chetan Mehta (University of Mpumalanga)**	*Spatiotemporal analysis of vegetation condition using modis and Google Earth Engine in the Thabo Mofutshayana district, Free State (2003-2020).* **Presenter: Amanda Dyani (University of the Free State)** *Nighttime Light (NTL) data.* **Presenter: Zandile Mncube (University of the Free State)** *Quantification of greenhouse gas methane from landfills using Tropospheric Monitoring Instrument (TROPOMI) in Google Earth Engine.* **Presenter: Avela Xulu (University of the Free State)**

		Skosana (Nelson Mandela University)	*An assessment of domestic greywater reuse: a case study of Ga-Thoka village, Polokwane local municipality, South Africa.* **Presenter: Mokitlana Rinkie Sekgobela (University of Limpopo)** *Assessment of the suitability of mine water treated with pervious concrete for Potable use.* **Presenter: MP MNGUNI (University of Mpumalanga)**	
12h30-13h30	*Noise pollution and student livability: Exploring the soundscapes of Hatfield, Pretoria.* **Presenter: Allan Rikhotso (University of Pretoria)** *Food for thought: Investigating the Influence of the Sociocultural Factors in following Plant-Based Diets in Cape Town.* **Presenter: Tyla Augustine (University of the Western Cape)** *Urban agriculture in poor neighbourhoods: Case of Ekangala, Pretoria, South Africa.* **Presenter: Erica Nthabiseng Mashanye (University of the Free State)** *"Who's on Dinner?" Collective food systems and the ethics of care in Bay Area housing cooperatives.* **Presenter: Sibel Guner (University of Cape Town)**	*Synoptic environments in which supercell thunderstorms develop over the highveld of South Africa.* **Presenter: Joew Prisca Malebane (University of Pretoria)** *Analysis of extreme summer rainfall events across the Free State Province, South Africa: 1981-2022.* **Presenter: Nicolle Loader (University of the Free State)** *Climate variability, extremes and their impacts on dam levels in Limpopo province.* **Presenter: Kholofelo Letsong (University of Limpopo)** *Investigating trends of extreme cold temperature events in the Free State from 1990 to 2020.* **Presenter: Hlavutelo Hosana (University of the Free State)**	*The impact of climate change on past and current hydrological trends in the Olifants River Catchment.* **Presenter: Carli van Zyl (Stellenbosch University)** *Conservation conflicts and climate change nexus of bordering rural communities: A literature review.* **Presenter: Ntebohiseng Sekhele (University of the Free State)** *Framing water supply sustainability and adaptation in drought-affected areas of Mbhashe and Mnquma in the Amathole District Municipality.* **Presenter: Fortunate Nomsa Mapuka (University of Fort Hare).** *Modeling suitable habitats for Artemisia Afra using the maximum entropy model in Sekhukhune District Municipality, South Africa.* **Presenter: Willem Matsane (University of Limpopo).**	*Assessing the hydrological regime metrics of lacustrine wetlands for the Maputaland Coastal Plain of South Africa, from 1984 to 2022.* **Presenter: Camryn Oschger (University of Pretoria)** *Mapping The Effects Of Climate Change On The Quantity of Water Within The Middle-Letaba Dam, Limpopo Province.* **Presenter: Mulisa Mapfumo (University of Venda)** *Integration of ground-based vegetation parameters, thermal infrared and UAV multispectral data for mapping of crop canopy temperature.* **Presenter: Phumlani Zwane (University of Limpopo)**
Lunch break (1 hour)				
14h30-15h30	*(Un)safety and (In)security in a middle-income neighborhood: Case study of Phase 2 Bloemanda, Bloemfontein.* **Presenter: Xolani Makhubo (University of the Free State)**	*Determining river ecosystem types for the Southern African Development Community (SADC) region.* **Presenter: Lukho Goso (University of Pretoria)**	*Exploring people's perceptions, attitudes and beliefs on climate change, and their behaviours surrounding it, in Centurion.* **Presenter: Yasti**	

	Socio-economic impacts of Covid-19 on undocumented migrants in the informal sector in downtown, Bloemfontein, South Africa. **Presenter: Theodorah Ramogwebo (University of the Free State)** *Analysing the impact of Covid 19 on the livelihoods of communities adjacent to Protected Areas: Machibini community and Hluhluwe Imfolozi* Park. **Presenter: Mawande Mkhize (University of Zululand)**	*Evaluation of gully erosion control measures using sequential mapping in a research catchment near Ladybrand, Free State Province.* **Presenter: Thembela Cuba (University of Free State)** *The Geomorphology of Floodplain Wetlands of the Olifant's River Catchment.* **Presenter: Hannah Chemaly (Stellenbosch University)** *The Geomorphology of floodplain wetlands of the upper Umzimvubu River catchment in the Eastern Cape, South Africa.* **Presenter: Jacques Bösenberg (Stellenbosch University)**	**Govender (University of Pretoria)** *Evaluating environmental practitioners' perceptions towards environmental impact assessment follow-up: lessons from filling station projects in Limpopo province.* **Presenter: Moloko William Sebone (University of Limpopo)** *Biodiversity and economy but not social factors predict human population dynamics in South Africa.* **Presenter: Bopaki Phogole (University of Johannesburg)** *Examining the effectiveness of social media in EIA- the case of Xolobeni, Eastern Cape South Africa.* **Presenter: Tlhoeli Hokinyane (University of the Free State)**	
15h30-15h45	**Wrap up of Day 1**			

Day 2 – 16 September 2022				
	Room 1 (Chair: JJ Gregory)	**Room 2 (Chair: Mathabo Lifero)**	**Room 3 (Chair: Francois de Bruyn)**	**Room 4 (Chair: Allan Rikhotso)**
9h00-10h00	*South African Teachers' Conceptualisations of 'Place' in Geography: A case study* **Presenter: Sizwe Njapha (University of Pretoria)** *Pre-service geography teachers' engagement with undergraduate geography content at the University of Zambia*. **Presenter: Matilda Kanyampa Nakazwe (University of Pretoria)** *Knowledge and Perceptions of South African adults towards the Sustainable Development Goals.* **Presenter: Nondumiso Mathibela (University of Johannesburg)**	*Moisture Fluxes Associated with Two Types Of South Atlantic Ocean Anticyclones.* **Presenter: Bhavani Brijlal (University of Pretoria)** *South-American seasonal rainfall as a precursor to southern African seasonal rainfall.* **Presenter: André Fourie (University of Pretoria)** *The thermodynamic environments in which supercell thunderstorms develop over the highveld of South Africa.* **Presenter: Langutelani Mathebula (University of Pretoria)**	*Identifying the discrepancy between the training of environmental students at the University of the Free State and the requirements by the registration body environmental assessment practitioner association of South Africa (EAPASA).* **Presenter: Nevil Shirinda (University of the Free State)** *How effective is environmental education in secondary schools?* **Presenter: Kagiso Thobejane (University of the Free State)** *Evaluating the root cause of flash flooding impacts in Alexandra using the city-rap urban resilience tool.* **Presenter: Moleboge**	*Spatiotemporal variability in vegetation coverage and land surface temperature in the city of Bloemfontein, South Africa.* **Presenter: Jeniffer Hlongwane (University of the Free State)** *Illegal grazing in Golden Gate Highlands National Park: predicting areas at risk using digital elevation models and spatial analysis.* **Presenter: Fransie Mulaudzi (University of the Free State)** *Mapping and characterization of soil erosion forms on the high rainfall areas of the Keiskamma catchment.* **Presenter: Yonela Mlindazwe (Nelson Mandela University)**

			Makushu (North West University) *Exploring informal traders' flood preparedness in Ladysmith, KwaZulu-Natal.* **Presenter: Noluthando Madondo (University of Zululand)**	*Assessing impacts of climate change, land use and land cover changes on surface water quality in Letaba river catchment, South Africa.* **Presenter: Grace Mohlala (University of Limpopo)**
10h00-11h00	*Housing the Elderly in the City of Tshwane.* **Presenter: Francois de Bruyn (University of Pretoria)** *The densification of sectional title schemes and purpose-built student accommodation in Stellenbosch: Saturation or further growth possibilities?* **Presenter: Emily Pienaar (Stellenbosch University)** *Insight into urban decline and urban renewal in Ekurhuleni: The case of Benoni.* **Presenter: Mathabo Lifero (University of Pretoria)**	*Maximum temperature vs. rainfall seasonal forecasts: which one is potentially more profitable?* **Presenter: Moahloli Ntele (University of Pretoria)** *Ambient BTEX concentrations around a Gas-refuelling station in Johannesburg, South Africa.* **Presenter: Clinton Nyathi (University of the Witwatersrand)** *The Speed of Movement of Tropical Cyclones in the South Indian Ocean Under Anthropogenic Warming.* **Presenter: Aaliyah Mahomed (University of the Witwatersrand)** *The Margin of Error in Human Perception of Temperature and Humidity.* **Presenter: Paul Greyling (University of the Witwatersrand)**	*A Netnographic Analysis of Mining Activities and its Impacts on Marine Biodiversity on the West Coast, South Africa.* **Presenter: Yaaseen Patel (Stellenbosch University)** *Exploring environmental and socio-economic risks and opportunities of mine closure: perceptions from Lindokuhle community in Mpumalanga*. **Presenter: M. Rakhalaru (University of South Africa)** *Assessing pro-environmental behavior towards plastic pollution amongst university students and staff members.* **Presenter: Bonginkosi Ngobeni (University of Mpumalanga)**	*Distinguishing between Elephant and climatic variability induced thicket degradation in Addo Elephant National Park.* **Presenter: Tlhologelo James Mapheto (Nelson Mandela University)** *The effects of the COVID-19 lockdown on vegetation health in the Golden Gate Highlands National Park using remote sensing.* **Presenter: Bjorn Boyes (University of the Free State)** *Investigating the impact of social values on ecosystem services on the Cape Peninsula in South Africa using geospatial techniques.* **Presenter: Curtley Tonkin (Stellenbosch University)** *Assessment of spatiotemporal variability of droughts in uMkhanyakude District Municipality, KwaZulu-Natal.* **Presenter: Jabulile Mzimela (University of Zululand)**
30 minutes comfort break				
11h30-12h30		*Applying the Camping Climate Index (CCI) for the first time in South Africa.* **Presenter: Zandizoloyiso Mnguni (University of the Witwatersrand)** *The extent South African Policies consider and include Extreme Climatic Events (ECEs) and the impacts thereof on Health; focusing on eThekwini*. **Presenter: Charné Jordan (University of the Witwatersrand)** *Healthcare Practitioner's Perspectives on the*	*Assessing the efficacy of feedback mechanisms on electricity consumption in households in Linden – a middle-income suburb in Johannesburg.* **Presenter: Roseline Masebinu (University of Johannesburg)** *Investigating gender differences in knowledge, attitudes and, practices on Schistosomiasis in Ha-Nesengani, Vhembe District, Limpopo Province.* **Presenter:**	

		Potential Relationship between Weather, Climate and Mental Health: A Biometeorological Study. **Presenter: Mukhtaar Waja (University of Witwatersrand)** *The impact of climate variability on the historic distribution of Bulinus africanus in the Johannesburg and Tshwane Municipalities in Gauteng.* **Presenter: L.F. Thekiso (North-West University)**	**Tshilidzi Mukwevho (University of Limpopo)** *Investigating the effect of vermicompost from red wiggler worms on spinach crop growth.* **Presenter: Yamkela Lusasa (Walter Sisulu University)** *Measuring corporate sustainability in the automotive sector in Nelson Mandela bay.* **Presenter: Ongama Ntshiba (Nelson Mandela University)**	
12h30-13h30			*Seasonal vulnerabilities and copying strategies at WEF nexus in Harare low income areas: Moving towards sustainable cities.* **Presenter: Crecentia Gandidzanwa (University of Zimbabwe)** *Investigating Food Wastage: Drivers, Management and Reduction Measures at the University of Mpumalanga.* **Presenters: Andile Mhlongo (University of Mpumalanga)** *The state of air quality and public perceptions in Sebokeng, Vaal.* **Presenter: Thato Mokhomong (North West University)** *Impact of gold mines on the local surface water systems: a case study of the Kaap river in Barberton, Mpumalanga.* **Presenter: MF Mamabolo (University of Mpumalanga)**	
13h30-13h45	**Closing remarks**			

List of abstracts:

FOOD FOR THOUGHT: INVESTIGATING THE INFLUENCE OF THE SOCIOCULTURAL FACTORS IN FOLLOWING PLANT-BASED DIETS IN CAPE TOWN.

Tyla Augustine (University of the Western Cape)

Email: 3225157@myuwc.ac.za

There has been a significant increase in plant-based food choices and diets across the world. Adopting a plant-based diet is mainly attributed to ethical, environmental and health concerns. Although sociocultural factors have been acknowledged as factors in influencing food choices and diet there is still a lack of awareness, understanding, and discussion of the impact of these factors on food choices and diet in most countries such as South Africa. As plant-based diets and food choices have become a global trend, it is then necessary to identify, understand, and gain awareness of the sociocultural factors which influence food choices of plant-based diet partakers. This research aims to investigate the impact of sociocultural factors in influencing food choices and diets of plant-based diet partakers in Cape Town, South Africa. For this study participants who partake in plant-based diets will be selected as interviewees. These participants will be selected through non-probability sampling at Vegan restaurants as well as a Vegan market. Data will be collected within a qualitative methodology through the use of open-ended, semi-structured interviews. The data will then be recorded, coded, and analyzed via content analysis.

DEVELOPING A PROCESS FOR AUTOMATED DATA CLEANING: A CASE STUDY FOR CLEANING OF DATA FOR INFORMAL ROADS DETECTION IN SOUTH AFRICA.

Ruve Benadie (University of Pretoria)

Email: u16062664@tuks.co.za

Informal roads form spontaneously through human movement. Due to the spontaneous nature of these roads they often are not mapped and are missing from online resources such as Google Maps and OpenStreetMap. Neural networks are a possible solution to extract these roads from digital images automatically. However, neural networks require large training datasets of good quality in order to perform successfully. To assess the process of good training data development, aerial photographs of the City of Tshwane were used to digitise certain informal roads for the purpose of creating a complete training dataset. The informal roads were digitised as polygons in order to extract pixels for training purposes. Undergraduate students were tasked to digitise selected areas. The resultant digitised data had a lot of errors that needed to be fixed. Since manual cleaning can be very time consuming, we used Python scripting to develop an automated cleaning process. This process was able to fix the common digitising errors that were present in the dataset such as bowtie polygons, polygons that do not connect to the network, holes in polygons, and irregular shapes of polygons. The process was then compared to the performance of existing tools such as v.clean from GRASS and the topology checker from ArcGIS Pro, as well as the manually cleaned data. We found that our process was very successful and that it was possible to automate the cleaning process to a certain degree, but more testing is needed as not all errors can be corrected automatically. The developed process is a major first step to a comprehensive data cleaning tool for the informal roads training dataset to be used in a neural network, as well as for other similar digitisation applications.

MODELLING SURFACE WATER AVAILABILITY USING WATER RESOURCES SIMULATION MODEL.

Aluvuyo Bixa (University of the Witwatersrand)

Email: 2539328@students.wits.ac.za

Water scarcity and droughts have devastating impacts on humans and the environment. Thus, there is a need for water quantity monitoring to ensure that every person and the environment has access to safe water at all times. Studies related to modelling of water availability helps one to understand how much water is unaccounted for and what are the causes to water scarcity and what can be done to solve such problems.

THE GEOMORPHOLOGY OF FLOODPLAIN WETLANDS OF THE UPPER UMZIMVUBU RIVER CATCHMENT IN THE EASTERN CAPE, SOUTH AFRICA.

Jacques Bösenberg (Stellenbosch University)

Email: 26776227@sun.ac.za

The upper Umzimvubu River catchment is located in the northeast corner of the Eastern Cape in South Africa. The river flows throughout the Eastern Cape, forming floodplains wetlands along it's course, draining in the Port Saint Johns estuary (Zunckel, 2013). Several floodplains in the catchment have been identified, but have not comprehensively been defined or characterised. The catchment falls within the Ciskei-Swaziland uplift axis where two tectonic uplift events have occurred (Baby, Guillocheau, Braun, et al., 2020). These uplifts phases create long periods of vertical bedrock incision which lead to formations like inland lithologically controlled floodplains and tectonic basin floodplains, containing thick alluvial deposits (Grenfell & Grenfell, 2021). Nanson and Croke (1992) suggest that floodplain formation is complex, but can be classified with objective criteria. Grenfell and Grenfell (2021) state that geophysical feedbacks can alter floodplain stratigraphy and influence river flow, changing floodplain wetlands. It is proposed that "substantial environmental change will result in the predictable transformation of one floodplain type to another over time" (Nanson & Croke, 1992:2). The research investigates several proxy-variables based off geophysical feedback systems and geomorphological process of floodplain wetlands in the catchment. These proxy-variables, which will be obtained through desktop analysis, will serve as indicators to geomorphological processes, and determine the types and variations of wetlands found in the upper Umzimvubu catchment. These characteristics may also indicate how floodplain wetlands were formed and how they may develop.

THE EFFECTS OF THE COVID-19 LOCKDOWN ON VEGETATION HEALTH IN THE GOLDEN GATE HIGHLANDS NATIONAL PARK USING REMOTE SENSING.

Bjorn Boyes (University of the Free State)

Email: bjornboyes83@gmail.com

In 2020 COVID-19, a highly contagious disease, initiated a nationwide lockdown to reduce the spread of the virus. The lockdown restricted people's movement were restricted to essential services only, limiting especially the tourism industry. Tourism can have a detrimental effect on vegetation health if not managed correctly. The purpose of this study was to assess whether the sudden decrease in anthropogenic activity in parks and reserves had a measurable impact on vegetation health. The Golden Gate Highland Park was selected as the study area to assess the vegetation from before, during and after the COVID-19 lockdown. Remotely sensed images from the SENTINEL satellite program using SENTINEL 2A and 2B were used to determine the change in vegetation growth during the summer seasons (December-February) of 2019 (before lockdown), 2020 (during lockdown) and 2021 (after

lockdown). The images were processed using a normalized difference vegetation index through SENTINEL's own software package SNAP and the map algebra tools in ArcGIS™ were used to quantify the changes in the vegetation index across the study period. The findings show no significant difference in vegetation from before lockdown, when anthropogenic activities were at their highest, to after lockdown when there was a break in tourism. This seems to imply that park management has been up to standard.

MOISTURE FLUXES ASSOCIATED WITH TWO TYPES OF SOUTH ATLANTIC OCEAN ANTICYCLONES.

Bhavani Brijlal (University of Pretoria)

Email: U19219416@tuks.co.za

There are atleast two types of South Atlantic Ocean Anticyclone (SAOA) ridging events that have been dentified in the South African domain. Type-N events occur north of the 40ºS latitude, and Type-S events occur south of 40ºS latitude. The strength of the onshore flow associated with each type of ridging event differs. Since SAOA ridging events contribute significantly to the to the amount of precipitation over South Africa, it is necessary to understand where this difference in strength originates as it can help to improve the predictability of the ridging events. The aim of this study is to explain why the 2 types of ridging events differ in the strengths of their onshore flow into the South African domain, and to diagnose where this difference in strength originates. Using 41 years of ERA5 data, the difference in strengths of the onshore flow associated with each type of ridging event is diagnosed using the energetics framework. For the ERA-5 data the atmospheric variables considered are mean sea level pressure (MSLP), horizontal velocity field (zonal and meridional components of the wind), vertical velocity field, and the geopotential field and the energy diagnostics are calculated from these. The ERA-5 data has a horizontal resolution of 2.5° and is taken at six hourly intervals for 41 years (1979–2020). To establish the behavior of the two types of ridging events composite analysis is used. First composite means will be generated for mean sea level pressure and kinetic energy for the first six levels of the atmosphere (100hPa-500hPa), thereafter these composite means will be plotted to provide a visual representation of the behavior of each event. Since these calculations are currently ongoing the final results are not yet available, however it can be hypothesized that type-S events bring stronger flow into South African domain because there is a stronger flux of energy from the midlatitudes due to the presence of the jet stream in the midlatitudes. This is yet to be confirmed or rejected by the results of the study. Should the hypothesis accepted, it would imply that type-S events could potentially pose a higher risk of flooding or heavy precipitation events over South Africa and understanding where the strength of these events originate can help to improve its predictability."

THE GEOMORPHOLOGY OF FLOODPLAIN WETLANDS OF THE OLIFANT'S RIVER CATCHMENT.

Hannah Chemaly (Stellenbosch University)

Email: hannah.chemaly@gmail.com

Floodplains are created and shaped through combinations of complex fluvial processes. Their evolution and character can be attributed to stream power as well as sediment character. There are many different floodplain types that change and evolve as catchment and local conditions change leading to transitions between floodplain types. Previous research has not yet clearly defined what factors drive these transitions between different floodplain types, preventing the development of predictive capacity. The aim of this research was to investigate the diversity of floodplain types in the Olifant's River catchment and to develop a conceptual understanding of the macro-scale factors that drive transitions between floodplain types. The research was conducted by mapping and classifying

floodplains in a sub-section of the Olifant's River catchment using aerial photography and an SRTM elevation model. Floodplains were classified using the genetic classification system developed by Grenfell et al. (2019). Secondly, the catchment and floodplain characteristics of each mapped and classified floodplain were derived. Variables that were derived included floodplain longitudinal slope, mean catchment slope, the Köppen climate type, mean catchment aridity index, mean annual precipitation, mean annual runoff, dominant catchment vegetation cover, and dominant catchment and floodplain geology. Variations in each variable were described in conjunction with floodplain type to determine whether there were any trends or transitions. The outcomes of this analysis will be presented.

LAND EQUIVALENT RATIO OF COWPEA-SORGHUM RELAY INTERCROP AS AFFECTED BY DIFFERENT CATTLE MANURE APPLICATION RATES UNDER SMALLHOLDER FARMING SYSTEM.

Trust Antony Chinyama (University of South Africa)

Email: trustantonyc@gmail.com

Poor soil fertility is a major challenge to crop production in the communal farming areas of Zimbabwe. Intercropping legumes and cereals is a common soil fertility management technology among the farmers. A 3-year field experiment was conducted to evaluate cowpea–sorghum relay intercropping advantages in response to different cattle manure application rates. A 3 × 4 factorial experiment laid in a completely randomized block design (CRBD) with three replicates was conducted. The treatments were three cropping systems (sorghum sole, cowpea sole, and cowpea–sorghum intercrop) and four cattle manure application rates (0, 50, 75, and 100%). Crop growth rate (CGR), grain yield, harvest index (HI), relative competitive ability of each crop, and land equivalent ratio (LER) were measured. Analysis of variance and non-linear regression analyses were done to determine the yield benefits of cowpea–sorghum intercrop and estimate the relative competitive ability, respectively. Application of >75% cattle manure in a cowpea–sorghum intercrop enhanced the sorghum grain yield (75%) and HI (125%) of unmanured cowpea–sorghum plots. Cowpeas had higher CGR (159.6, 166.7 and 149.5 g m−2 day−1 at 7, 21, and 35 days after planting, respectively) at >75% cattle manure application rates on both intercrop and sole cropping than sorghum but with lower grain yield (1.4 t ha−1). Intraspecific competitive stress in sorghum was reduced at a high (>75%) quantity of manure applied. The effects of the intraspecific competition in cowpea were stronger (0.693) on grain yield than biomass at >75% manure application rates. The LER was >1 in all the treatments and was highest (2.73) under the cowpea–sorghum relay intercrop without cattle manure. Cattle manure application at 75% in a cowpea–sorghum intercrop enhanced the grain yield in sorghum and vegetative growth in cowpeas. It is therefore recommended to use the >75% cattle manure application rate in the intercrop if one wants higher grain in sorghum and high biomass in cowpeas possibly for fodder. Further studies are recommended to quantify the rate of increase in available N under the cowpea–sorghum relay intercrop with >75% cattle manure application rates.

CAN CITY PLANNING INSTRUMENTS MEASURE UP TO URBAN RESILIENCE INDICATOR NORMS? A MULTI-CRITERIA ANALYSIS OF IUDF NOMINATED SITES IN THE WESTERN CAPE OF SOUTH AFRICA.

Edroy Christians (Stellenbosch University)

Email: edroyc@gmail.com

The study explores the relationship between urban resilience indicators, as described by international urban resilience standards and other stand-alone urban resilience frameworks as a measure of resilience in cities in South Africa between the reference period 2016 to 2021. While some cities

display their strategic intent in the form of municipal planning instruments like the Integrated Development Plan (IDP) and align it to the Integrated Urban Development Frameworks (IUDF), others do not, and this is reflected in compliance towards urban resilience norms. Urgent interventions are required to streamline resilience frameworks as these address key risks within cities, particularly in the event of pandemics as occurred in 2020 (COVID-19 pandemic). The MCDA research method was utilised to predict the best urban resilience framework. It analyses the content through a systematic classification of coding and identifying themes or patterns that highlight qualitative content and analysis of different texts into a number of categories. The selection process did not produce consistent results as the selection of too many alternative indicators resulted in a rank reversal problem. The Urban resilience assessment from a COVID-19 perspective were also utilised as a comparison with other frameworks. The selected urban framework that consistently produced higher ratings was the ISO 37123 indicators linked to the risk management process. As the ISO 37123 was only published at the end of 2019, more time is required for cities to adopt its recommendations.

EVALUATION OF GULLY EROSION CONTROL MEASURES USING SEQUENTIAL MAPPING IN A RESEARCH CATCHMENT NEAR LADYBRAND, FREE STATE PROVINCE.

Thembela Cuba (University of the Free State)

Email: cubalukhanyo@gmail.com

Gully erosion is a complex and dynamic degradation process affecting soils in many parts of the world. Knowledge about gully control measures is important in developing and implementing effective control measures. To understand gully erosion and the processes influencing it, the extent and magnitude of gullies has to be mapped. This paper evaluates gully erosion control measures in a research catchment near Ladybrand in the Freestate Province. This was achieved by sequential mapping (digitizing) gullies in the catchment, characterising the control measures in the catchment and quantifying erosion rates before and after the control measures were in place. Using SPOT 5 imagery and Google Earth Pro, gullies in the study site from the year 2003 to 2022 were mapped and digitized. For further analysis of the gullies' depth, surface area and the amount of soil loss before and after the control measures, ArcMap 10.7.1 was used. This data helped determine the extent of gully expansion and erosion in the catchment. Overall this study found that the gabion check dam used in the catchment to control gully erosion and expansion was effective after construction but became ineffective after several years and the gully in the catchment continued to expand. Further research will determine the exact volumes of soil lost throughout the years before and after the control measures were in place.

HOUSING THE ELDERLY IN THE CITY OF TSHWANE.

Francois de Bruyn (University of Pretoria)

Email: fdc.debruyn@tuks.co.za

This study aims to investigate the concept of "Housing the Elderly" in Pretoria/Tshwane through a Geographical lens; This includes the distribution of institutions that provide housing for the elderly. The comparison and evaluation of the costs of providing housing for the elderly. It will also compare the features that various housing service providers offer. The research will be done using a desktop study of secondary data found in the study area and available in the public domain. Spatial Analysis and relationships will be explored. The spatial and social relationships of stated institutions will be examined using a desktop analysis of secondary data from the research area that is available to the public. The research project will consist of a mixed-method approach of qualitative data aligned to the

spatial attributes of institutions that provide housing. The mapping process will include a quantitative component, and it's feasible that the facilities, services, and sample participants may be distributed demographically. The demographic and spatial information gathered here will be employed in descriptive statistics to create a context for the quantitative and qualitative spatial data. Maps, statistics, text, and other media from various secondary sources and platforms will be consulted to help corroborate and gain a more precise picture of the research topic. To aid corroborate and get a clearer understanding of the study topic, maps, figures, text, and other material from different secondary sources and platforms will be explored.

SPATIOTEMPORAL ANALYSIS OF VEGETATION CONDITION USING MODIS AND GOOGLE EARTH ENGINE IN THE THABO MOFUTSHAYANA DISTRICT, FREE STATE (2003-2020).

Amanda Dyani (University of the Free State)

Email: amandadyani2014@gmail.com

Drought is a recurrent feature of South Africa's climate system and is a product of below-normal precipitation coupled with higher-than-normal temperatures. These conditions have serious implications on the agricultural sector, environment, society, and the economy particularly in regions such as the Free State which are semi-arid in nature. This study aims to investigate the effects of drought on vegetation using the Moderate Resolution Imaginary Spectrometer (MODIS)-derived spectral indices over Thabo Mofutsanyana District Municipality Municipality between the period 2003– 2020. Specifically, this study exploited multiple indices such as the vegetation condition index (VCI), temperature condition index (TCI), and vegetation health index (VHI), and within a Google Earth Engine (GEE) framework. The main climatic factors such as precipitation, temperature and evapotranspiration were also mapped as they contribute to the drought events. These spectral indices are correlated with climate parameters using Mann-Kendall to establish causal linkages. The spectral indices shows that the is fluctuation of dry and wet season in the area however the annual VCI values shows that during the period of 2003, 2004, 2008,2012,2015,2018 while the TCL showed fluctuations but did not indicate the drought events as the annual TCL values are above the 40% threshold. The VHI indicated that during the year 2003, 2015, and 2018 the conditions where very close to bad conditions which is not surprising these years were affected by the ENSO conditions.

IMPROVING COMMUNITY RESILIENCE IN SOUTH AFRICA THROUGH RURAL REVIVAL AND REVITALISATION.

Claire Fordred (University of South Africa)

Email: cfordred@gmail.com

Globally, rural people are faced with the everyday challenges of food security, poverty, inequality, and environmental degradation, to name a few. By means of a comprehensive literature review, it is noted that with the help of rural revival and revitalisation, carried out by the government and the private sector that it is possible to restore the environment and create healthy, vibrant areas to work and live in. This is possible by increasing access to basic services, fostering gender equality and rural job creation. There is no single definition for rural revival and revitalisation, but the following concepts represent it as a positive transformation of rural areas done in a sustainable manner for present and future generations. It is a process that strives to reverse rural decline, to create a maintainable diversified local economy and resilient livelihoods. Over the last few decades, the deterioration of rural South Africa has been consistent, this is due to the increase in population, lack of service delivery and an increase of community members moving to the cities seeking job opportunities and other

advantages. Development and rural revitalisation go hand in hand and require a holistic approach including all socio-ecological components. The purpose of this concept paper is to highlight how rural revival and revitalisation improve the resilience of rural social-ecological systems and how it addresses some of the sustainable development goals. This paper also explores how the use of corporate social responsibility initiatives are ideal in contributing to rural revitalisation.

SOUTH-AMERICAN SEASONAL RAINFALL AS A PRECURSOR TO SOUTHERN AFRICAN SEASONAL RAINFALL.

André Fourie

Email: u19022001@tuks.co.za

ENSO involves changes in the water temperature of the Central and Eastern Pacific Ocean. The two phases of the ENSO cycle are El Nino and La Nina, and the ENSO cycle influences the rainfall in both South-America and southern Africa during different stages of the ENSO development during the year and different stages of the annual cycle. Rainfall variability teleconnections exist between South-America and southern Africa. This study determines whether South-American seasonal rainfall is a precursor to southern African seasonal rainfall. Correlation analysis is done to determine whether there exists a positive or a negative relationship in terms of seasonal rainfall between the South-America regions and the southern African region. The Climate Predictability Tool is used to determine whether the South-American regions (South-East South-America, Central Chile and the Nordeste of Brazil) are precursors to southern Africa in terms of seasonal rainfall. Through the correlation analysis we show that there exists negative correlations between all of the South-American regions and the southern African region. By using the observational rainfall data over South-East South-America as input in the Climate Predictability Tool it is shown that the Climate Predictability Tool can skilfully predict the above-normal and below-normal seasonal rainfall over the southern African region during its mid-summer season.

SEASONAL VULNERABILITIES AND COPYING STRATEGIES AT WEF NEXUS IN HARARE LOW INCOME AREAS: MOVING TOWARDS SUSTAINABLE CITIES

Crecentia Gandidzanwa (University of Zimbabwe)

Email: pamigandi@gmail.com

This paper reveals the vulnerabilities at the intersection of WEF challenging urban residents in low income areas in Harare and the adaptive options used to overcome such challenges. Key informant Interviews and FGDs with urban households were used. Data was also collected from a total of 314 questionnaires administered to urban residential households in low income areas. The major challenges are faced especially in informal settlement which are not connected to network services. In the face of the vulnerabilities, the households used multiple sources of water most which are unsafe to carry out their daily household chores. Numerous energy and food sources were also used. Identifying and acknowledging the seasonal vulnerabilities faced by Harare residents in low income will assist the vulnerable households better cope with urban WEF challenges, as well as inform the service providers on better ways to improve service delivery. This work motivates policy makers to move towards sustainable WEF provisioning and consumption. It is also important to address WEF challenges in an integrated way for sustainable livelihoods.

DETERMINING RIVER ECOSYSTEM TYPES FOR THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC) REGION.

Lukho Goso (University of Pretoria)

lukogoso@gmail.com

River typing is the process of grouping river reaches based on similarities in abiotic and biotic variables. Currently, little is known about river ecosystem types for the SADC region. This affects biodiversity planning, which requires information on the spatial distribution and connectivity of different ecosystem types. This project uses GIS to determine the degree of connectivity for SADC river ecosystem types, using several spatial datasets to determine river ecosystem types. First, the RiverAtlas version 1.0 was used to calculate dominant Freshwater Ecoregions of the World (FEOW), and Major Habitat Type (MHT) of each river reach. Second, Longitudinal Geomorphic Zones (LGZs) were assigned to the reaches based on their average slope. At a coarser scale, a combination of the MHTs and LGZs resulted in 53 of the 54 possible river ecosystem types, while the finer FEOWs combined with the LGZs resulted in 283 river ecosystem types for the SADC. Tropical and subtropical floodplain rivers dominate the SADC region, accounting for 36% of the total extent of all rivers. The most extensive FEOW in the SADC is #546 Kasai, which is 7.4% in terms of the extent. Lower Foothills are the most dominant LGZ, accounting for 46.2% of the total extent of all rivers.

EXPLORING PEOPLE'S PERCEPTIONS, ATTITUDES AND BELIEFS ON CLIMATE CHANGE, AND THEIR BEHAVIOURS SURROUNDING IT IN CENTURION.

Yasti Govender (University of Pretoria)

Email: u19169567@tuks.co.za

American environmentalist and activist, Paul Hawken said "at present, we are stealing from the future, selling it in the present and calling it gross domestic product." Climate change as most of us know is an ongoing problem that some might argue is largely impacted from anthropogenic processes which as a result has crippled us. Acknowledging that climate change is a problem is, however, only one variable, it is important for people to also understand why climate change happens and what we can do- as a collective effort- to help reduce adding to further environmental degradation which ultimately leads to climate change. People's behaviour is what determines how climate change problems are tackled; people's decision-making skills determine the behavioural actions they are willing to take; and their knowledge on certain matters determines their decision making skills. This research paper seeks to gain insight on people's perception attitudes and beliefs on climate change and what their behavioural inclinations are surrounding the topic, in the area of Centurion in the City of Tshwane. Many research papers look at people's beliefs on climate change however these are more targeted in the Global North. The study conducted will look to fill a research gap in South African literature that may one day aid in beneficial and more influential policies and behaviourism to reduce the adverse effects of climate change in South Africa.

THE MARGIN OF ERROR IN HUMAN PERCEPTION OF TEMPERATURE AND HUMIDITY.

Paul Greyling (University of the Witwatersrand)

Email: 1629917@students.wits.ac.za

A number of tourism climate indices and thermal indices are being developed on the basis of respondent's perceptions of 'ideal climate', using questionnaires. However, it has not yet been established whether an individual can accurately assess what the exact temperature and humidity are

without having access to meteorological data or measuring devices. This questions the reliability of these purported 'ideal' thermal ranges or thresholds. This study explores the accuracy of human perception of real-time temperature and humidity, by comparing survey responses on perceived temperature and humidity against the measured meteorological conditions. Data collection will be conducted during the months of June and July 2022, with a sample size of 150 people. The respondents will be recruited through non-probability convenience sampling, approaching possible respondents in public places. Both the questionnaires and meteorological readings will be undertaken outdoors in the full sun. The difference between the perceived and actual temperature, humidity, and thermal comfort will then be calculated. The results of this study will inform future index development, and the validity of the ongoing use of perceived thermal comfort ratings in these indices.

"WHO'S ON DINNER?" COLLECTIVE FOOD SYSTEMS AND THE ETHICS OF CARE IN BAY AREA HOUSING COOPERATIVES.

Sibel Guner (University of Cape Town)

Email: bella.sibel@gmail.com

People in western cities are working more, laughing less, and missing community. Western cities are increasingly dominated by a neoliberal ideology that values capital above all else, resulting in extensive systems that govern the production of economic goods while restorative social practices are squeezed to the margins. In urban housing, this manifests as atomized nuclear households that maximize private resources and a focus on paid labor. Across the San Francisco Bay Area, informal housing cooperatives challenge this trend with detailed systems of care that restore attention to the realm of social reproduction by collectivizing domestic labor. Using the lens of their food practices allows us to interrogate how such housing projects might solve the challenges facing people in cities that value capital production over human wellbeing. This research explores the question: How can food systems in East Bay housing cooperatives model ways to build systems of care that protect against the harms of neoliberal ideologies in cities? The researcher embedded herself into two cooperatives in the Bay Area to participate in their systems and learn how they cultivate an alternative mode of living in the U.S.'s most expensive region. Findings demonstrate that by building self-organized communities centered around a shared food culture, residents are able to practice a way of living that restores care, time, community, and joy, while modeling a vision for counterpolitics that they hope to eventually see at a larger scale.

SPATIOTEMPORAL VARIABILITY IN VEGETATION COVERAGE AND LAND SURFACE TEMPERATURE IN THE CITY OF BLOEMFONTEIN, SOUTH AFRICA.

Jeniffer Hlongwane (University of the Free State)

Email: 2018366977@ufs4Life.ac.za

Urban expansion has increased rapidly as a result of the socio-economic development in cities and the growth of the urban population. Urbanisation is a result of rural-to-urban migration and natural population expansion due to the spread of built-up areas to peri-urban areas. As the city is expanding and there are some developments on the landscape, vegetation cover is declining. The major impact of the growth of the city is the increase in Land Surface Temperature (LST). Bloemfontein is currently experiencing rapid urban growth resulting in vegetation decline and an increase in LSTs. The main aim of the study was to determine the differences in LST and vegetation cover in the city of Bloemfontein. The study is informed by 3 objectives: i) To determine the changes in the distribution of LST and NDVI

in Bloemfontein between 2014, 2016 and 2019, ii) To examine the relationship between LST and NDVI between 2014, 2016 and 2019 in Bloemfontein and iii) To establish measures that should be put in place to alleviate LST in Bloemfontein. Data for this study was Landsat 8 satellite images and literature studies focusing on the LST and NDVI. The results show that the LST is increasing and the NDVI is decreasing by 0. 56 and 0.58. The relationship between NDVI and LST denotes a negative correlation while on the other year 2016 shows no correlation by 0.65. The study is carried out to provide information to the municipality to undertake appropriate decisions to reduce the impact of the UHI by adopting effective planning measures. This study also provides information on the data and methods that can be used to quantify LST for future planning measures in the city.

EXAMINING THE EFFECTIVENESS OF SOCIAL MEDIA IN EIA- THE CASE OF XOLOBENI, EASTERN CAPE SOUTH AFRICA.

Tlhoeli Hokinyane

Email: 2013103847@ufs4life.ac.za

This is a qualitative case study that examines the role that Twitter TM plays in affecting change in the environmental impact assessment in Xolobeni, a village in the Eastern Cape, South Africa. This is a topical issue given the observed effectiveness of online activism such as #MeToo and #BlackLivesMatter in correcting social injustices globally through social media. Data was collected by a document analysis of the scoping reports, basic assessment reports and environmental impact assessment reports, published books, court proceedings, scholarly articles and legislature applicable to the EIA procedures. The study analyses three cases on Twitter activism to challenge three environmental authorizations which were granted to developers in Xolobeni. Local villagers launched a feverous campaign through the Amadiba Crisis Committee (ACC) to raise awareness of the violation against the community that has been side-lined in the assessment and decision-making processes that led to the environmental authorizations being granted. They effectively gathered enough support through this Twitter campaign to be granted an appeal in terms of NEMA. The ACC gathered enough partition signatures globally through their Twitter pages to start the process of legal action against the developers. This case study shows how Twitter can be used effectively by a community to challenge an EIA process and its outcomes.

INVESTIGATING TRENDS OF EXTREME COLD TEMPERATURE EVENTS IN THE FREE STATE FROM 1990 TO 2020.

Hlavutelo Hosana (University of the Free State)

Email: 2018439725@ufs4life.ac.za

Extreme temperature events pose a great threat to the environment, society, and economy. The focus over the years has been on warm extremes, however, research done thus far on cold extremes show that even with increasing global temperatures, cold extremes persist. Extreme cold temperature events such as cold waves are infrequent and unpredictable climatic activities caused by extremely low temperatures resulting in detrimental impacts. These events have adverse impacts on countries, particularly developing countries such as South Africa with inadequate infrastructure and low adaptability capacity. This study analyzes the spatial and temporal trends of extreme cold events in the Free State, South Africa, from 1990 to 2020. To characterize the cold temperature data, the World Meteorological Organisation (WMO) Commission for Climatology and Indices (CCI) Expert Team on Sector-Specific Climate Indices (ET-SCI) are applied. The extreme cold indices are calculated using ClimPACT and the trends are determined using the Mann-Kendall test, Spearman Rank Correlation

and Sen's Slope estimates. The results show cold extremes fluctuate regionally and seasonally. The occurrence of frost and hard freeze days increased, whereas cold waves decreased. Overall, increasing trends were evident in cool days, cold nights, and consecutive cold days and nights during autumn and winter. The research findings contribute to the existing knowledge base and awareness-raising for extreme cold temperature events in South Africa in this warming world."

SPATIOTEMPORAL PATTERNS OF HEATWAVES ACROSS THE NORTHERN CAPE PROVINCE, SOUTH AFRICA: 1979-2021.

Jacobus Kruger (University of the Free State)

Email: kooskruger305@gmail.com

Across South Africa, the Northern Cape Province (NCP) is expected to have the largest increase in surface air temperature and heatwave characteristics, and this will amplify associated human and environmental implications. Research on heatwave trends has predominantly used station data which does not give a good spatial picture. Thus, this work uses daily maximum and minimum surface air temperature gridded data from 1979-2021 (AgERA5) to identify heatwaves and analyse associated spatiotemporal patterns. Heatwaves characteristics are identified based on the Expert Team on Sector-Specific Climate Indices. Three heatwave aspects are derived for the summer season (Nov-Mar): the total heatwave days (heatwave heatwave frequency; HWF), the average heatwave temperature (heatwave magnitude; HWM) and the number of heatwave events (heatwave number; HWN). To explore central tendency and variability, arithmetic mean and standard deviation are investigated. The Mann-Kendall trend test and Sen's slope values were used to calculate trends and represent the rate of change for all grid cells, respectively. On average the NCP experiences 1.5 heatwave events (HWN), lasting for 7.5 days (HWF), with an average HWM of 4.7 °C2. Generally, the HWN and HWF increased with many observed statistically significant trends, however, decreasing trends were evident. On average there is an annual increase of <0.01 events.year-1, lasting for 0,03 days.year-1 longer and decreases in magnitude with a rate of -0.01 °C2.year-1. Because heatwaves have adverse implications on livestock agriculture, water scarcity and tourism, to name a few, this research should be considered for decision-making regarding mitigation strategies.

USED DISPOSABLE DIAPER DISPOSAL PRACTICES BY PARENTS WHOSE BABIES RECEIVE POST-NATAL SERVICES AT ROSENKRANTZ CLINIC IN GA-MATLALA.

Ramokone Lamola (University of Pretoria)

Email: ramokonesarahlamola@gmail.com

The promotion of clean environment by the public has considerable impact in the reduction of solid waste in communities. Soiled disposable diapers form part of solid waste and since their invention;their consumption has increased resulting in management challenges and subsequent environmental consequences as they are not biodegradable.The purpose of this study was to investigate how parents dispose soiled disposable diapers in the rural areas of Ga-Matlala in Limpopo province. The study sought to determine the awareness and perception of parents on environmental and health risks associated with poor disposal of soiled disposable diapers. The study also sought to establish the use of disposable and cloth diapers. This was a survey research which used both quantitative and quantitative research method.Questionnaires,field observational checklist and structured interview were employed with the parents and municipal waste management official.Data analysis was done using Statistical Package for the Social Sciences. The study established that majority of the participants uses disposable diapers. Moreover,the majority of parents dispose their soiled

diaper waste by burning them.Most participants are aware of the negative impacts that disposable diapers has on the environment and they are willing to work with the responsible municipality to keep their communities clean and safe for them and their livestocks.This study recommends that the municipality should provide the communities with skip bins and educational awareness programs that would educate people about the proper ways to dispose their waste and how they should dispose their solid waste in skip bins.

STUDIES INVESTIGATING THE IMPACTS OF EXTREME CLIMATE ON WATER RESOURCES IN THE AFRICA SHOWED THAT CLIMATE EXTREMES AFFECT BOTH THE QUALITY AND QUANTITY OF WATER RESOURCES.

Kholofelo Letsong (University of Limpopo)

Email: kpletsong@gmail.com

The Limpopo province is one of the most vulnerable provinces to climate extremes because of its low adaptive capacity to climate change and extreme climate events. This study aims to assess climate variability and extremes, by considering meteorological data from 12 climate stations, and its impacts on the water levels of 5 dams in Limpopo province, from 1988 to 2018. Climate variability and trends in Limpopo was assessed using in-situ secondary rainfall and temperature data. To establish the variability of various atmospheric variables, mean and anomaly seasonal composite plots produced from National Climate and Environmental Program (NCEP) data, were analysed. An analysis of the seasonal variations showed an increase in temperature and rainfall, as well as high evaporation losses during the summer season, and a decrease during winter with lower evaporation from the dams. Temperature exhibited a positive trend at 75% of the climate stations, whereas rainfall showed a decreasing trend at all the climate stations considered. Temperature and rainfall amounts show a weak positive correlation with the dam levels meaning that dam levels increase with both temperature and rainfall. Therefore, the reduction and increase in dam levels is related to the variability of temperature and rainfall of the region, this relationship is directly proportional. Additionally, a drought index (PDSI) computed at Tzaneen climate station and was considered together with Tzaneen dam levels as a case study to establish the effect of dry and wet periods on dam levels. It was found that Tzaneen experienced more wet periods than droughts which can be attributed to high temperatures leading to increased evaporation. This study provides insights on the relationships between relevant atmospheric parameters and dam levels in Limpopo Province. The results presented could assist in quantifying the effects of climate variability on dam levels and thereby be useful when developing mitigation and adaptations plans for the province.

INSIGHT INTO URBAN DECLINE AND URBAN RENEWAL IN THE CITY OF EKURHULENI: THE CASE OF BENONI.

Mathabo Lifero (University of Pretoria)

Email: u22841866@tuks.co.za

The escalating urban problems in South Africa can be attributed to factors such as deindustrialisation and ultimately the end of the of the apartheid era, the trend of declining cities can be seen in various metropolitan cities in South Africa. This study in particular focuses on the city of Benoni. This study will be done by reviewing the history of urban decline in the Benoni CBD , understanding the current and future plans for urban renewal in the Benoni CBD area and the Benoni Plaza will be used as a case study to highlight the urban decline and urban renewal strategies that have been implemented over the years. A combination of archival work , policy review as well as the perspectives of the key

respondents who have worked, lived or owned a business in Benoni for twenty years or more and has been utilised to retrieve the relevant information regarding this study. The results of this study show varying results and show an amalgamation of unforeseen factors that have contributed to the state of city's decline ranging from deindustrialisation, a lack of local government initiative as well as the migration of foreigners. Policies, strategies and action has been taken to improve the state of the city of Benoni but the bigger question is, is there more to be done ? And is the model that is being utilised sustainable enough to prevent a reoccurrence of the same issues in the near future?

ANALYSIS OF EXTREME SUMMER RAINFALL EVENTS ACROSS THE FREE STATE PROVINCE, SOUTH AFRICA: 1981-2022.

Nicolle Loader (University of the Free State)

Email: 2015058262@ufs4life.ac.za

Extreme rainfall events have disastrous implications, influencing, among others, agricultural productivity, and human health. The 6th Assessment of the Intergovernmental Panel on Climate Change recently reported that South Africa will likely experience an increased occurrence of extreme rainfall events under anthropogenically-induced warming. Evidence from literature suggests that these changes are already occurring, with observations revealing increases in their magnitude and frequency, particularly across the central and eastern regions of the country. Focusing on the central region of South Africa, the current study explores trends and interannual variability in extreme rainfall events for the summer months (October-April) for the period of 1981-2022 across the Free State Province, within South Africa's summer rainfall zone. Rainfall trends were calculated using the Mann-Kendall trend test and Sen's Slope, while a composite analysis was undertaken to investigate the impact of the El Niño Southern Oscillation (ENSO) on extreme rainfall events. Although the analyses are still ongoing, based on previous studies, it is expected that the trend results will show an increase in magnitude and frequency of extreme rainfall events. As for the ENSO impact, a higher (lower) frequency and magnitude of extreme rainfall events is expected during La Niña (El Niño) years along with an increase in trends.

EXPLORING THE PERCEPTIONS OF RURAL COMMUNITIES TOWARDS RURAL-URBAN MIGRATION AND THEIR INFLUENCE ON THE REALISATION OF MIGRATION: THE CASE OF KWANOKWEJA, KWAZULU NATAL, SOUTH AFRICA.

Buhle Adorable Lunika (University of Zululand)

Email: adorablebee1@gmail.com

The South African history of migration is deeply entrenched in the past political events that influenced the patterns of human mobility and settlement within the country. The colonial and apartheid policies restricted the mobility of black Africans within and into the country and afforded free mobility rights to the whites. The then existent policies favoured the development of areas for the minority whites, and excluded areas designated for non-whites from development programmes. The urban areas were economic hubs with diverse employment opportunities and public amenities, while the rural counterparts were mainly used as labour reserves for the mines in the urban areas. The dawn of democracy led to an influx of internal migrants, moving from rural to urban areas for various reasons. South Africa is challenged with high rates of urbanisation and rural-urban migration. The objective of this paper is to explore the perceptions of the rural residents in KwaNokweja towards rural-urban migration, and their influence on migration decisions. The Push and Pull Theory will be employed to identify the factors that push individuals out of the rural areas, and attractions drawing them to urban

areas. This study makes adopts a mixed methods approach, employing semi-structured interviews in the qualitative field, these are suitable to capture the understanding of the relevant municipal authority, councilor and traditional authority. Quantitative questionnaires will capture the social-economic characteristics of households and the experiences that shape their attitudes, perceptions, and migratory behaviours. These will be administered to households, in line with the New Economics of Labour Migration theory which acknowledges that households play an integral part in the migration decision process.

INVESTIGATING THE EFFECT OF VERMICOMPOST FROM RED WIGGLER WORMS ON SPINACH CROP GROWTH.

Yamkela Lusasa (Walter Sisulu University)

Email: yamkelalusasa@gmail.com

Globally, food shortages seem to be a problem and the growing population puts pressure on agriculture, increasing the demand for more food to be produced. Despite the increasing need for more food production the environment needs to be put into consideration, thus sustainable agriculture must be practiced. Penning de Vries et al, (1995) describes sustainable agricultural practices as a manner in which the quality of the soil and the non-agricultural environment either remain constant or improve, and limited natural resources such as water and mineral fertilizer are not overexploited. This could be practical if the environment is preserved, that is expansion of agriculture into ecosystems is stopped, less inorganic fertilizer is used, and also when food waste is reduced. Therefore, the current study investigated whether vermicompost from red wiggler worms (Eisenia Foetida) could improve soil quality for crop growth and also reduce municipal waste going into landfills as these worms have an ability to ingest and alter organic wastes into humus-like organic material. To achieve this, an experiment was conducted where three plots (A, B and C) of spinach were cultivated. Two of the plots will be treated with different fertilizers Plot A with vermicompost, plot B with any random organic fertilizer and plot C will be the control where no treatment were used. Comparison will be made by measuring the stem and leave of the crop on the 3 plots respectively. Results were summarized using tables and graphs, and where necessary analyzed using t-test and ANOVA.

EXPLORING INFORMAL TRADERS' FLOOD PREPAREDNESS IN LADYSMITH, KWAZULU-NATAL.

Noluthando Madondo (University of Zululand)

Email: phumelelenoluthando1@gmail.com

Exploring informal traders' flood preparedness in Ladysmith, KwaZulu-Natal is urgent with unprecedented climate change. Globally, floods are set to increase in frequency and intensity. As it stands, Ladysmith experiences severe floods regularly. Informal traders are amongst the vulnerable informal economic actors because they stand at the margins of the climate-challenged economy due to their greater resource constraints and low adaptive capacity. At present, there is a dearth of information on informal traders' flood preparedness level in Ladysmith. Hence, this study explores the flood preparedness level of informal traders using a mixed-methods approach. A questionnaire survey will be administered to 40 informal traders and two municipal officials will be interviewed. The study intends to expand the body of knowledge on informal traders' experiences, level of preparedness, and coping and adaptation strategies. Thereby guiding the formulation of context-specific flood preparedness and coping and adaptation plans and programmes in Ladysmith.

BEYOND PROCEDURAL PLANNING: ADVANCING THE EXPLORATION OF PLACEMAKING FOR URBAN PUBLIC SPACE IMPROVEMENTS IN SOUTH AFRICA.

Thendo Mafame (Stellenbosch University)

Email: tmafame@sun.ac.za

South African cities have witnessed the proliferation of separated infrastructure growth, where urban spaces have been isolated, calling for place targeted interventions. Globally, improving urban public spaces is increasingly guided by collaborative and participatory methods. In theory, collaborative engagements, such as placemaking, for urban public space improvements, result in developments aligned with beneficiaries' needs. Placemaking as a comprehensive method to guide the improvements of urban public spaces comes from the emphasis on a procedural planning approach, such as having clear steps and guidelines to undertake a planning process. Despite the prominent acknowledgement of the significance of placemaking as a critical strategy to create participatory and collaborative planning processes for inclusive urban public space improvement, there has been limited exploration of the use of placemaking at both theoretical and practical levels in the South African context. This study aimed to explore and understand placemaking processes within the planning theories and how a general practice of placemaking influences the professional urban planning practises by private organisations, which target spatial improvements and place creation in urban areas. The study addressed its aim by investigating procedural planning theory's comprehensive and communicative practises and its enablement of participatory and collaborative planning processes such as placemaking. The virtual qualitative research methods, such as semi-structured interviews, focus groups discussion and virtual observations, were used to examine multiple case studies. The study's results had made a novel theoretical, methodological, and academic reach application to placemaking practice contribution. This contribution was achieved by filling the gap to advance the exploration of procedural planning theory's comprehensive and communicative practises and its enablement of participatory and collaborative planning processes, to understand the emergence of the placemaking concept. Thereby unlocking the potential of placemaking practise in cities of the Global South.

THE SPEED OF MOVEMENT OF TROPICAL CYCLONES IN THE SOUTH INDIAN OCEAN UNDER ANTHROPOGENIC WARMING.

Aaliyah Mahomed (University of the Witwatersrand)

Email: 1601732@students.wits.ac.za

The emergence of Category 3-Category 5 cyclones in the South Indian Ocean poses a threat to developing countries as they are more vulnerable to tropical cyclone disasters than regions with established disaster management strategies. Recent research regarding the translation speed of tropical cyclones suggests that under a warming climate, global tropical cyclone translation speed has decreased by 10% over the period 1949-2016. The slowdown of high-intensity storms will exacerbate the impacts of tropical cyclones resulting in longer periods of flooding, strong winds and storm surges, subsequently causing environmental and infrastructure damage, loss of human life and economic decline. However, several studies have contested this slowdown, arguing that the shift to geo-stationary satellite monitoring after 1980 introduces heterogeneity to multi-decadal data. Tropical cyclone speed generally increases with latitude thus undetected slow-moving (fast-moving) tropical cyclones at low (high) latitudes will increase (decrease) the mean annual global tropical cyclone speed.

Furthermore, inaccurate estimates of tropical cyclone frequency contaminates the mean value of tropical cyclone speed thus affecting trend analysis. This study explores this debate for the South Indian Ocean, using from National Oceanic and Atmospheric Administration (NOAA) International Best Track Archive for Climate Stewardship (IBTrACS) over the period 1980-2021. A sufficient understanding of anthropogenic influences on tropical cyclones particularly, in the South Indian Ocean, is important in contributing to accurate forecasts on the likelihood and occurrence of these storms, thus allowing vulnerable coastal regions to plan and adapt to these evolving tropical cyclones.

(UN)SAFETY AND (IN)SECURITY IN A MIDDLE-INCOME NEIGHBORHOOD: CASE STUDY OF PHASE 2 BLOEMANDA, BLOEMFONTEIN.

Xolani Makhubo (University of the Free State)

Email: 2013165226@ufs4life.ac.za

The middle-income suburb is described as the neighborhood of the working class. However, it is important to give attention to the intrinsic problems associated with their safety and security. This study explores the geography of (un)safety and (in)security in a middle-income suburb, phase 2 Bloemanda, Bloemfontein. The study identifies, address and understand the unique dynamics of (un)safety and (in)security within the area. The study also clarifies the key contextual factors that contribute to the increase of criminal activities within middle-income suburb, phase 2 Bloemanda, Bloemfontein. The empirical data was obtained by using qualitative research approach to get the data using the interviews of the councilor, community policing forum (CPF) and police. Also, quantitative research approach was used in the study to obtain the data from the community using interviews and analysis of quantitative data to further explain and identify statistical relations of variable. The statistical package for the social science (SPSS) was used to analyze data, which is used for complex statistical data analysis. The statistics of the cases that has been reported in the area were obtained from the Kagisanong police station. However, that provided clarity on types of criminal activities mostly occurring in the area. Cases were reported mostly on Mondays and Tuesdays because most crimes occur over the weekends. The empirical findings also demonstrated that the community is not safe inside their own homes even though the neighborhood is a gated community but that does not stop the offenders to get inside the victim's home.

EVALUATING THE ROOT CAUSE OF FLASH FLOODING IMPACTS IN ALEXANDRA USING THE CITY-RAP URBAN RESILIENCE TOOL.

Moleboge Makushu (North-West University)

Email: RitaMakushu@gmail.com

The intensity and frequency of flash floods has increased across the world, especially in urban environments as a result of fluctuations in extreme rainfall events. Their occurrences are destructive to property as well as disruptive to the everyday lives of the people affected. However, rainfall is not the only factor that drives how frequent and intense flash flooding is. There are a number of other environmental, socioeconomic, political and physical factors that drive these disasters and their impacts. In this study, we focus on flash flooding in Alexandra. This is an informal settlement that is subjected to flash floods annually which leads to regular loss of lives and livelihoods together with the damage to infrastructure. Through the use of the UN-Habitat City-Rap methodology, we aimed to identify these unique contextual drivers that make communities in Alexandra vulnerable to flash flooding. Preliminary findings indicate that factors such as poverty, xenophobia, poor urban planning, lack of rainwater drainage infrastructure, lack of disaster awareness campaigns and plans as well as

deficient early warning systems all play a role in making communities in Alexandra vulnerable to flash flooding events.

SYNOPTIC ENVIRONMENTS IN WHICH SUPERCELL THUNDERSTORMS DEVELOP OVER THE HIGHVELD OF SOUTH AFRICA.

Joew Malebane (University of Pretoria)

Email: u17144958@tuks.co.za

Supercell thunderstorms are extremely severe thunderstorms which may cause heavy rainfall, hail and even tornadoes. The synoptic circulation associated with supercells are only anecdotally known and the aim of this research is to objectively identify the associated weather systems. The synoptic-scale environments in which supercell thunderstorms develop over the Highveld are investigated from 2010-2020, during warm months. A recent study identified 66 left moving supercell days over the highveld of South Africa and these are used for the analysis. Self-Organizing Maps (SOM) are used to qualitatively understand and cluster the synoptic circulation associated with supercell development. The SOM was trained on 1994 days and the 1200 UTC, 850 hPa geopotential heights were used in the analysis. The SOM created 28 archetypal nodes, where only 6 nodes were identified having more than 4 supercells occurrence during the entire period. The favoured synoptic types are the ridging Atlantic Ocean High which occurred on 14% of supercells days, a ridging high with a surface cold front (23% of supercell days) a deep surface trough with a well-established Indian Ocean High (9% of supercell days). A westerly trough with an associated cut-off low caused supercells to develop on 6% of all supercell days. Ridging-high dominated supercell events developed on the western edge of the highveld. Most of the supercell days (46%) are associated with presence of a dryline, with very steep moisture gradient. Each of the synoptic types were accompanied by 850 hPa surface convergence and most of the nodes indicated a tropical temperate trough like circulation with high values of 500 hPa relative humidity from tropical Africa to the south-east coast. One notable exception was the ridging high node where the air remained dry. Knowledge of the synoptic environments presented here may provide forecasters with integrated description, the synoptic circulations, characteristics, and frequency associated therewith, to forecast supercell thunderstorms timeously with greater accuracy.

IMPACT OF GOLD MINES ON THE LOCAL SURFACE WATER SYSTEMS: A CASE STUDY OF THE KAAP RIVER IN BARBERTON, MPUMALANGA.

M.F. Mamabolo (University of Mpumalanga)

Email: 219000603@ump.ac.za

Mining activity has been identified as the most significant source of heavy metal contamination in river basins, this due to inadequate disposal of mining waste thus resulting in acid mine drainage. In the case of gold mining, the reaction between gold-bearing rocks, water, and oxygen causes acid to form in tailing dams near gold mining locations. Sulphide minerals are abundant in gold-bearing rocks. When minerals come into contact with water and oxygen, they dissolve and produce substances that are highly acidic in the water. After a period of time the acidity of the water increases thus allowing more minerals in the rock to be dissolved. This research will investigate the impact of gold mines on the Kaap river system, Barberton, Mpumalanga Province. This will be done by assessing the water quality and identifying of pollutants sources flowing into Kaap River, as well as comparing the various contaminants in the water samples with the limits specified in the South African National Drinking standard (SANS) and the standards for pollutant discharge into the environment. The study will also

investigate the mineralogical composition of various mine spoil and rock samples by microprobe analysis to ascertain the possible sources of the metals in surface waters. The study will comprise water, rock and mine tailings samples. The rock and mine tailings samples will analysis using XRD and SEM-EDS. On-site measurement of the potential of hydrogen (pH), electrical conductivity (EC), total dissolved solids (TDS), and dissolved oxygen (DO) will be taken by utilising a BANTE 900P portable water quality meter. This research will assist in enhancing knowledge regarding the quality of water in the Kaap river. It will also provide information regarding the heavy metals present in the water as well as whether the heavy metals present are from mine tailings or weathering of rocks. Furthermore, the study will recommend measures that can be implemented to reduce the impacts of gold mining on water resources.

MAPPING THE EFFECTS OF CLIMATE CHANGE ON THE QUANTITY OF WATER WITHIN THE MIDDLE-LETABA DAM, LIMPOPO PROVINCE.

Mulisa Mapfumo (University of Venda)

Email: mulisamapfumo3@gmail.com

Water is critical in sustaining life, crucial to economic growth, social development as well as environmental sustainability. Therefore, the problem of water shortage is not just a local, provincial, or national phenomenon but a global issue that affects individuals, industries as well as the economies at large. Climate change, identified as one of the major global challenges in the twenty-first century, affects both natural and human systems by increasing their vulnerability at various scales and with varying intensity. This study is aimed at mapping the effects of climate change on the quantity of water within the middle-Letaba dam for the period between 2009 and 2020. In this study, the Landsat data were used for mapping water bodies. Two water bodies' extraction indices namely, Normalized Difference Water Index (NDWI) and Simple Water index (SWI) were tested for extracting water bodies from Landsat data. The results of this study indicated that SWI yielded the highest overall accuracy 72.36% for all the years being studied whereas NDWI yielded the lowest overall accuracy 63.56%. The year 2014 showed a great difference when compared to other years as it has recorded (NDWI 12.94 and SWI 12.33 squared km) in the Middle Letaba Dam as compared to the other years that were recorded as follows: 2009 (NDWI 4.03 and SWI 2.53 square km); 2017 (NDWI 6.11 and SWI 7.23 squared km) and 2020 (NDWI 2.32 and SWI 1.56 squared km). The year 2014 SWI map is slightly different from the validation map, 2014 SWI recorded 12.03 squared km while the validation map is 11.70 squared km . The results of this study indicate that heavy rains, floods, and drought are the results of climate change and their manifestation can be mapped using remote sensing data. Remote sensing contributes vitally to mapping water, as it can measure and give results of the water quantities

DISTINGUISHING BETWEEN ELEPHANT AND CLIMATIC VARIABILITY INDUCED THICKET DEGRADATION IN ADDO ELEPHANT NATIONAL PARK.

Tlhologelo James Mapheto (Nelson Mandela University)

Email: James.mapheto@gmail.com

This study aimed to distinguish elephant-induced thicket degradation from the effects of climatic factors, using remote sensing and GIS techniques. This involved using satellite imagery to map land cover classes for 1998 and 2018. The IDW spatial interpolation technique was applied on climatic datasets (rainfall and temperature). Trend analysis was performed on climatic data and NDVI dataset to illustrate time series of each variable; this also provided input data for spatial correlation approaches. A model was then created using the NDVI trend and the NDVI vs. Rainfall residuals. Clear

cases of thicket degradation are observed in the AENP; especially in areas with perpetual elephant activities. The combined spatial coverage of thicket vegetation cover classes decreased from 60,49% in 1998, to 49,19 % in 2018. The spatial interpolation of the climatic variables revealed an inverse relationship between the spatial distribution of mean rainfall accumulation and mean maximum temperature. The trend analysis revealed that a decrease in rainfall accumulation has a delayed negative effect on vegetation condition, and vice versa. The residuals reveal that elephant activities had a major impact on vegetation production. The model depicting vegetation productivity shows that 63,42 % of the AENP landscape experienced degradation of vegetation productivity over the study period. This study concluded that elephant activities were key drivers of vegetation degradation in the AENP over the 1998 to 2018 study period.

FRAMING WATER SUPPLY SUSTAINABILITY AND ADAPTATION IN DROUGHT-AFFECTED AREAS OF MBHASHE AND MNQUMA IN THE AMATHOLE DISTRICT MUNICIPALITY.

Fortunate Nomsa Mapuka (University of Fort Hare)

Email: 201412369@ufh.ac.za

Water scarcity is becoming more prevalent across different landscapes, and many countries are grappling with the sustained supply, quality, and quantity thereof. Accordingly, climate change is now recognized as one of the defining water supply challenges for the 21st century. Therefore, South Africa, as a water-scarce country with rainfall distributed unevenly on the landscape and tied to seasonal cycles that drive repeatedly from feast to famine, between floods and droughts, must act urgently to safeguard water resources and ensure their efficient and effective usage. As a result, this study uses interviews, research questionnaires, and focus groups to identify the challenges faced by drought-affected areas at the local level when addressing water shortages due to drought and to explore locally relevant water supply sustainability and adaptation options through knowledge co-production using two of the six local municipalities under the drought-stricken Amathole District Municipality as case studies. The expected outcome of the study is an integrated strategy that promotes resilience for water systems in drought-afected areas and that balances robustness with flexibility, to address both the short- and long-term implications of drought on water supply.

URBAN AGRICULTURE IN POOR NEIGHBOURHOODS: CASE OF EKANGALA, PRETORIA, SOUTH AFRICA.

Erica Nthabiseng Mashanye (University of the Free State)

Email: 2017226388@ufs4life.ac.za

Urban agriculture helps to improve food insecurity in cities, especially among poor neighborhoods. This importance prompts many citizens to engage in urban agricultural activities worldwide. However, while there is immense an engagement of urban agriculture in cities worldwide, certain neighborhoods in cities participate less in urban agriculture. This study focuses on Ekangala Township in Pretoria where there is less engagement in urban agriculture. Questions as to why there is less participation in urban agriculture in this specific township will be answered in this paper. Disabling and enabling factors of urban agriculture are explored in this study by focusing on the laws and policies of urban agriculture implemented and used in this neighborhood, spatial justice issues, and other factors contributing to urban agricultural activities of the township. Thirty households were interviewed using stratified random sampling method where fifteen households were those partaking in urban agriculture and fifteen were those that did not. Different ways of integrating innovative and

alternative forms of urban agriculture in this neighborhood will be explored using the already existing factors contributing to the engagement and disengagement of urban agriculture.

ASSESSING THE IMPACT OF LAND REDISTRIBUTION APPROACH ON SMALL-SCALE FARMERS LIVELIHOOD IN VUWANI TOWNSHIP IN LIMPOPO PROVINCE, SOUTH AFRICA.

Vhugala Mashau (University of the Free State)

Email: 2021596388@ufs.ac.za

The debate on land reform approach appears far from over as ordinary citizens are becoming aware of their democratic rights to land ownership in South Africa. Government adopted a three-dimensional approach namely land tenure, land restitution, and land redistribution to address apartheid era injustices on land issue. I argued that, despite the gains of democracy on land reform matters, the land redistribution approach is seen as disincentive to the small-scale farming development initiatives. The land redistribution strategy was utilized in this study as a starting point. The aim of this study is to assess the impact of land redistribution approach on the livelihood of small-scale farmers in Vuwani Township. The major finding of the study was that there is a decline in small-scale farming performance in Vuwani Township due to land claim threats. The land is generally underutilised as neither the potential beneficiaries nor current occupants of the claimed cannot invest in them yet. The findings revealed that there are conflicting rationalities where in these disputes are politically motivated, and others resulted from land usage rights demands. This was used to explore other factors towards justification of the claim that indeed the land redistribution approach is a disincentive on the livelihood of small-scale farmers in Vuwani Township. The study's conclusion is that small-scale farmers can still significantly benefit from a well-planned and implemented land reform.

THE THERMODYNAMIC ENVIRONMENTS IN WHICH SUPERCELL THUNDERSTORMS DEVELOP OVER THE HIGHVELD OF SOUTH AFRICA.

Langutelani Mathebula (University of Pretoria)

Email: u18325824@tuks.co.za

Severe weather associated with supercell thunderstorms can present a significant threat to the property and the lives of the people over the highveld of South Africa. Supercells are a subset of severe weather-producing thunderstorms. In some cases, the occurrence of supercells corresponds with the development of tornadoes, strong damaging winds, large hail, and heavy rainfall. The thermodynamic environments in which supercells develop over the highveld of South Africa are as yet not well understood. Severe weather conditions associated with supercells have profound implications on the economy and constitute a substantial risk to the society of South Africa. The main goal of this research is to study the thermodynamic and wind shear characteristics of the environment before the development of supercells over the highveld of South Africa. A database of supercell thunderstorms over the highveld was used and dates were identified for further analysis using ERA5 reanalysis data. Variables associated with the formation of severe storms were calculated namely convective available potential energy (CAPE) and wind shear through the lowest 6 km of the atmosphere. In our study, we found that wind shear plays a more important role than CAPE value compared to those found in established literature. CAPE values are generally significantly smaller than those found at locations at lower elevations such as the great plains of the USA. It is recommended that these findings be tested on a larger sample size to confirm their accuracy. Understanding the thermodynamic and wind shear characteristics of the environment, a few hours before the development of supercells over the highveld will increase the lead time forecasting of supercells, this will help save lives and properties."

KNOWLEDGE AND PERCEPTIONS OF SOUTH AFRICAN ADULTS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS.

Nondumiso Mathibela (University of Johannesburg)

Email: nnmathibela13@gmail.com

The Sustainable Development Goals (SDGs) are a set of global goals which call for worldwide action and seek to combat poverty, protect the planet and ensure that all individuals live in justice, peace and prosperity. The study aims to investigate South African adults' knowledge and perceptions of the SDGs. Furthermore, the study also briefly discusses the impact of the Covid-19 pandemic on the SDGs and people's perceptions. To achieve the objectives of this study, a semi-structured online survey was designed and conducted to assess the adults' knowledge and perceptions of the SDGs. The results with 153 respondents revealed that the majority of South African adults enrolled at a higher education institution, those who have post-matric qualifications or those who have completed their qualifications have good knowledge regarding the SDGs which has influenced their positive and supportive attitudes towards the SDGs. Adequate knowledge and supportive attitudes toward the SDGs are essential for the overall implementation, progress, and achievement of the SDGs.

MODELING SUITABLE HABITATS FOR ARTEMISIA AFRA USING THE MAXIMUM ENTROPY MODEL IN SEKHUKHUNE DISTRICT MUNICIPALITY, SOUTH AFRICA

Willem Matsane (University of Limpopo)

Email: willemmatsane@gmail.com

Artemisia afra is one of the indigenous medicinal plants that is brutally harvested due to its wide spectrum of medicinal benefits. Predicting the potential habitats and understanding optimal environmental conditions for growing Artemisia afra is required. This paper, therefore, sought to assess the most significant environmental variable influencing the suitable habitat of Artemisia afra and to further predict the potential habitat distribution. To achieve this aim, a total of 141 sampled points, topographic variables, and bioclimatic variables were used to perform the Maxent model. The Maxent model was used to estimate suitable habitat distribution in this study, because of its advantage of depending on present data only, outperforming incomplete data, and small sample sizes. The area under the curve was used to evaluate the accuracy of this model and Jackknife was used to estimate the importance of environmental variables in habitat prediction. Results showed that elevation, isothermality, mean temperature of the warmest quarter, mean temperature of the coldest quarter, precipitation of driest month, precipitation seasonality, precipitation of warmest quarter, annul mean temperature, slope, and aspects are important in predicting suitable habitat for Artemisia afra. Based on the AUC score of 0.96 the model was extremely accurate. Furthermore, results revealed that Artemisia afra has a high probability of occurrence in mountainous areas. The results can be used for protecting and conserving endangered plants.

FLOOD IMPACT ASSESSMENT AT HENNOPS RIVER USING GIS AND REMOTE SENSING.

Matilda Mbazo (University of the Witwatersrand)

Email: matilda.mbazo@gmail.com

Climate change is a global phenomenon that has observable impacts on the environment. Subsequently, global weather patterns have aggravated rainfall patterns all over the world. Increased rainfall over Southern Africa as a result of this change in weather pattern has resulted in multiple types of floods such as flash floods, groundwater floods, coastal floods and river floods, causing substantial

environmental damage and socio-economic deprivation. The research project employs Geographic Information System (GIS) techniques and data such as Digital Elevation Model (DEM) to assess the impact of floods exacerbated by climate change in South Africa, inland in the Gauteng province, specifically in Centurion.

AN INVESTIGATION OF ENVIRONMENTAL SUSTAINABILITY KNOWLEDGE, ATTITUDES, AND PRACTICES AMONGST HIGH SCHOOL STUDENTS IN MBOMBELA, MPUMALANGA PROVINCE.

Payal Mehta (University of Mpumalanga)

Email: 219103542@ump.ac.za

The natural environment has faced increased degradation in the past few decades due to urbanisation and industrialisation, which has heightened the need for environmentally sustainable practices to ensure the efficiency of finite natural resources. For the global transition towards sustainability to be successful, it is vital to assess the knowledge, attitudes, and practices towards environmental sustainability in different groups of people. This study aims to use a qualitative approach to conduct an investigation of the environmental sustainability knowledge, attitudes, and practices possessed by students in a high school. The selected study area is Lowveld High School located in Mbombela, Mpumalanga province. The theoretical framework used for this study is the Hines Model of Responsible Environmental Behaviour. The methodology includes using an encrypted recording device to record data through focus groups for 35 students and semi-structured interviews for 5 teachers. Only students of grade 12 will be considered as this study focuses on students of senior age. A combination of random sampling and purposive sampling will be used in this study. Informed consent forms will be distributed to participants above the age of 18 while informed assent forms and parental consent forms will be distributed to participants below the age of 18. The recordings will be transcribed manually by the researcher. The transcribed data will be recorded and analysed using thematic analysis. The data analysis technique for this study is thematic analysis, which involves coding the data to identify prominent themes and patterns.

THE EXTENT SOUTH AFRICAN POLICIES CONSIDER AND INCLUDE EXTREME CLIMATIC EVENTS (ECES) AND THE IMPACTS THEREOF ON HEALTH; FOCUSING ON ETHEKWINI.

Charné Meyer, Caradee Wright (University of the Witwatersrand)

Email: 1862115@students.wits.ac.za

South Africa as an economically developing region is particularly vulnerable to climate change as ECEs increase in frequency, intensity and magnitude. While there is a growing focus in regional development policy regarding climate and climate change, very little policy explicitly considers extreme climate events, nor do many policy documents consider the climate-health nexus. EThekwini is exposed to a wide range of ECEs including cut-off low induced floods, droughts, extreme temperature events, tornadoes and drought – each with a multitude of health conditions such as morbidity, mortality, food and water-borne disease, and communicable diseases amongst others. This study explores the extent to which the climate-health nexus has been considered in policy documents, and the framing of the policy response regarding extreme climate events. Through a process of sourcing policy documents, and a thematic and content analyses of their inclusion of health and climate, this study highlights areas for further policy engagement.

INVESTIGATING FOOD WASTAGE: DRIVERS, MANAGEMENT AND REDUCTION MEASURES AT THE UNIVERSITY OF MPUMALANGA.

Andile Mhlongo (University of Mpumalanga)

Email: 219094888@ump.ac.za

According to the Food and Agriculture Organisation of the United Nations (FAO), it is estimated that every year, one-third of all food produced for human consumption is either discarded or left unconsumed, throughout the world. The wastage of food causes a plethora of environmental issues and is deemed an ethical concern because the food that is being wasted could have potentially been used to feed hungry and malnourished people. Therefore, reducing food waste has the potential to lower the prevalence of food scarcity within the population. Universities have enormous population numbers due to which the social and environmental consequences of their operations are significant. Thus, this study aims to investigate food wastage by examining its drivers, management and reduction measures at the University of Mpumalanga. This study specifically focuses on the conference restaurant of the Tfokomala hotel at the university. The methodology involves a mixed-methods approach which includes using closed and open-ended questionnaires, primary document analysis, and a food waste audit characterised by volumetric measures of food wastage complemented by visual analysis of photographs. The sampling techniques used are convenience sampling and purposive sampling. The collected data will be recorded through Microsoft Excel and will be analysed through SPSS or Statistica. This study will help identify what factors drive attitudes towards the handling and disposal of food waste and how such factors affect the management of food waste within restaurants. Understanding the link between the management of food waste and relevant reduction measures would lead to revised management plans for handling and disposing of excess food that would further reduce the amount of edible food being discarded.

ANALYSING THE IMPACT OF COVID 19 ON THE LIVELIHOODS OF COMMUNITIES ADJACENT TO PROTECTED AREAS: MACHIBINI COMMUNITY AND HLUHLUWE IMFOLOZI PARK.

Mawande Mkhize (University of Zululand)

Email: mawandewando@gmail.com

The rapid spread of the Corona virus disease (COVID-19) has had a tremendous impact on the lives of people at a global scale. The pandemic is an external shock that has drastically affected the livelihoods of people. Communities that are adjacent to PAs are in most cases rural and are unemployed. These people utilise their skills and the resources found at their disposal to sustain themselves. In some cases, their livelihoods are derived from resources found within the confines of PAs. The purpose of this study is to explore the impact of COVID-19 on the livelihoods of the communities that are adjacent to PAs, specifically looking at Machibini community and Hluhluwe Imfolozi Park (HIP). In pursuit of this purpose, the study aims to find possible solutions that will remedy the various challenges that the people encountered during the pandemic with regards to their livelihoods. A qualitative approach in a form of questionnaire surveys and close observation of the community members was utilised in order to see the various challenges that this community was faced with and the strategies they devised to cope with them.

MAPPING AND CHARACTERIZATION OF SOIL EROSION FORMS ON THE HIGH RAINFALL AREAS OF THE KEISKAMMA CATCHMENT.

Yonela Mlindazwe (Nelson Mandela University)

Email: s217168035@mandela.ac.za

The Keiskamma catchment has been identified as an area that is severely prone to soil erosion. It is amongst the erosion hotspots, with extensive soil loss, particularly its central parts. The present study sought to map and characterize soil erosion forms in the humid areas of the Keiskamma catchment through the use of remote sensing and field assessment. High resolution sentinel-2 imagery for Keiskamma catchment area at two different dates (2018 and 2022) was used to generate two LULC maps using the IDRIS TerrSet, QGIS and Google Earth Pro software. Supervised classification was performed for the two sets of imagery to produce LULC maps. The imagery was also used to compute Normalized Difference Vegetation Index (NDVI) to show vegetation stress conditions which are an indicator of areas sensitive to erosion. Field assessments were conducted to characterize soil erosion forms. Soil samples were taken from the site for laboratory analysis of soil physical properties such as bulk density and soil texture. The findings and analysis of this study concluded that soil erosion in the Keiskamma catchment was significantly influenced by LULC changes and the physical properties of the soil and underlying geology of the area. The finding of the present study also reflects a considerable gap in land stewardship in communal villages. Therefore, robust land rehabilitation and management policies should be enforced in the catchment to restore degrading land and curb excessive soil erosion.

NIGHTTIME LIGHT (NTL) DATA.

Zandile Mncube (University of the Free State)

Email: 2015306141@ufs4life.ac.za

Nighttime Light (NTL) data, which provides a measure of socio-economic development, is now publicly available on the Google Earth Engine (GEE) cloud-based geo-computing platform, eliminating the computational burden for all users. The use of GEE to detect NTL has expanded dramatically, but the research trends and hotspots remain unknown. It is there therefore necessary to summarize this research. This article provides a systematic overview of GEE-based NTL studies from its inception in 2010. We searched the Google Scholar database, which returned 359, 73 of which were relevant to our review. The utility of NTL has evolved into studies of urbanization, land use and land cover classification, environmental, and socio-economic characterization of communities. The use of NTL data within the GEE platform has developed into studies of these four categories all around the world. From 2014, studies showed steady growth with a peak in 2021. Most of the research has been done in China, a slightly less than half of the total 73. VIIRS-DNB is the widely used NTL data due to its superior characteristics to DMSP-OLS that followed, and the recent Luojia01-1 NTL sensors show an increase, although the product is not currently available on GEE. A larger proportion of NTL was used as the primary dataset (45), while the remaining 28 were used as auxiliary datasets; mostly in connection with Landsat, Sentinel-1 and -2 and MODIS. Overall, the GEE platform has been used in NTL research with great success, and many governments and institutions have supported these efforts

APPLYING THE CAMPING CLIMATE INDEX (CCI) FOR THE FIRST TIME IN SOUTH AFRICA.

Zandizoloyiso Mnguni and Jennifer Fitchett (University of the Witwatersrand)

Email: Zandimnguni2@gmail.com

Nature-based tourism is one of South Africa's largest economic contributors, attracting local and international tourists. Camping forms a key component of this sector of the tourism market, offering low-cost accommodation and an experience in nature. Climate is a key determinant of the possibility for camping, and more broadly has been proven to be an important factor in tourists' selection of destinations. The Camping Climate Index (CCI) was developed in the United States of America to quantify the climatic suitability of various destinations for camping tourism. A preliminary study has demonstrated the suitability of this index in the South African context. Accordingly, this project calculates the CCI for five destinations distributed across South Africa, namely Polokwane, Port Elizabeth, Springbok, Twee Rivieren and Cedara. The index is calculated for each destination for the period 2012-2021 to assess the relative climatic suitability of each destination, and to compare the South Africa climate for camping to that of the United States. Tourism climate index scores allow for an objective measure of climatic suitability to be factored into adaptation planning for the tourism sector, particularly under climate change.

MULTI-PURPOSE USE OF CEMETERY LAND THROUGH COMMUNITY DESIGN AND PLANNING.

Thandazile Mnguni (University of Pretoria)

Email: zongile28@gmail.com

Most cities have plenty of public space devoted to cemeteries, which could pose a potential solution to the shortage of open space in cities experiencing increased densities. However, communities' cultural and religious beliefs can affect the use of cemetery land for other purposes. The existing body of research on multiple land use suggests that in some South African communities, cultural norms and beliefs have posed a challenge and have prevented the potential use of cemeteries as public spaces that fulfill the needs of the living while used to respect the memory of the deceased. This study sought to explore the multi-use of cemeteries through community design and planning to facilitate optimal use of such spaces for other purposes. It explores how the planning of cemeteries through community design can be done to ensure the multiple uses of cemetery land. The study examines how community design and planning assist municipalities in addressing the challenges of burial spaces and providing public open spaces without conflicting with their primary function as burial sites. The study explores how burial spaces translate into spaces of reminiscence, urban memory, story-telling, and place-making based on the urban imaginary and everyday lived urban experiences. This justifies questioning the relationship between city-building, land use planning, and perpetuity to raise new pathways for urban theory and consultative planning. This study uses a qualitative case study approach to investigate the multi-use of cemeteries through community design and planning to facilitate optimal multi-usage of such spaces. The researcher selected three municipalities as case studies (City of UMhlathuze, King Cetshwayo, and EThekwini Metro).

ASSESSMENT OF THE SUITABILITY OF MINE WATER TREATED WITH PERVIOUS CONCRETE FOR POTABLE USE.

M.P. Mnguni (University of Mpumalanga)

Email: 201908077@ump.ac.za

Wastewater from mines, referred to as Acid Mine Drainage (AMD), is a huge concern to water catchments as it is acidic and renders the water catchment areas unusable for potable and some non-potable uses. Acid Mine Drainage also contains toxic heavy metals such as aluminum, iron, manganese, nickel, and copper, which when taken by humans can cause diseases such as renal damage, neurological problems, and death if ignored. Acid Mine Drainage (AMD) samples will be collected from one of the abandoned coal mines in Mpumalanga Province at Witbank. Pervious concrete will be cast into 100 mm cubes using ingredients consisting of Portland cement CEM I 52.5R with or without 30% ground granulated blast furnace slag (GGBS), and 6-7 mm granite aggregate. In the batch test set–up, one 100 mm concrete cube of pervious concrete will be submerged in three liters (3L) of acid mine drainage and placed inside a tightly covered plastic container. The experiment will be conducted in triplicates for a period of 60 days. During the first 7 days, aqueous samples will be collected once a day and then it will be decreased to twice a week. The concentrations of the treated mine water parameters will be compared against the World Health Organization (WHO) guideline and the South African National Standard (SANS) 241 drinking water specification to assess the potential use of pervious concrete treated mine water for drinking purposes. using pervious concrete for water purification might be very beneficial as it will make more water resources available for use.

ASSESSING IMPACTS OF CLIMATE CHANGE, LAND USE AND LAND COVER CHANGES ON SURFACE WATER QUALITY IN LETABA RIVER CATCHMENT, SOUTH AFRICA.

Grace Mohlala (University of Limpopo)

Email: 201729176@keyaka.ul.ac.za

An ecosystem's ability to tolerate certain conditions, such as those brought on by changes in water quality after storms, snowmelt, hot weather, or droughts, can contribute to the deterioration of surface water quality. The study explores the implications of climate change, Land use and Landcover changes on the surface water quality at the Letaba River catchment, South Africa. The long-term Landsat archival data series will be used to map and quantify the impacts of Climate Change, Land use and Landcover change on water quality over a period of 36 years (1985–2021). According to Literature the support vector machine (SVM) algorithm in Google Earth Engine and advanced spatial geographic information system techniques show a great performance to analyse multi-source satellite images, hence, it will be used to analyse the image classification in this study. The entire study area's Landsat data set is utilised to evaluate, map, and monitor Land use and Land cover change that has developed over time. Pearson correlation in R software is performed as statistical analysis to ascertain the correlation between water quality measures and climate change. Multivariate Analysis of Variance (MANOVA) is used to measure the effects of climate change on water quality and differentiate how climate change impacts water quality. A quantitative evaluation and a thorough breakdown of the pace of change is provided through the analysis of post-classification maps for the Letaba river basin. Four temporal stages (i.e., 1985-1995, 1995-2005, and 2005-2015) of the generated Letaba river catchment detection maps will be examined.

THE STATE OF AIR QUALITY AND PUBLIC PERCEPTIONS IN SEBOKENG, VAAL.

Thato Mokhomong (North-West University)

Email: thatomokhomong00@gmail.com

Air pollution in the Vaal triangle is a major environmental and health concern. Historically, Sebokeng is a low-income township where criteria pollutants frequently exceed the ambient air quality standards. Source apportionment results have indicated that the main contributing sources to the ambient particulate loading includes dust, motor vehicles, waste burning, industry, and domestic solid fuel combustion. Although contributions from external sources do contribute to the poor air quality in Sebokeng, the majority of the particulate matter loading originated from local sources within the township. These emissions are associated with poverty, poor service delivery and municipal planning failures. This aim of this study is twofold, i) establish the extent of the air quality problem in Sebokeng by analyzing ambient air quality data from 2016 to 2021 collected within the township. ii) Investigate the perceptions that residents living in Sebokeng to the extent of the air pollution problem and the main sources of the air pollution. To achieve this, existing ambient air quality data from SAAQIS and the DEA will be used to establish the state of air quality in Sebokeng. Published literature and government documents will be reviewed to establish the main contributing sources and a survey will be used to gather the perceptions of the community members in knowing what they believe are the major sources of air pollution in Sebokeng. Results of both the ambient air quality assessment and the perception of the Sebokeng residents will be presented on this paper.

THE ASSESSMENT OF FACTORS THAT CONTRIBUTE TO ILLEGAL WASTE DUMPING AMONG RESIDENTS OF IPELEGENG, SCHWEIZER-RENEKE.

Kgomotso Mokoduwe (University of the Free State)

Email: 2017094406@ufs4life.ac.za

Illegal dumping is a worldwide issue that affects both developed and developing countries. In the past few years, South Africa has been generating more than 54 million tonnes of waste per year and 90% of it landed in landfills and some were dumped illegally. This study assessed the factors contributing to illegal dumping. The study area was at Schweizer-Reneke, a small town in the North West province. The results were obtained from the 100 questionnaires that were distributed to community members who live closer to these dumpsites. The questionnaires were not online but in-house, and a municipal official was also interviewed regarding waste management and their plans to eradicate illegal dumpsites. The number of illegal dumpsites that were identified was 5. Out of 100 respondents who took part in this research 64% live next to these illegal dumpsites. According to the acting community services manager of Schweizer-Reneke, environmental awareness programs are given to the community members and the reason why some people dump their waste illegally is because they are impatient. In conclusion, the main factors contributing to unlawful dumping at Schweizer-Reneke are laziness, the incompetence of the municipality- they do not provide proper waste collection services, and lack of environmental awareness and education. Poor service delivery is the reason for illegal dumping, this was indicated by 80% of the respondents. All three factors lead community members to dispose of their waste in areas not legally designated for dumping.

ASSESSMENT AND APPLICATION OF LAND ADMINISTRATION CONCEPTS TO SOUTH AFRICA FOR ALL FORMS OF LAND TENURE.

Sam Motswenyane (University of Pretoria)

Email: u18372122@tuks.co.za

Many people living on customary lands have insecure access to land, raising the risks of destruction of cultural land-use practices, forced evictions, and social conflicts. Despite a high-quality cadastre covering South Africa's surveyed or formalized areas, a large majority of the rural population of former Bantustans lives on land outside of the formal land tenure system. International good practice approaches need to be explored to assess whether they can contribute to integrated and more efficient land administration that can also address land reform objectives in South Africa. The paper reviews how international good practices, such as fit-for-purpose land administration, the Land Administration Domain Model (LADM), and the Social Tenure Domain Model (STDM), could help meet the aforementioned needs by assessing the undocumented rights on communal land and in informal settlements. Fit-for-purpose land administration, LADM, and STDM can describe non-formal rights, restrictions, and responsibilities, improve the current cadastral system, and facilitate equitable tenure security for all. This research assesses and investigates case studies on the adoption of a spatial framework for fit-for-purpose land administration that promotes the LADM and STDM. The case studies will be reviewed using fieldwork and data collected from primary and secondary sources. The findings will be used to develop a conceptual data model for integrated land administration in South Africa. The study recommends adjusting institutional, legal, and spatial frameworks for an integrated, accurate land administration system that meets the needs of the people and their relationship to the land, promotes fair tenure security, and manages land use sensibly. The conference presentation will focus on the findings from an assessment of LADM and STDM case studies in other countries and how the findings will influence this research.

INVESTIGATING GENDER DIFFERENCES IN KNOWLEDGE, ATTITUDES AND, PRACTICES ON SCHISTOSOMIASIS IN HA-NESENGANI, VHEMBE DISTRICT, LIMPOPO PROVINCE.

Tshilidzi Mukwevho (University of Limpopo)

Email: 201808835@keyaka.ul.ac.za

Schistosomiasis is a neglected tropical disease and is often described as a poverty disease. Schistosomiasis is most prevalent in developing regions of Africa and Asia. This community-based study aims to explore gender differences in knowledge, attitudes, and practices with regards to Schistosomiasis in Ha-Nesengani village, Vhembe District, Limpopo Province, South Africa. To achieve this, a qualitative study that involved primary data collection was conducted. Data was collected using questionnaires that had questions about demographic characteristics, knowledge, attitude, and practices regarding Schistosomiasis. A total of 342 people took part in the study. However, for data analysis purposes, 3 individuals were left out of the study because they did not want to indicate their gender. There were more female participants (60%) than men (40%) The collected data was analysed using Microsoft Excel and was presented in tables and graphs. The results of this study revealed that there is no difference in knowledge, attitudes, and practices regarding Schistosomiasis between the men and women of Ha-Nesengani but there are still misconceptions about the disease.

ILLEGAL GRAZING IN GOLDEN GATE HIGHLANDS NATIONAL PARK: PREDICTING AREAS AT RISK USING DIGITAL ELEVATION MODELS AND SPATIAL ANALYSIS.

Fransie Mulaudzi (University of the Free State)

Email: 2018163309@ufs4life.ac.za

Golden Gate Highlands National Park (GGHNP) is being threatened by potential domestic animal invasion in the park due to the expansion of the nearby communities. Therefore, the increase in the communities surrounding the park increase the possibilities of livestock invasion in the park and this becomes a problem since the domestic animal's graze excessively in the park causing wild animals to compete for food. The aim of the study was to identify areas that are threatened by the risk of potential illegal grazing practices: by predicting areas that are likely to be frequented by domestic herders using factors such as (out of line of sight) and secondly by using animal census data (collected by SANParks for the year 2020) to determine areas that are occupied by local domestic animals or herders. Analysis of the data was done in ArcMap 10.7.1 using a digital elevation model of the park and spatial layers (e.g., roads, buildings and waterways.) The findings show that most of the domestic animals are concentrated near the boundary of the Lesotho border where there is a dense concentration or residences and most of these domestic animals are in the mid-high elevations. This shows that topography does not play a role when it comes to herders accessing the park. The same applies to the presence of park ranger buildings.

ASSESSMENT OF SPATIOTEMPORAL VARIABILITY OF DROUGHTS IN UMKHANYAKUDE DISTRICT MUNICIPALITY, KWAZULU-NATAL.

Jabulile Mzimela (University of Zululand)

Email: jabulilemzimela@gmail.com

Exploring drought is urgent with unprecedented climate change. Globally, drought is projected to become more pervasive, this will negatively affect the sustainability of the agricultural sector. Interest in documenting the impact of drought, which is the main threat affecting the agricultural sector, has increased. uMkhanyakude District Municipality (UKDM) has been exposed to substantial drought occurrences while 95% of rural dwellers within the district depend on small-scale agriculture, social security grants, and remittances for survival. Spatio-temporal drought assessment is inadequately addressed over UKDM. Yet it is critical to comprehend drought duration, magnitude, and spatial extent in UKDM for decision making. The present contribution maps and quantifies historical agricultural droughts in UKDM to understand drought characteristics. Four indices (Standardized Precipitation Index (SPI), Normalised Difference Vegetation Index (NDVI), Vegetation Health Index (VHI), and Vegetation Drought Index (VDI)) are used to map and quantify agricultural droughts because a single indicator-based index may not completely capture drought characteristics (e.g. duration, severity, intensity, and spatial extent) and, therefore, may produce unreliable results. The SPI is detected from CHIRPS precipitation data and calculated over 30 years (1990-2020). Three satellite-based datasets (Landsat 5, 7, and 8) were used to compute NDVI, VHI and VDI over 30 years. All indices were computed on Google Earth Engine, and change detection was mapped through visual interpretation. Outputs from drought assessment are essential for reliable drought-related decision-making and adaptation in the agricultural sector.

PRE-SERVICE GEOGRAPHY TEACHERS' ENGAGEMENT WITH UNDERGRADUATE GEOGRAPHY CONTENT AT THE UNIVERSITY OF ZAMBIA.

Matilda Kanyampa Nakazwe (University of Pretoria)

Email: kanyampakumbwa@gmail.com

The importance of having effective teachers has made Universities and Colleges in both developed and developing countries to continuously strive at finding best ways to prepare their student teachers for the classroom. Teacher preparation is seen as one of the important factors that influence teacher effectiveness. Graduate teachers are expected to have acquired subject matter or content for their teaching subject amongst other kinds of knowledge. The purpose of the study was to explore geography teacher's engagement with geography content during their undergraduate teacher preparation at the University of Zambia. A case study design was utilized to collect data from nine geography teachers who were trained at the University of Zambia. A semi-structured interview guide was employed to collect the data. Furthermore, the collected data was transcribed, coded and analyzed thematically. The study established that geography teachers considered the geography content courses learnt during their undergraduate to have been adequate in preparing them for teaching. Most participants felt they acquired broad and in-depth content knowledge than they required for secondary teaching. The study further established that most of the participants enjoyed engaging with either physical geography or human geography during their undergraduate preparation, a trend which has somehow continued in their career development. Inadequate time for practical experiences and difficulties in acquiring knowledge and skills to conduct field work were also highlighted by participants as some of the challenges experienced during their teacher preparation.

INVESTIGATING THE IMPACT OF LULC IN THE VAAL RIVER.

Yanga Ndamase (University of the Witwatersrand)

Email: 2118851@students.wits.ac.za

The Vaal River is an important water body in securing valuable water in South Africa's economic hub, however, Land use and Land cover (LULC) activities driven by population aggravation have consequently resulted in the deterioration of the water quality. The study aims to evaluate LULC activities which affect the water quality in the Vaal. The impact of LULC activities have resulted in the increase of land sedimentation and the absorption of pollutants in the water body. The Vaal River has also been invaded by invasive species including macrophytes, exoskeleton creatures and aquatic life. Additionally, these invasive species coupled with increasing nutrients from LULC activities consequently have resulted in the Vaal River experiencing eutrophication. There is a greater need for monitoring and treatment plans as the Vaal Dam has now reached hypertrophic status. This study used remote sensing and geographical information systems (GIS) to examine the LULC activities that have resulted in the deterioration of water quality in the Vaal River through satellite images namely medium resolution imaging spectrometer full resolution (MERIS) and Landsat images. The study will use supervised classifiers which are a successful tool for the assessment of impact caused by LULC activities, through the application of water observation and information systems (WOIS), maximum likelihood, support vector machines and random forest. This study concludes that LULC activities, land sedimentation and invasive species contribute as drivers of the decline of water quality in the Vaal River and exacerbates eutrophication, therefore, manifesting that there is a greater need to understand the relationships between LULC and water quality.

POSSIBLE LAND MANAGEMENT STRATEGIES FOR STORAGE OF SOIL ORGANIC CARBON IN THE WESTERN FREE STATE.

Nolusindiso Ndara (University of Cape Town)

Email: ndrsin001@myuct.ac.za

Abstract: Extensive changes in land use and agricultural activities which have occurred during the last 200 years have transformed soils into net sources of atmospheric CO2. Agricultural production becomes a problem when land is being extensively cultivated leading to soil degradation thus loss of nutrients. This study therefore established land management strategies suitable for enhancing the storage of soil organic carbon (SOC). Soils sampled in 2019 from different sites in Free State were used to determine the amount of carbon and nitrogen. It is apparent that grassland can store more carbon especially in the Lixisols which appeared to have stored an average carbon of 1.23 g and maximum of 1.86 g from 0-2 cm to 20-30 cm depths. Moreover, cultivated land can store less carbon especial in the Arenosols which stored an average of 0.18 g and maximum of 0.22 g from 0-2 cm to 30-45 cm depths. Moreover, the study demonstrated that soil texture and grain size distribution play an additional role in carbon storage with higher loads linked to higher silt content and less carbon being stored in soils with high sand content. More carbon was stored in the top layers of the soil 5-10 cm and was observed to decrease with increasing depth. DAYCENT carbon model was further used to simulate soil carbon in different land management scenarios to come up with suitable land management options for storing more carbon in future. Results illustrated that native grassland can substantially store more carbon than cultivated land, however moderate grazing should be applied. This would allow for a reduction of future dust emissions and increase ecosystem services in the cultivated lands of the Free State.

ASSESSING PRO-ENVIRONMENTAL BEHAVIOUR TOWARDS PLASTIC POLLUTION AMONG UNIVERSITY STUDENTS AND STAFF MEMBERS.

Bonginkosi Ngobeni (University of Mpumalanga)

Email: 201960761@ump.ac.za

Today, plastic pollution is viewed as a global problem since plastics have tainted every aspect of the environment. Ineffective handling of household and industrial trash is to blame for this environmental problem. understanding human behaviour may be more important for reducing plastic pollution and promoting sustainable consumerism. Human behaviour is influenced by rules and regulations at the societal level. however, it can also be influenced by individual awareness, perception, attitude, and level of concern about environmental issues. Understanding pro-environmental behaviour and how to promote it is critical when it comes to issues of environmental concern such as plastic pollution on the environment where there is widespread agreement that human behaviour is the primary cause. This study aims to assess pro-environmental behavior among university students and stuff members and also aim to understand how their attitudes, beliefs and values affect environment all ethical behavior.This study will adopt a qualitative approach to assess the pro-environmental behaviour among University students and staff members and also the role played by these groups using questionnaires. The questionnaires will consist of both closed questions.

SOUTH AFRICAN TEACHERS' CONCEPTUALISATIONS OF 'PLACE' IN GEOGRAPHY: A CASE STUDY.

Sizwe Njapha (University of Pretoria)

Email: njaphasc@gmail.com

Geography, like other subjects, has a set of unique concepts. In South Africa, the national curriculum for school geography (CAPS) outlines “geography’s four key” concepts; namely “place, spatial distribution, spatial processes, and human and environmental interaction”. The existing literature points out that geography is the study of places and geographers strive to comprehend how places are related and distinct from one another. This research employs a qualitative case study methodology to explore teachers’ conceptualisation(s) of the concept of ‘place’, through eight geography teachers at state and independent schools in South Africa. Data collection instruments included official document analysis, card sorting, and interviews. School geography teachers were requested to explain and describe their knowledge of the concept of ‘place’ in school geography and explain strategies as to how they facilitate and implement geographic learning of ‘place’ in their lessons. The concept of ‘place’ was overwhelmingly regarded by teachers as the most important. The study further revealed that teachers had various perspectives about place, and thus conceptualised place differently. The reason for this is that the concept of ‘place’ in geography, is open to multiple interpretations. This study illustrates the apparent relationship between teachers’ conceptualisation of the concept of ‘place’ in school geography and their ideals, educational training, social standing, working environments and teaching experience. Therefore, this study recommends that the concept of ‘place’ be unpacked in the CAPS FET Geography curriculum document so that the fundamental details on which it is founded, and which give it form, are made visible.

MAXIMUM TEMPERATURE VS. RAINFALL SEASONAL FORECASTS: WHICH ONE IS POTENTIALLY MORE PROFITABLE?

Moahloli Ntele (University of Pretoria)

Email: u21815471@tuks.co.za

Seasonal forecasts (maximum temperatures and rainfall), have been generally under-utilized for enhancement of decision making for various processes, e.g., farming, despite their potential to maximize the economic value, monetary or otherwise, associated with these processes. The purpose of this research is to present a framework that will compare the cumulative profits of maximum temperatures, and rainfall seasonal forecasts to determine which between the two, is more profitable for a forecast user in southern Africa (20ºS to 36 ºS and 12ºE to 37ºE). The framework uses the Climate Predictability Tool (CPT) to calculate the cumulative profits for the two sets of forecasts by mapping the 14-year (2006 - 2020) seasonal hindcasts for the four run on seasons, i.e. October to December (OND), November to January (NDJ), December to February (DJF), and January to March (JFM), generated from the North American Multimodel Ensemble (NMME) data, with the corresponding observations from the NASA Earth data, using the full training period length of 29 years (1991 to 2020). The results from this study are envisioned to provide guidance on the financial losses or gains a forecast user may potentially make from the utilization of the two sets of forecasts.

MEASURING CORPORATE SUSTAINABILITY IN THE AUTOMOTIVE SECTOR IN NELSON MANDELA BAY.

Ongama Ntshiba (Nelson Mandela University)

s216815576@mandela.ac.za

This study explored the methods available for measuring corporate sustainability and created an instrument to measure corporate sustainability in the Nelson Mandela Bay (NMB) automotive manufacturing sector. The instrument was created based on three components of sustainability which are environment, society and economy. The study went a step further and added a fourth dimension, current trends to design a measuring instrument. The instrument was then applied on participating companies and further refined to improve it. Multi-dimensional indicators to measure corporate sustainability were created and applied to companies in the automotive manufacturing sector. The indicators were used to create a composite corporate sustainability index which can be used to compare the corporate sustainability performance of companies. These indicators were created based on theoretical research and fist hand experience observing the automotive manufacturing sector in the NMB. The indicators were applied to companies as a pilot to test whether they are feasible. Following this, the indicators were refined, improved and applied to more companies to measure corporate sustainability performance. The results of the study were the measuring instrument created, the creation of a composite index as well as the application of the instrument on companies to determine whether the instrument was refined enough to detect differences in the corporate sustainability performance of companies.

AMBIENT BTEX CONCENTRATIONS AROUND A GAS-REFUELLING STATION IN JOHANNESBURG, SOUTH AFRICA.

Clinton Nyathi (University of the Witwatersrand)

Email: 2172631@students.wits.ac.za

Volatile organic compounds (VOCs) pollution, namely five aromatic hydrocarbons, benzene, toluene, ethylbenzene, and xylenes (BTEX), is a significant problem due to inhalation and detrimental human and environmental health effects. These chemicals are classified as harmful air pollutants by the US Environmental Protection Agency by the World Health Organization. Due to the potential health risks associated with these pollutants, BTEX concentrations will be determined in the ambient air of a Johannesburg gas-refuelling station. The Passive sampling approach offers time weight average (TWA) concentration of air VOCs pollutants to be monitored to prolong exposure. Radiello passive samplers will be used to collect air samples and stationed for two weeks at the testing site. Chemical analysis of the collected air samples will be conducted at the ChemTech lab. Therefore, the BTEX interspecies ratios will be used to determine the source apportionment and behaviour of the BTEX compounds in the ambient air around the Gas-refuelling station. The Kriging interpolation will be used to map hot spot sources.

ASSESSING THE HYDROLOGICAL REGIME METRICS OF LACUSTRINE WETLANDS FOR THE MAPUTALAND COASTAL PLAIN OF SOUTH AFRICA, FROM 1984 TO 2022.

Camryn Oschger (University of Pretoria)

Email: u19015412@tuks.co.za

Deriving metrics related to the hydrological regime of wetlands provides a better understanding of wetland diversity and their variability in a region. Changes in the hydrological regime characteristics of lacustrine wetlands of the Maputaland Coastal Plain (MCP) in response to rainfall variability remains

to be uncovered. This study focuses on determining hydrological metrics for the lacustrine wetlands of the MCP, including (i) the temporal interval between extreme (high and low) precipitation events; (ii) the temporal interval between extreme (high and low) inundation extent of lacustrine wetlands; and (iii) the lag between selected precipitation and inundation extent of lacustrine wetlands. Precipitation and wetland data, obtained from NASA's POWER website, as well as SAWS, was examined over a 38-year period from 1984 to 2022. The extent of lacustrine wetlands was derived from Landsat series images between 1984 to 2016 (derived from the Global Surface Water Product), and Sentinel-2 images (from the Mzansi Amanzi's dataset), from 2016 to 2022. The outputs provide useful information for the monitoring of the ecosystems supported by lacustrine wetlands, as well as government departments, such as the department of water and sanitation in the MCP for sustainable resource management.

A NETNOGRAPHIC ANALYSIS OF MINING ACTIVITIES AND ITS IMPACTS ON MARINE BIODIVERSITY ON THE WEST COAST, SOUTH AFRICA.

Yaaseen Patel (Stellenbosch University)

Email: 22285008@sun.ac.za

Mining is one of South Africa's biggest contributors to the GDP and is economically important to our country. Although there are positive benefits associated with mining, there are also negative impacts. The environmental degradation, impact on local communities and their livelihoods and destruction of land are some of the effects recorded. As a result, current and prospective mining activities have been a contested issue on the West Coast of South Africa. This is evident by the widespread media attention, as well as social media campaigning. The COVID-19 pandemic presented many new opportunities for disseminating information and generating support for online research and activism. This rise in online activism has also resulted in communities actively participating in issues they believe in. This has seen a groundswell of online protests and petitions against mining on the West Coast. A novel method to analyse some of these online interactions is through netnography. Netnography is a form of ethnography, and this method focuses on analysing participation between people, online. This research, is therefore, set out to document social groups that have formed in response to mining activities on the West Coast as well as analyse their activities through a netnographic approach. Preliminary results indicate that there are dedicated sites and several people in support of protecting the West Coast against mining activities. Additionally, there has been an increase in awareness about the issue in online domains.

BIODIVERSITY AND ECONOMY BUT NOT SOCIAL FACTORS PREDICT HUMAN POPULATION DYNAMICS IN SOUTH AFRICA.

Bopaki Phogole (University of Johannesburg)

Email: pbopaki@yahoo.com

The ongoing exponential growth of human population poses a risk to sustainable development goals (SDGs). Unless we understand the drivers of this growth and inform policy development accordingly, the targets of SDGs would remain a unattainable. One of the old theories of population growth known as the Malthusian theory predicts that resource availability drives population growth to a certain time when population growth outrun resource availability, leading to all sort of crises known as Malthusian crisis. Although the link between economic growth and population has been widely investigated while testing the theory, little is known about environmental and social factors potentially driving population growth. Here, because of various crises of our time recalling the Malthusian crisis, we

revisited the theory by fitting structural equation models to environmental, social and economic data collected over 30-year period in South Africa. None of the social variables tested predicts population growth. Instead, we found that biodiversity (species protection index) correlates positively with population growth. Biodiversity provides various resources through ecosystem goods and services to human, thus supporting population growth as predicted in the Malthusian theory. However, we also found that this population growth may lead to conservation conflict as we found that biodiversity habitat (wetland area) correlates negatively with population growth, thus raising the compromising effect of population growth on life on earth. What's more, we found a significant link between economic growth measured as GDP and population growth, further supporting the Malthusian prediction. Overall, our study re-affirms the value of biodiversity to human and suggests that the Malthusian theory should continuously be tested with predictors other than economic.

THE DENSIFICATION OF SECTIONAL TITLE SCHEMES AND PURPOSE-BUILT STUDENT ACCOMMODATION IN STELLENBOSCH: SATURATION OR FURTHER GROWTH POSSIBILITIES?

Emily Pienaar (Stellenbosch University)

Email: 21724350@sun.ac.za

Increasingly higher education institutions (HEIs) are unable to provide accommodation to all students, forcing students to make use of the private rental market to find alternate accommodation. The eagerness of private property developers to fill the gap in alternate student housing could lead to the oversupply of student accommodation, fundamentally changing the townscape of Stellenbosch. The aim of this research is to determine the extent of sectional title schemes (STSs) and purpose-built student accommodation (PBSAs) in Stellenbosch. The study draws on a mixed methods approach. Interviews with key stakeholders (such as high-ranking planning officials) will be done to document their opinions on the Stellenbosch student accommodation development debate. A survey among student commuters is used to determine reasonings for not using Stellenbosch student accommodation, and maps of the spatial extent of STSs and PBSAs will be produced. Preliminary research has identified 197 STSs present in Stellenbosch in 2019 and has recognised 'MySpace' (by Abacus private developer firm) to be a prominent PBSA provider. Furthermore, one of the main reasonings for students to commute has been associated with the high rental prices of accommodation. To ensure that the spatiality of Stellenbosch is protected, more informed policies and building regulations need to be implemented by Stellenbosch municipality if they wish to promote more sustainable densification trends.

AN INVESTIGATION OF E-WASTE MANAGEMENT IN SOUTH AFRICA: A CASE STUDY OF MBOMBELA LOCAL MUNICIPALITY.

Mthunzi Qulo (University of Mpumalanga)

Email: mthunziasakhe@gmail.com

E-waste has recently been highlighted as the fastest growing global waste stream as it continues to generates three times faster than the other types of waste and still expected to increase significantly. This study aims to investigate the state of e-waste management in South Africa using Mbombela Local Municipality as a case study. The research design that this empirical study will adopt to achieve its objectives and reach the aim is the case study design. Following a qualitative approach, primary data will be collected using two instruments, namely, key informant interviews and observations. Key informant interviews will be held with informal waste collecting people and formal e-waste collecting companies and Mbombela Local Municipality officials that are in the waste management department.

Purposive and snowball sampling techniques will be used in selecting relevant officials from the city of Mbombela, e-waste collecting companies and informal e-waste collecting individuals. Secondary data will be collected using document analysis relevant to the study. These will include both published and unpublished documents. After the study has conducted, the following specific objectives are hoped to be achieved: To identify the major types of e-waste that are generated by the Mbombela Local Municipality, to assess and evaluate current e-waste management practices and approaches that are being applied by the Municipality in managing e-waste, and lastly, to provide recommendations on other suitable sustainable e-waste practices and approaches that can be adopted by the Municipality.

EXPLORING ENVIRONMENTAL AND SOCIO-ECONOMIC RISKS AND OPPORTUNITIES OF MINE CLOSURE: PERCEPTIONS FROM LINDOKUHLE COMMUNITY IN MPUMALANGA.

Muneiwa Rakhalaru (University of South Africa)

Email: 10214119@mylife.unisa.ac.za

Land degradation, water contamination, soil contamination, and potential seismic threats are all cited in the literature as local and global environmental risks connected with mine closure. Despite various studies in understanding the socio-economic effects of mine closure and various policies and legislation enacted by the government of South Africa, mine closure in South Africa has continued to present negative environmental, social, and economic outcomes within mining communities. The study, therefore, sought to explore the Lindokuhle community's perceptions of environmental and socio-economic risks and opportunities regarding mine closure. The study's main objectives were to (i) identify the environmental and socio-economic impacts of mine closure; (ii) to evaluate South Africa's legislative scope in attending to mine closure, detailing how the legislature helps mitigate or abet environmental risks and socio-economic risks that come with mine closure; (iii) to ascertain the perceptions and experiences of the Lindokuhle community on the environmental and socio-economic risks and opportunities post mine closure. Critical literature review and semi-structured interviews were used as the study's research instruments. The interview results show the lack of legal implementation regarding mine closure and environmental safety; mining communities are neglected by the local municipality service delivery plans, leading to deplorable living conditions, the lack of sustainable sources of income, and the lack of employment opportunities, leading to crime and risky behaviors. To cope with various economic challenges, some of the Lindokuhle community members have started new business initiatives, vending, and benefiting from the various new skills training initiatives provided by various government departments. The study recommends involving community members in the mine closure plan at the initial phase of the mine opening, the need for intergovernmental relations, and active engagement to abate the risk of post-mine closure. The Lindokuhle community is cognizant of its challenges and possible solutions to avert the environmental and socio-economic risks of mine closure in mining communities. As such, there is a need for proactiveness on the part of the government in implementing policy initiatives and supporting various local economic activities.

SOCIO-ECONOMIC IMPACTS OF COVID-19 ON UNDOCUMENTED MIGRANTS IN THE INFORMAL SECTOR IN DOWNTOWN, BLOEMFONTEIN, SOUTH AFRICA.

Theodorah Ramogwebo (University of the Free State)

Email: 2021519562@ufs4life.ac.za

The study investigates the socioeconomic effects of Covid-19 on undocumented migrants in the informal sector of Bloemfontein's downtown. Undocumented migrants are non- South African citizens who have migrated to South Africa and not having legal documents to be officially residing in South Africa. The purpose of this study was to examine the socio-economic impacts of Covid-19 on undocumented migrants in the informal sector. This study was informed by four objectives; (1) To identify various forms of informal business activities practiced by undocumented migrants, (2) To examine the impacts of Covid-19 on migrants in the informal sector, (3) To investigate the strategies utilised by migrants in coping with the impacts, (4) To provide practical and policy relevant recommendations to improve the welfare of migrants in the informal sector. This ethnographic study was carried out in downtown, Bloemfontein. Data was collected from secondary data and to increase the validity of the results, 28 in-depth interviews with migrants in the informal sector were conducted. The findings demonstrate that undocumented migrants earn a living by working for themselves. Covid-19 had an impact on the enterprises they run because they lost customers, which reduced their source of income, and drove them to borrow money or draw from their savings in order to survive. In conclusion, the majority of migrants were affected by COVID-19 and received little support from friends or family.

NOISE POLLUTION AND STUDENT LIVABILITY: EXPLORING THE SOUNDSCAPES OF HATFIELD, PRETORIA.

Allan Rikhotso (University of Pretoria)

Email: u18346252@tuks.co.za

Cities across the world are increasingly getting noisy as their populations increase. Noise is as old as humankind on Earth is, but it only received attention only in recent centuries. The word noise has a negative connotation as research has shown that noise has the potential to adversely affect humans, however, in most cases, natural sounds do make noise but are found to be soothing and healthy for most people. This study will explore the soundscapes of the studentified neighbourhood of Hatfield, Pretoria. These soundscapes may be anthropogenic and natural; this study will look at both the negative and positive effects of these soundscapes. The concept of soundscape may be defined as the total sounds within the boundaries of a particular place at a given time. From a perception angle, this study will seek to understand if the students who reside in Hatfield perceive these soundscapes to be noisy and how they affect their livability in this neighbourhood. Broadly the study aims to investigate the impact of noise pollution on the livability of students. The study of soundscapes has attracted other professionals such as town planners as a way of improving living in the city. This study will employ two methodologies namely an ethnographic soundwalk and a survey. A soundwalk methodology is a walk on a predetermined route with the aim of actively listening to the environment. Students residing in Hatfield will then be surveyed online.

EVALUATING ENVIRONMENTAL PRACTITIONERS' PERCEPTIONS TOWARDS ENVIRONMENTAL IMPACT ASSESSMENT FOLLOW-UP: LESSONS FROM FILLING STATION PROJECTS IN LIMPOPO PROVINCE.

Moloko William Sebone (University of Limpopo)

Email: 201619609@keyaka.ul.ac.za

Environmental Impact Assessment follow-up emerges as a worldwide challenge. A few research indicated that EIA follow-up is the weakest step in the EIA process and of concern to many developing countries in that it is often overlooked as a critical step in EIAs. In most developments in the post-decision stage, EIAs are neglected after project approval and authorization. This is the case in South Africa, where the EIA follow-up practice is plagued by a variety of challenges. However, it has been 20 years of EIA practice in South Africa, with intense challenges and shortcomings that require improvements. The arguments over the weakness and negligence in the EIA follow-up are a major concern. Without an adequate follow-up, the purpose of EIA in development projects is not accomplished. This study is aimed at exploring the perceptions of EIA practitioners towards conducting EIA follow-up tasks for filling station projects approved between 2014 and 2017 in Limpopo province with the intention of collating the challenges, practice, status and ascertaining the efficacy through structured interviews and self-administered survey questionnaires. Considering the potential environmental impacts and misalignments associated with filling station projects, it is necessary to comprehend how practitioners adapt and incorporate EIA follow-up responsibilities into their project life cycle. There has been virtually little research on EIA follow-up for filling station projects in Limpopo province as a major part of the construction industry of South Africa.

AN ASSESSMENT OF DOMESTIC GREYWATER REUSE: A CASE STUDY OF GA-THOKA VILLAGE, POLOKWANE LOCAL MUNICIPALITY, SOUTH AFRICA.

Mokitlana Rinkie Sekgobela (University of Limpopo)

Email: 201813208@keyaka.ul.ac.za

South Africa is a water scarce country, the 30th driest in the world. Certain parts of the country have been experiencing severe droughts since 2015. The study titled: An assessment of domestic greywater reuse: A case study of Ga-Thoka village in Polokwane Local Municipality, South Africa, aimed to assess domestic greywater reuse in Ga-Thoka village. Objectives of the study were to identify sources of freshwater and the nature of potable water supply, analyse the quality of greywater from selected households, establish the potential of greywater reuse by the households, and to determine the awareness and perceptions of the households on reuse of greywater. Greywater samples were collected from selected households in the village. The collected greywater samples (93) were taken to CDM water laboratories for the analysis of greywater quality. The analysis revealed the presence of metals such as copper and sulphates. The study found that 85% of the respondents said they always have freshwater available and it was discovered that 51% of the respondents get freshwater from their home taps. Ninety-two percent (92%) of the households generate greywater. Sixty-eight percent (68%) of the respondents do not have knowledge about greywater importance. The Pearson Chi Square test revealed association between factors investigated (socio-economic characteristics, water scarcity and awareness) and the willingness to reuse greywater by the respondents. It was concluded that Ga-Thoka village households reuse their greywater mostly for irrigation. The study recommends that the households should reuse their greywater on other different activities that do not strictly require freshwater.

CONSERVATION CONFLICTS AND CLIMATE CHANGE NEXUS OF BORDERING RURAL COMMUNITIES: A LITERATURE REVIEW.

Ntebohiseng Sekhele (University of the Free State)

Email: sekhelenm@ufs.ac.za

Conservation areas are a source of livelihood to rural communities since they provide resources such as firewood, water, non-timber products, medicinal plants, hunting opportunities, and pastures for livestock grazing. A change in regional climate patterns challenges rural and impoverished households that rely heavily on these resources. Climate change impacts are more complex when juxtaposed with national parks that limit access to natural resources from bordering local communities. We conduct a systematic literature review (SLR) to assess two areas of research that have evolved separately yet are fundamentally interconnected, namely natural resources-related conflicts between communities and protected areas as well as climate change impacts on natural resources. There is a dearth of literature on the climate change-conflicts nexus in conservation areas, thus this review contributes to the body of knowledge by exploring whether conservation conflicts are worsened by climate change or not. To address and mitigate conservation conflicts, we conclude that during the establishment of protected areas, a bottom-up approach should be encouraged amongst stakeholders, and for existing conserved areas, collaboration efforts between protected areas and their adjacent communities should be nurtured. The recognition of conservation conflicts and climate change interconnections can help develop more effective conservation policies and programs.

HOUSEHOLD SOLID WASTE MANAGEMENT PERCEPTION AND PRACTICES.

Tsakani Germina Selomo (University of Limpopo)

Email: tgselomo@gmail.com

Poor waste disposal practices hamper the progress towards an integrated solid waste management (SWM) in households. Knowledge of current practices and perception of household solid waste management (HSWM) is necessary for accurate decision making in the move towards a more sustainable approach. The study's objective is to evaluate SWM in two communities (Ga-Makanye Village and Toronto Township) of the Mankweng cluster, Limpopo, South Africa. 100 participants for the study were chosen using a straightforward random sampling procedure. Observational and semi-structured questionnaire methods were used to collect the data, and (SPSS) version 26.0 was used for analysis. The results indicated that majority of wastes generated is food. The majority of respondents (50%) did not practise source waste separation or waste recycling. In the village, most respondent (70%) keep their waste in pit holes, while in the township, they utilise plastic bags and bins (88%). Waste collection is door-to-door service, once per week in township and street sweeping in village. Burning waste and illegal dumping are the two disposal methods most frequently used in the village (46% and 38%). In both communities, about 80% of respondents said that illegal dumping occurs because of ignorance, a lack of knowledge and unavailable waste collection services. Respondents recommended that the municipality build recycling facilities, install disposal bins on hotspots for illegal dumping, and promote SWM. This study emphasises the value of waste separation, recycling, and education awareness campaigns in achieving sustainable SWM.

PROBABILISTIC SUPERVISED CLASSIFICATION APPROACH TO THE MAPPING OF WETLAND ECOTONES.

Daniëlle Seymour (Stellenbosch University)

Email: danielleseymour181@gmail.com

Remote Sensing has become widely used in ecology due to its ability to obtain large amounts of data over greater spatial and temporal scales than is possible through field-based methods. Thus, it is effective for detecting and monitoring spatiotemporal aspects of ecotones where one vegetation type (or ecosystem) transitions into another, particularly for dynamic wetlands. Probabilistic, supervised classification of Sentinel-2 MSI: MultiSpectral Instrument, Level-2A imagery was used to identify, map, and characterize wetland ecotones in a South African palmiet alluvial fan. The resultant output probability maps and fuzzy probability graphs developed for transects placed across the wetland, showed 1) abrupt (under 10 m), sharp ecotones between palmiet groups, 2) sharp, narrow ecotones (under 10 m) between palmiet and sclerophyllous wetland, and upland fynbos communities, and 3) distinct and complex ecotones within the sclerophyllous wetland vegetation and fynbos dominated areas of the wetland. Probabilistic classification methods are deemed useful in mapping fine-scale, abrupt ecotones, especially for wetlands that are dynamic entities in a landscape. Such entities are complex units, and probability, per-pixel classification provides more information than binary classifications or vector line maps. Findings of this study suggest the great potential and need for wetland ecotone mapping as core areas in understanding wetland ecosystem processes.

IDENTIFYING THE DISCREPANCY BETWEEN THE TRAINING OF ENVIRONMENTAL STUDENTS AT THE UNIVERSITY OF THE FREE STATE AND THE REQUIREMENTS BY THE REGISTRATION BODY ENVIRONMENTAL ASSESSMENT PRACTITIONER ASSOCIATION OF SOUTH AFRICA (EAPASA).

Nevil Shirinda (University of the Free State)

Email: 2017315207@ufs4life.ac.za

Currently in South Africa, in order to practice as an environmental assessment practitioner (EAP), one needs to register with Environmental Assessment Practitioner Association of South Africa.EAPASA have certain core competencies that anyone that wants to register with the association needs to provide a proof that they know and can do them.The university have certain graduate attributes every student needs to have mastered when they obtain their qualification.The study was conducted to investigate the discrepancy between the university graduate attributes and the requirements (Core competencies) set by EAPASA.The discrepancy needs to be addressed because failure of the university from providing skills that are required by the registration association and employers will result in unemployment of graduates.The study was done in Bloemfontein, Free State.The study used interviews and questionnaires as methods of data collection.EAPs indicated core competencies and graduate attributes that they deemed as priority skills that EAPs should have. Preliminary results found that the university graduate attributes do match up with core competencies that EAPASA have.However,EAPASA have some core competencies that it requires from individuals that wants to register with them that the University of the Free State does not offer to their students.This study can be used in the future by different universities, in terms of skills or attributes that they would like to offer environmental students as a reference to what the registration association for environmental assessment practitioners wants.

ASSESSING URBAN TRANSFORMATIONAL STRATEGIES THROUGH INNOVATIVE AGRICULTURAL PRACTICES IN JOHANNESBURG METROPOLITAN AREA.

Nobukhosi Sithole (North-West University)

nobukhosisitholek@gmail.com

The Johannesburg metropolitan city is plagued by numerous challenges amongst which is food insecurity. The readily available skyscrapers to maximise land space availability over the years pose as deterioration sites due to poor maintenance. Technological advancement has turned them around to provide not only regenerated buildings but also solutions to food insecurity for the inhabitants through transformational strategies from municipal and national government. These strategies have promoted urban agriculture and introduced innovative agricultural measures like rooftop gardening and hydroponic farming. The implementations have been towards attaining sustainable environmental goals for land and water optimisation within limited land spaces in the inner city. This study assessed the attainment of these goals by engaging the various stakeholders where open-ended discussion interviews and questionnaires were used to obtain knowledge and experiences about the realisation of the above goals with these innovative farming practices. These transformational strategies have not only improved food security and created income-generating opportunities but have also regenerated the inner-city infrastructure of Johannesburg. However, numerous challenges are threatening the complete realisation of these goals amongst which are soil and water flow availability to the rooftop gardens which seem to be conquered by hydroponics though not entirely without its own hurdles but definitely more promising to attaining these goals with proper governance and policy support. Therefore, it remains that the city needs to address its resource scarcity constraints and pragmatically enhance its use of land space while being able to cultivate deep interaction and participation with stakeholders of innovative farming.

ANALYSIS OF THE IMPACTS OF AMATOLA FOREST COVER CHANGES AND RAINFALL ON SURFACE WATER RESOURCES IN THE UPPER PARTS OF THE KEISKAMMA CATCHMENT, EASTERN CAPE, SOUTH AFRICA.

Thandeka Evelyn Skosana (Nelson Mandela University)

Email: s217114156@mandela.ac.za

Generally, changes in forest cover directly impact catchment hydrological response. In the Keiskamma catchment, Eastern Cape, South Africa, hydrological response of land use/cover changes (LULC) have been studied at catchment scale, and the influence of the Amatola Forests and rainfall trends in the upper watershed remains unexplored. This paper examined the impacts of the Amatola forest cover changes and rainfall on streamflow and dam levels in the Upper Keiskamma catchment for five periods (5) 1986-1990, 1994-1998, 2002-2006, 2010-2014, and 2018-2020. Rainfall, streamflow, and dam levels trends were analyzed for the same period using the Mann-Kendell (MK) test and Sen's slope estimator techniques. Results revealed a series of fluctuations of forest cover and an overall decline from 1986-2020. The MK and Sen's slope estimator revealed a negative trend of hydrological data during the 34-year period, although not being significant ($p > 0.05$). Linear regression used to assess the impact of forest cover changes and rainfall on streamflow and dam levels showed weak relationships between the independent and dependent variables, as denoted by the low coefficients of determination. Therefore, the study concludes that the streamflow regime and subsequently dams levels of the Upper Keiskamma catchment cannot be solely explained nor influenced by changes in the Amatola forest and the rainfall regime. Thus, suggests that the controls of streamflow remain multifaceted and further research into multi-parameters regression analysis is recommended to

establish best models to explain streamflow and subsequently surface water resources in the upper Keiskamma catchment.

THE IMPACT OF CLIMATE VARIABILITY ON THE HISTORIC DISTRIBUTION OF BULINUS AFRICANUS IN THE JOHANNESBURG AND TSHWANE MUNICIPALITIES IN GAUTENG.

Lesego Thekiso (North-West University)

Email: lesegofortune4@gmail.com

Schistosomiasis is a water-borne disease mostly endemic in rural tropical regions. The Northeastern part of South Africa has an infection prevalence of 60-80%. In 2011 and 2018 the prevalence ratio was 23/1000 cases in Gauteng. Climatic events such as droughts and floods alter open water source ecosystems. Flooding increases the density of schistosomiasis hosts by a factor of 2.6. The Gauteng province is prone to floods and accounts for 42 % of these flood events from 1911-1988. This study aims to determine the influence of climate variability on the historic distribution of Bulinus africanus in Johannesburg and Tshwane Municipalities. Bulinus africanus snail dataset from 1950-1980 will be extracted from National Freshwater Snail Collection and used as presence data in the Maxent model. Using multiple regression analysis, a Pearson correlation statistical procedure will be run to identify the environmental variables that are mostly correlated to the snail datasets and be used in the Maxent model. The Tshwane municipality reported high snail density in the year 1977 and low density in the year 1978 while Johannesburg municipality had the highest in 1978 and lowest in 1982. Over 170 Bulinus africanus snails were found in the Tshwane region and 118 in Johannesburg. Bulinus species occur mostly in the Southeastern parts of the Tshwane municipality mostly found in Bronkhorstpruit. In the Johannesburg municipality, they were mostly found along the Jukskei River and Braamfontein Spruit.

HOW EFFECTIVE IS ENVIRONMENTAL EDUCATION IN SECONDARY SCHOOLS?

Kagiso Thobejane (University of the Free State)

Email: 2017273661@ufs4life.ac.za

The purpose of this study is to assess the effectiveness of environmental education of secondary schools. There are some areas in which people are not adequately informed about the environment and this study addresses that theoretical problem. The main objectives of this study were (1) to assess the environmental awareness of adults who recently left school, (2) to investigate how knowledgeable adults who recently left school are regarding environmental issues such as the water crisis and (3) to investigate if teachers are including environmental education in their daily teaching routine. The implementation of environmental education in school curriculums is a huge call for concern. This study adopts a qualitative research approach since it focuses on the perceptions and personal experiences of the individuals participating in the study. Since data collection is a crucial part of research, this study relied on primary data collection by means of questionnaires and structured interviews. The main findings of this study were that the participants are aware of the environment and what it encompasses judging from the results of the questionnaires, however, when it comes to specific environmental issues such as the water crisis, the overall performance was average. Furthermore, the educators proved to be environmental stewards who encourage good environmental behavior, since most of them discuss current environmental affairs with students and stress out the importance conservation.

INVESTIGATING THE IMPACT OF SOCIAL VALUES ON ECOSYSTEM SERVICES ON THE CAPE PENINSULA IN SOUTH AFRICA USING GEOSPATIAL TECHNIQUES.

Curtley Tonkin (Stellenbosch University)

Email: curtley.t@gmail.com

Ecosystem services (ES) provide a critical contribution to support human well-being, although ES face substantial degradation from anthropogenic impacts. ES assessments are used to support conversation programs that seek to safeguard ES. Numerous ES studies have investigated biophysical ES assessments and economic valuation, although social values (SV) for ES remains under-represented. Decision making based on limited ES assessments can result in negligent trade-offs for ES and relevant stakeholder values. ES trade-offs and synergies can be outlined using hotspot mapping and regression analysis methods. This study mapped hotspots and coldspots of biophysically modelled ES (BpS) and SV using the Getis-Ord Gi* statistic for the Cape Peninsula. The study also assessed the relationship between BpS and SV using the Ordinary Least Squares (OLS) regression analysis tool. SV were modelled using the Social values for Ecosystem services (SolVES) tool, based on questionnaire results, which provided 11 SV maps including aesthetic, biological diversity, cultural values, etc. Biophysically modelled services were modelled with the Integrated Valuation of Ecosystem Services and Trade-offs (InVEST) for carbon storage, habitat quality, flood risk mitigation, and annual water yield, based on geospatial biophysical data. Results indicated that BpS and SV hotspots mainly occurred in the Northern section of the Table Mountain National Park (TMNP). SV hotspots were located mainly around Table Mountain, the Tokai Plantation, and within the Cape Point Nature Reserve. BpS hotspots were situated mainly around the TMNP as well. SV and BpS coldspots occupied the largest area around the Cape Peninsula. The OLS regression analysis results found weak relationships between BpS and SV.

THE IMPACT OF CLIMATE CHANGE ON PAST AND CURRENT HYDROLOGICAL TRENDS IN THE OLIFANTS RIVER CATCHMENT.

Carli Van Zyl (Stellenbosch University)

Email: 21904065@sun.ac.za

Africa is particularly vulnerable to climate change as a direct consequence of its low adaptive capacity. Hydrologic variables like streamflow and rainfall are likely to be severely impacted, which will affect fluvial sediment transport dynamics. The interplay between streamflow and sediment supply plays a key role in determining fluvial style, and by extension, the ecosystem services rivers provide to society. Therefore, a thorough understanding of catchment hydrology is needed to assess potential changes in future flow regimes. Many depend on the Olifants River in the Western Cape, but little is known about its past and current hydrological trends in the context of climate change. To address this knowledge gap, the research aims to develop a conceptual understanding of how climate change influences catchment precipitation patterns, and potential response in Olifants River flow patterns. Five modified versions of the Mann-Kendall test were employed to determine long-term hydrological trends, and the catchment rainfall/runoff response relationship was investigated using Pearson's correlation coefficient. Results indicate that highly variable rainfall and streamflow in the region make significant trend detection challenging, and that the catchment experiences a rapid runoff response due to its impervious geology and sparse vegetation cover. In conclusion, quantifying the hydrological impact of climate change in the Olifants River Catchment is hampered by the absence of complete, long-term datasets, an already variable climate and methodological limitations.

HEALTHCARE PRACTITIONER'S PERSPECTIVES ON THE POTENTIAL RELATIONSHIP BETWEEN WEATHER, CLIMATE AND MENTAL HEALTH: A BIOMETEOROLOGICAL STUDY.

Mukhtaar Waja (University of the Witwatersrand)

Email: 1963933@students.wits.ac.za

Over the last decade, there has been an increase in research examining the influence of weather and climate in mental health caseloads. The most widely understood and well-documented link between climate and a mental health diagnoses, is Seasonal Affective Disorder (SAD). Climate seasonality, daily weather, and extreme weather events have also been statistically linked to diagnoses and increases in hospital admissions for conditions such as schizophrenia and bipolar disorder, although the nature of the causal relationship and aetiology of the climatic component of mental health conditions remain poorly understood. This study explores whether mental health practitioners perceive there to be a link between mental health and daily, seasonal, or inter-annual shifts in various climate variables – such as temperature, rainfall, or humidity – in South Africa, and the timing and causal mechanisms thereof. Exploring the influence of climate on mental health conditions may allow healthcare practitioners to better prepare for vulnerable periods, and to better understand a key factor behind patients' conditions.

QUANTIFICATION OF GREENHOUSE GAS METHANE FROM LANDFILLS USING TROPOSPHERIC MONITORING INSTRUMENT (TROPOMI) IN GOOGLE EARTH ENGINE.

Avela Xulu (University of the Free State)

Email: 2021855834@ufs4life.ac.za

Greenhouse gases are gases that absorb and emit radiation within the thermal infrared range in the atmosphere. These gases are very important and are responsible for warming up the earth because without them the planet would freeze out. Despite their significant role excessive greenhouse gas emission perturbates for alteration of the long-term mean temperatures which inevitably gives rise to global warming. Landfills are the greatest source of greenhouse gases, more so in-depth research has to be done on them. Remote sensing methods were used in carrying out the study as it offers the ability to quantify greenhouse gas emission from any source and from various activities including landfilling. This study aims to quantify methane emissions from two landfills in Bloemfontein the Northridge and Southridge landfill and to assess which of the two sites emits more methane. High-resolution imagery of greenhouse gas concentrations gathered by the tropospheric measuring instrument was obtained and analysed from Google Earth Engine using codes that were written on JavaScript and ran on the code editor. Additionally, ArcMap was used for further analysis and creation of maps. It is expected that the Northridge landfill will emit more methane in contrast to the Southridge landfill. The finds have shown that more methane gas in the landfills is emitted during the winter season as compared to summer which is contrary to many studies and the trend of methane emission has increased both in summer and winter during the 2019 to 2022 period range. Lastly the Northridge landfill emitted less methane.

INTEGRATION OF GROUND-BASED VEGETATION PARAMETERS, THERMAL INFRARED AND UAV MULTISPECTRAL DATA FOR MAPPING OF CROP CANOPY TEMPERATURE.

Phumlani Zwane (University of Limpopo)

Email: magnificent.psm@gmail.com

The land surface temperature is an essential dataset for various information related to crop water conditions and stress assessment. Using energy partitioning models, the thermal data is used with the vegetation cover to estimate the crop evapotranspiration. Thermal infrared sensors are not common in various operational earth observation satellites and usually come in coarse-resolution products. The main aim was to use the available in-situ data (LAI, CHL), unmanned aerial vehicle (UAV) image together with thermal (TIR) images to predict canopy temperature of tomato crop in Ha-Mphaila irrigation scheme. Various machine learning algorithms such as random forest, support vector machine and multiple linear regression models were evaluated to estimate canopy temperature. The results indicated a high correlation ($-0.6 < r > 0.7$) between canopy temperature and multispectral bands and a moderate correlation between temperature and ground-based vegetation parameters such as LAI and CHL. When comparing different machine learning algorithms, support vector machine ($R2 = 0.52$, RMSE = 1.28) outperformed random forest ($R2 = 0.47$, RMSE = 1.82) and multiple linear regression ($R2 = 0.41$, RMSE = 1.90). Therefore, the study explored the use of random forest since it is able to produce variable of importance for prediction of canopy temperature. The important variables selected using RF are LAI, NDVI, OSAVI and temperature of the soil. Therefore, the results showed the ability to estimate the canopy temperature using regression models. However, the model has performed poorly considering the sparse vegetation conditions. It is recommended to have separate models for each cover condition, such as soil and canopy temperatures. In conclusion, the combination of ground-based vegetation parameters, UAV, high resolution TIR images and machine learning algorithms can be used to predict canopy temperature of tomatoes.