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Winter Edition 2021



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Editorial

Winter. Again? The cold already skulked into our spines. With fingers clenched onto coffee mugs, we often find ourselves standing with our backs turned towards mid-morning promises from the north. The winter landscape has already prepared its inhabitants for longer, colder nights and drier days, and in moments of complete ignorance we ask: where have all the flowers gone?

But nature never fails.

Aloes are my Winter Allies. They carry promises of life in any Highveld garden as they attract numerous playful sunbirds and desperate bees. Likewise, the Winter Edition of ENVIRA illustrates promises of *life*. Even during the current complex COVID-19 challenges, research emanating from the UESM continues to address relevant questions that impact nature and human livelihoods.

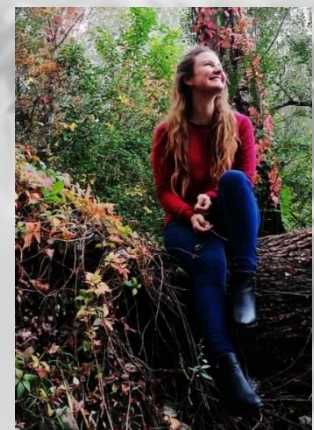
Study Nature

Love Nature

Stay close to Nature

It will never fail you

- Frank Lloyd Wright



Frances Siebert (Editor) and Clarissa Minnaar (Sub-editor)



Senior Laboratory Manager Lieb Venter

Interview by
Clarissa Minnaar

Flash Q's

Early bird or night owl	Early bird
Teleportation or mind-reading	Mind-reading
Cave or tree house	Tree house
Beach house or cabin in the woods	Cabin in the woods
Pap or potato	Pap
Favourite meal	Meat
Favourite hobby	Gardening
Favourite sport	Rugby
Favourite TV show	NCIS
Favourite season	Spring

General

What is your best childhood memory?

Doing woodwork with my father in the garage.

Do you have a hidden talent? What is it? Singing.

What is one song you have memorized completely?

There's a lot. The first song that comes to mind is Silent Night, but a more modern song would be Change on the Rise by Avi Kaplan.

What is one totally irrational fear that you have?

The fear of heights. It's irrational because I always find myself working on top of high buildings.

What is the top destination on your must-visit list?

Addo Elephant Park

Can you name the weirdest food you have ever eaten?

Grasshoppers and mopane worms. I've also eaten a snake before.

If you could become an expert at something in a blink of an eye, what would it be?

Human behaviour.

What is your favourite way to unwind after a busy day?

Walking in the veld on our small holding.

Do you have any pets?

Yes. A White Swiss Shepherd dog, Kelpies, cats and birds. Since we stay on the small-holding we are also in the privileged position to enjoy a variety of different wild bird species, which includes a fish eagle breeding pair. There are also some ground squirrels, jackals and two brown hyenas. It's nice to know they are all there by choice and not because they're fenced in.

Describe something you saw recently that made you smile?

I've recently noticed a growing spirit of support and understanding between people (especially students) and how they care for- and support each other in the midst of the pandemic. It seems like the continuation of the pandemic has begun to increase students' compassion for one another. Though we're expected to have less contact, it appears as if we want to have more contact, communication and share support. This spans over different social groups and it's phenomenal, it really warms my heart. I became aware of this not only at the university, but also off-campus.

Do you have a guilty pleasure?

Yes, playing computer games. I like playing Age of Empires. You need to think strategically and it really takes your mind off everyday things.

Career / NWU related

Where did you get your schooling?

I went to Middelburg High School, in the Eastern Cape province. In 1996 I enrolled for a BSc degree at the former Potchefstroomse Universiteit vir Christelike Hoër Onderwys (PU vir CHO).

What are some interesting undergraduate projects you were involved in?

I was in the fortunate position to be trained in mammal ecology by Prof Gary Bronner as part of my 3rd-year ecology project. That sparked my love for ecology. While I was an undergrad student, I also did many EIA's specifically on the small mammal dynamics in Potchefstroom and surroundings, as well as at some surrounding mines. The best project I worked on in this regard and the one that makes me the proudest, is the Mooiriver Mall. I was part of the

EIA team that led to the mall becoming a reality.

What was the focus of your post-graduate studies?

I have a master's degree in Zoology. The focus of my master's degree was the effect of lead and water quality on the biology of *Tilapia sparrmanii*. The research incorporated applied zoology in the environment and pollution in freshwater systems.

Have you obtained any other qualifications outside of Natural Sciences?

Yes. I have obtained a senior certificate in management and trained in GLP (Good Laboratory Practices) and Gas handling. I am also a qualified first responder and a RPO (Radiation Protective Officer).

Do you have any other research interests?

Yes, I'm also interested in water chemistry and was involved in the Botany water research groups (under- and post-grad) and presented the botany water excursion with botany lecturers for 11 years.

What led you to this career?

I always had a love for animals and the environment. At university, I switched from academics to support, but I feel like I still have a foot in both worlds. In 2001 the lab technician at the Zoology department retired and I applied for his position to generate my own income to pay for my studies. The original plan was to do my PhD by following this route. Prof Pieter Theron actually advised me to do so. However, my father passed away shortly after I started my new position, which meant that I had no alternative financial support. I then began developing a niche where I managed to establish myself within the position I was holding at that time. This niche involved combining science with technology, engineering

and law (occupational health and safety, construction and electrical law). I started digging into all these facets that were never part of science and research and begun incorporating them into science. This meant managing / controlling the environmental factors through designing buildings and laboratories to minimize the effect of the lab environment on experiments, making them more accurate. To me this became a science – to minimize the standard deviation of means through e.g. fixing ventilation issues, lighting, airflow (cross contamination), securing clean water for laboratory use. What makes my position so exciting to me is that I get to be involved in all the research in the different disciplines in some way or another.

Who has influenced you most when it comes to how you approach your work?

I couldn't possibly single out one person, there are so many people I would like to include in my answer to this question. My dad taught me to draw up- and read plans from a young age. He always said that you cannot customize a project if you cannot see it in your head. He also said that a project is 95% planning and 5% implementation thereof.

Academically, I've also had a tonne of influences. Many professors, deans and rectors influenced my scientific thinking and thinking outside of the box, management- and communication skills and thorough record keeping. I learned a lot from the directors I've had the privilege to work under. I was also very fortunate to learn various skills from Prof Jan Geertsema during our frequent discussions as we cycled to campus together. He had a philosophical way of explaining concepts to me at 18 years of age.

Further, Prof Daan van Wyk was the reason for me being the first attending and voting undergraduate student with full access to the faculty council and he made me feel comfortable in doing so.

At the end of the day I believe all these people have crossed my path to make me who I am today for one reason – to serve.

What is a work-related accomplishment that you are really proud of?

Two that really stand out for me is the building and construction of G4, the undergraduate practical labs. It was my first project and is being used daily. Secondly, is the combined construction of G23 (including the setup of the building and its floors) for Zoology and Microbiology, and the redevelopment of E6 to accommodate Agriculture, Soil Science and Geology.

What energizes you at work?

Challenges, and 90% of those are related to time restrictions. However, my biggest interest and inspiration is when academics come to me with a problem and we sort it out together, allowing me to immerse myself in the science of it all.

What is your favourite memory to recall when reflecting on your time as an employee at the NWU?

Being on the organizing committee for the International Congress for Physiologists in Chobe National Park. It was my first interaction with international scientists and I was intrigued by their misconceptions of living in Africa.

The second memory close to my heart is the project on crocodiles that died in the Kruger National Park with Prof Bouwman and Prof Rialet Pieters. We did helicopter surveys for two days and got the answers we were looking for.

Cities and Nature

Charlie M. Shackleton
Sarel S. Cilliers
Elandrie Davoren
Marié J. du Toit *Editors*

Urban Ecology in the Global South

 Springer


50 | 50

ONS PLANEET
ONS TOEKOMS



Accolades

Congratulations

The following awards and accolades from the international scientific community demonstrate the high quality and significant impact of research within the UESM.

Urban Ecology

Congratulations to Sarel Cilliers, Marié du Toit (Extraordinary Senior Lecturer, UESM) and Elandrie Davoren (PhD NWU alumni) on the book *Urban Ecology in the Global South* in the Springer series *Cities and Nature*, for which they acted as editors. NWU personnel and alumni were involved in writing seven of the seventeen chapters – Sarel Cilliers (5 chapters) and Marié Du Toit and Elandrie Davoren (3 chapters each). The first editor from Rhodes University (Charlie Shackleton) contributed to 4 of the chapters. Juaneé Cilliers (Extraordinary Professor, UESM) and Louis Lategan (Extraordinary Senior Lecturer, UESM) were co-authors on one chapter.

Read more about the book under the [News Flash article](#).

The Urban Ecology research group is showcased under [Calliper](#).

Media personality

Bianca Greyvenstein

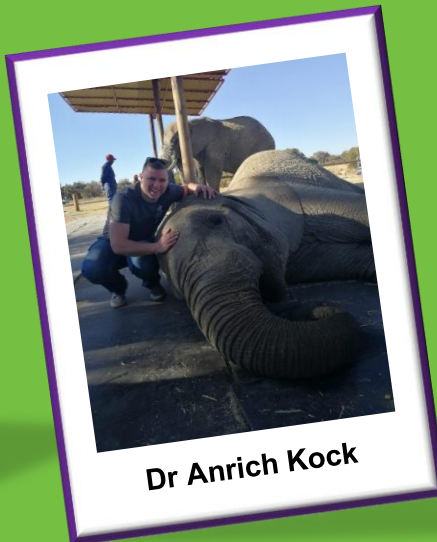
Bianca's expertise in preying mantids in South Africa has earned her multiple opportunities to share her knowledge with the interested viewers of *50/50* as well as the listeners on *RSG*.

[See more or view](#) Bianca's features on two *50/50* episodes and her interview on *RSG*.

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Newly Appointed Postdoctoral Fellows 2021

Interactive 





Why 'The Calliper'?

A calliper is an instrument that measures the diameter of an object. In this

Regulars item, we measure and reflect on scientific outputs of UESM members below the level of full Professor.

How the top 10 most cited and published researchers below the level of Full Professor were determined:

This list is based on citations and publications of UESM-affiliated Senior Lecturers and Associate Professors as reflected by SCOPUS on 10 June 2021.



Research Performance Below the Level of Full Professor

PUBLICATIONS

	<u>Number of Publications</u>	<u>H'index</u>
Oriel Thekiso	66	22
Rasheed Adeleke	63	12
Jonathan Taylor	48	12
Hannalene du Plessis	47	9
Kerry Hadfield-Malherbe	33	12
Sarina Claassens	33	10
Roelof Burger	33	9
Charlotte Mienie	30	11
Frances Siebert	30	9
Sandra Barnard	27	8
Courtney Cook	23	10

CITATIONS

	<u>Citations</u>	<u>H'index</u>
Oriel Thekiso	1364	22
Jonathan Taylor	635	12
Rasheed Adeleke	547	12
Kerry Hatfield-Malherbe	415	12
Sarina Claassens	377	10
Hannalene du Plessis	287	9
Roelof Burger	269	9
Charlotte Mienie	247	11
Courtney Cook	218	10
Frances Siebert	209	9
Sandra Barnard	199	8

Research Group Showcase

Urban Ecology

The Urban Ecology research group regularly collaborates with international scientists on research projects and publications, with Potchefstroom included as a case study in a highly influential paper on a global analysis of urbanization impacts on bird and plant diversity. Two recent highlights include: the co-editing of a book published in the Springer Cities and Nature series with the title: *Urban Ecology in the Global South*, which represents contributions from 53 authors from 20 countries ([see News Flash Article](#)). Secondly, a paper titled *Urban green infrastructure and ecosystem services in sub-Saharan Africa*, co-authored by Marié du Toit, Sarel Cilliers and collaborators from the University of Leeds, is currently 14th in the list of the 25 most cited papers in Landscape and Urban Planning since 2018. Landscape and Urban Planning is a monthly peer-reviewed academic journal with an impact factor of 5.441.

The Urban Ecology Research Group has been invited to share their latest highlights in this Winter edition of ENVIRA.

Congratulations on their excellent achievements!

SUCCESS IS NO ACCIDENT. IT'S HARD WORK, PERSEVERANCE, LEARNING, STUDYING, SACRIFICE AND MOST OF ALL, THE LOVE OF WHAT YOU ARE DOING.

- PELE

The next edition of ENVIRA will showcase other research groups within the UESM.



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Research Ethics in Environmental Sciences and Management

Ethics

Roelof Burger

The Senate has decreed that all studies, including MSc and PhD students, should have an ethics number and all studies need an ethics review. As many have experienced, students are not being allowed to submit their studies without such an ethics number. The Faculty of Natural and Agricultural Research Ethics Committee (FNASREC) was formed to review low and no risk studies in the Faculty. While many research groups had their own processes before 2018, all research in the NWU now has to undergo a second ethics review, independent of the scientific reviews that continue to be the responsibility of the sub-programmes. The Senate provided a grace period for FNASREC to review studies that started before 2018, but that ran out in September 2020. We must now be aware that no research can start without an ethics number. Another important consideration is that the responsibility for ethics approval lies with the supervisor and not the student. Staff should, therefore be careful to monitor all studies under their supervision. FNASREC has tried to construct an archive of students in the faculty. We estimate a total of 390 active MSc and PhD students in the Unit for Environmental Sciences and Management. Of these, we can confirm 305 ethics numbers, with 266 of these provided by FNASREC. During 2020, we reviewed 252 studies from the unit. An important insight is that 85 students still need ethics clearance, of which 17 have been registered for more than a year. Supervisors should confirm that all their students have ethics numbers at this point and should be aware that they risk disciplinary action from the Senate if their ethics approvals are not in place. Applications to FNASREC can be submitted to <https://tinyurl.com/fnasrec>. Ethics approval is only valid for a year, after which an annual review will be conducted and the certificate renewed.

What you need to know about ethics in the Unit for Environmental Science and Management

1. All research needs to be reviewed by one of the ethics committees at the NWU, including masters and doctoral students.
2. No research is allowed to start without an ethics number.
3. No student is allowed to submit his dissertation without an ethics number from one of the NWU ethics committees.
4. The ethical responsibility of student studies lies with the supervisor, not the student.
5. For low and no risk studies, the process is fairly quick and painless. Start by submitting an application to <https://tinyurl.com/fnasrec>

Community projects

Valuing Water - Quality and Quantity

Lee Chenhaka, Raesa Bhikhoo, Lesego Molale-Tom & Stenly Makuwa



Stakeholders (JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, NWU – Microbiology, Dr KK District, YWP – NW Chapter, Department of Economic Development, Conversation and Tourisms (DEDECT), and Small Five Environmental and Tourism Organization) who interacted with the people of the villages of Ventersdorp. Image captured by: JB Marks Municipality Representative.

Take a moment, imagine life without water...

Forget about that cup of coffee, no more refreshing showers, don't bother with daily toothbrushing regimes. More pressing: no food, no clothes, no industries, and no energy.

Covid-19 has highlighted the need for good hygienic practices and having access to proper sanitation facilities. It's sad to say that nearly one in every ten people still lack access to safe water and sanitation facilities. Every year, South Africa celebrates National Water Week (NWW) from 15 – 22 March. Coinciding with World Water Day, this commemoration is aimed at educating the public about the role they play in water conservation and protection. In support of NWW, the JB Marks Local Municipality, Dr. Kenneth Kaunda District Municipality, Dr. KK District, YWP – North West (YWP-NW), Department of Economic Development, Conversation and Tourisms (DEDECT), the North West University (colleagues and students from Microbiology) and Small Five Environmental and Tourism Organization, embarked on a Roadshow in the villages of Ventersdorp. The visited areas are also a research site of the NWU-Unit for Environmental Sciences and Management.

Loudhailers were used to bring awareness about NWW and the importance of good quality water in Setswana to members of the Tsetse and Boikhutse villages. During the procession flyers and memorabilia with the message of the day was distributed to community members. The outreach programme was met with excitement but also with discouragement. During NWW the service areas of the JB Marks Municipality experienced water-cuts or no water delivery. In the debriefing meeting, it was communicated that when there are power cuts, water delivery is further impacted. One of the young researchers, Seipathi, also a UESM MSc student, furthermore, advised that information on flyers should also be printed in Setswana, the first language of the majority of village residents. Bilingual flyers are envisaged to improve the impact of information that is being communicated.

As part of NWW-2021 activities, Mr Stenly Makuwa from JB Marks Local Municipality on an interview with Aganang Community Radio-station shared the importance of safe water delivery to communities by taking regular water samples from communities serviced by JB Marks Municipality. A representative from the Young Water Professionals – NW Chapter stated that after all the proceedings of the day, one thing was crystal clear... *Water is our most precious and valuable resource.* We therefore need to positively change our behavioral patterns towards how we treat water. Our very existence could depend on how we value water today.



Community projects

Ikageng Men’s Conference (Organization)

Moitlamo Matshaba (Buns)



Gender-based violence (GBV) is a widespread issue in South Africa, which disproportionately affects females. GBV is rooted in many establishments, cultures and traditions yet many people remain unaware of the seriousness thereof. Addressing male behaviour towards females from a young age may treat the root of this ongoing problem.

The Ikageng Men’s Conference (IMC) seeks to reposition the dignity of men in the society, by providing them with a suitable platform to stand up and address such crucial issues. Effective male leadership in these communities is promoted by the IMC through governing discipline in their lives and discouraging gender-based violence in households. This ties in with regular visits to schools with a special focus on teaching and guiding the young boys of society.

Families that are child-headed, and vulnerable homes that are exposed to GBV and child abuse are also assisted by encouraging family members to seek help and pointing them to relevant institutions for assistance.

Several events are held throughout the year to raise awareness and address issues such as GBV, alcohol- and drug abuse. Different speakers are often invited to speak to the public. Speakers from FAMSA (Families South Africa), the SAPS and Social Development regularly address the community. These events are also often accompanied by marches.

The IMC gets a lot of positive feedback from the community on the events. Many community members value the organization for their efforts - especially for providing information on when/where/how to seek help.

Future events and plans have already been scheduled including school visits, but due to the COVID-19 regulations, it is uncertain how many of the planned events will realize. However, the IMC envisions reaching the whole of Ikageng and more of Potchefstroom.

For more information on IMS or to get involved contact Moitlamo Matshaba (Buns) at

ikagengmenconference@gmail.com



Various events held by the Ikageng Men’s Conference.

[View videos](#)

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Student Association

Ad Vivendum

Lucia Mhlanga



Ad Vivendum 2021, first get-together.



Ad Vivendum group photo right after shooting the Open Day video.



Making eco-bricks for Value Your Environment Week.



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The COVID-19 pandemic has undoubtedly brought about changes to Ad Vivendum's 'normal' activities that take place during the first semester of the year. This demanded creative work-arounds from our side. Despite the regulations accompanying the pandemic we successfully made sure that the students were exposed to an integration of both NWU's vibrant student life and their fields of study.

We could not have the traditional registration and orientation (R&O) this year, but we still managed to thoroughly inform the first years about all the campus- and online facilities of which they could take advantage. We have held multiple events via Zoom in order to comply with the COVID-19 regulations. Ad Vivendum has also safely collaborated with the various hostels on campus where we had events to inform students about different current affairs.

Earlier this year we came together as a committee to make eco-bricks for Value Your Environment Week. We also sold keyrings to raise money that will assist the less fortunate students. More recently, we took part in Wellness Week to raise awareness about mental health issues. During Canned Food Day we managed to collect non-perishable food items as well as masks and sanitary towels and we also collected clothing on Barefoot Day to be donated to the less fortunate. We would like to extend our most sincere gratitude to everyone that has supported Ad Vivendum, especially those that contributed to Canned Food and Barefoot Day.

Ad Vivendum collected sanitary towels for an NWU initiative that took place during Gender Awareness Week. The sanitary towels collected were donated to the youth in the community.

We are in the process of selling Ad Vivendum hoodies at present and we encourage all students to purchase them.

Science Fact Box



What do Climate Change and Coffee have in common?



Killer whales have best friends



“Bee Stops” and “Bee Hotels”



Greenland ice sheet close to tipping point



New hope for endangered *Karomia gigas* tree



Return of the world's tiniest pig



Strange ocean food



Conservation beyond forests



Enigmatic Waves That Cause Auroras



Air manipulation in elephant trunk

Hobby Showcase: *Aquatic Ecosystem Health*



Watercolour painting
Vickey-Luanne Harris



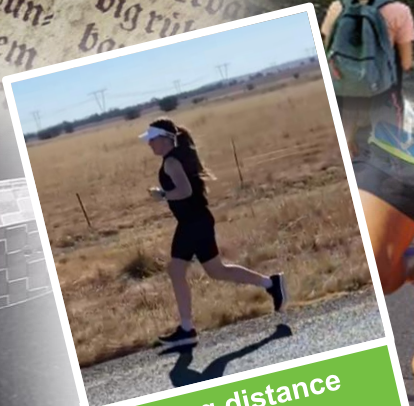
Rock climbing
Franco de Ridder



Reading fiction
Victor Wepener



Miniature 3D metal model
construction
Henk Bouwman



Long distance
running
Sune Claassen



Hiking
Annika Kruger



[View more](#)

A decade of socio-ecological research by the Water Research Group on the Phongolo floodplain

Victor Wepener

The Phongolo River floodplain is the largest floodplain system in South Africa. This 13,000 ha floodplain and its 100+ associated temporary floodplain depressions (pans), form the most biodiverse floodplain ecosystem in South Africa. It hosts more than 400 bird species, more than 40 fish and frog species ([Acosta et al. 2020](#)). The Ndumo Nature Reserve, a RAMSAR site, is situated at the northern end of the floodplain. This region is highly reliant on the natural capital of the floodplain for its ecosystem goods and services.



Lake Nyamithi in Ndumo Game Reserve is the largest wetland on the Phongolo River floodplain and hosts the third largest crocodile population in South Africa.

The rapidly increasing human population is dependent on the resources that the floodplain offers and makes use of water from the floodplain for agriculture, daily consumption and as food source (including traditional fishing). Since the construction of the Pongolapoort Dam in the late 1970s, the system has relied on an artificial flooding regime to simulate the floodplain's natural seasonal water equilibrium. However, due to an ongoing drought there has been no flood release for the past five years. Furthermore, the floodplain is in a moderate- to high-risk malaria area where indoor residual spraying of DDT is actively applied in summer for malaria vector control. Additional chemicals such as fertilizers and pesticides are introduced into the environment through growing commercial and subsistence agriculture practices. These different socio-

ecological facets of the floodplain ecosystem interplay to develop a delicate balance between resource utilization and maintenance of biodiversity ([Smit et al. 2016](#)).

This fascinating ecosystem has been the topic of research by the Water Research Group for the past 12 years. To date eight BSc Honours, 24 Masters and eight PhD students from seven universities (North-West University, University of Venda, University of Zululand, University of Johannesburg, Hokkaido University, University of Antwerp and University of Leuven) completed their research projects on aspects of the floodplain. A total of 42 publications on the cultural and fish utilisation, water quality, parasite-, macro-invertebrate- and amphibian biodiversity, pesticide ecotoxicology and development of a risk management

framework of the Phongolo floodplain system have been published. New parasite species were described in fish (1), amphibians (6) and reptiles (2); and one new frog species was described from the region. New records of two alien parasites on fish and the alien redclaw crayfish and its parasite were also recorded. The long-term success of the research programme can be ascribed to excellent international collaboration networks led by extraordinary professors from Hokkaido University in Japan (Prof. Yoshinori Ikenaka) and University of Leuven in Belgium (Prof. Luc Brendonck) as well as funding from multi-national agencies. Over the past 12 years the programme has been supported financially by AIREs du-Sud (France), VLIR (Belgium) and the South

African Water Research Commission and National Research Foundation. In addition to the numerous postgraduate students who undertook their research projects on aspects of the Phongolo floodplain, a new crop of tutored Masters students is contributing to a better understanding of the socio-ecological structure of the system. The Water Research Group hosts an annual [Living Laboratory](#) as part of the Masters of Sustainable Development of the University of Leuven. During this two-week period, up to 60 students from Leuven and NWU conduct research on social and ecological issues facing the region. This programme is indeed an excellent success story exemplifying the importance of developing strong international research networks.



Fish are harvested from the flooded pans during the traditional fishing ritual (isifonya) which is a major cultural occasion on the floodplain.

Plastic, Still?

Vickey-Luanne Harris,
Rialet Pieters & Henk Bouwman

In the past 50 years the surface of the planet has changed drastically due to the overwhelming presence of plastic pollution. An estimated 60–80% of all litter is plastic, and in South Africa, that amounts to around 600 000 tonnes of mismanaged plastic pollution annually, of which more than 90 000 tonnes is suspected to end up in our oceans. Plastic is not biodegradable, meaning that every single piece of plastic ever made since it first made its appearance in 1907, is still in existence today. Larger plastics do however disintegrate into smaller fragments (<5 mm) —or microplastics (MPs) — which are ubiquitous in all environmental compartments today.

Microplastics leach and desorb harmful pollutants to

exposed organisms: Leaching of endogenous plastic compounds such as bisphenol A, phthalates and brominated flame retardants and desorption of previously adsorbed pollutants. Persistent organic pollutants, polyaromatic hydrocarbons, and polychlorinated biphenyls are pollutants that had been found to adsorb to MPs.

Desorption and leaching of these pollutants occur in water and soil, but also inside organisms after ingestion and in both situations affect the exposed organisms (Figure 1). One of these effects is endocrine disruption, which is when the roles that hormones play in all vertebrates are being disrupted.

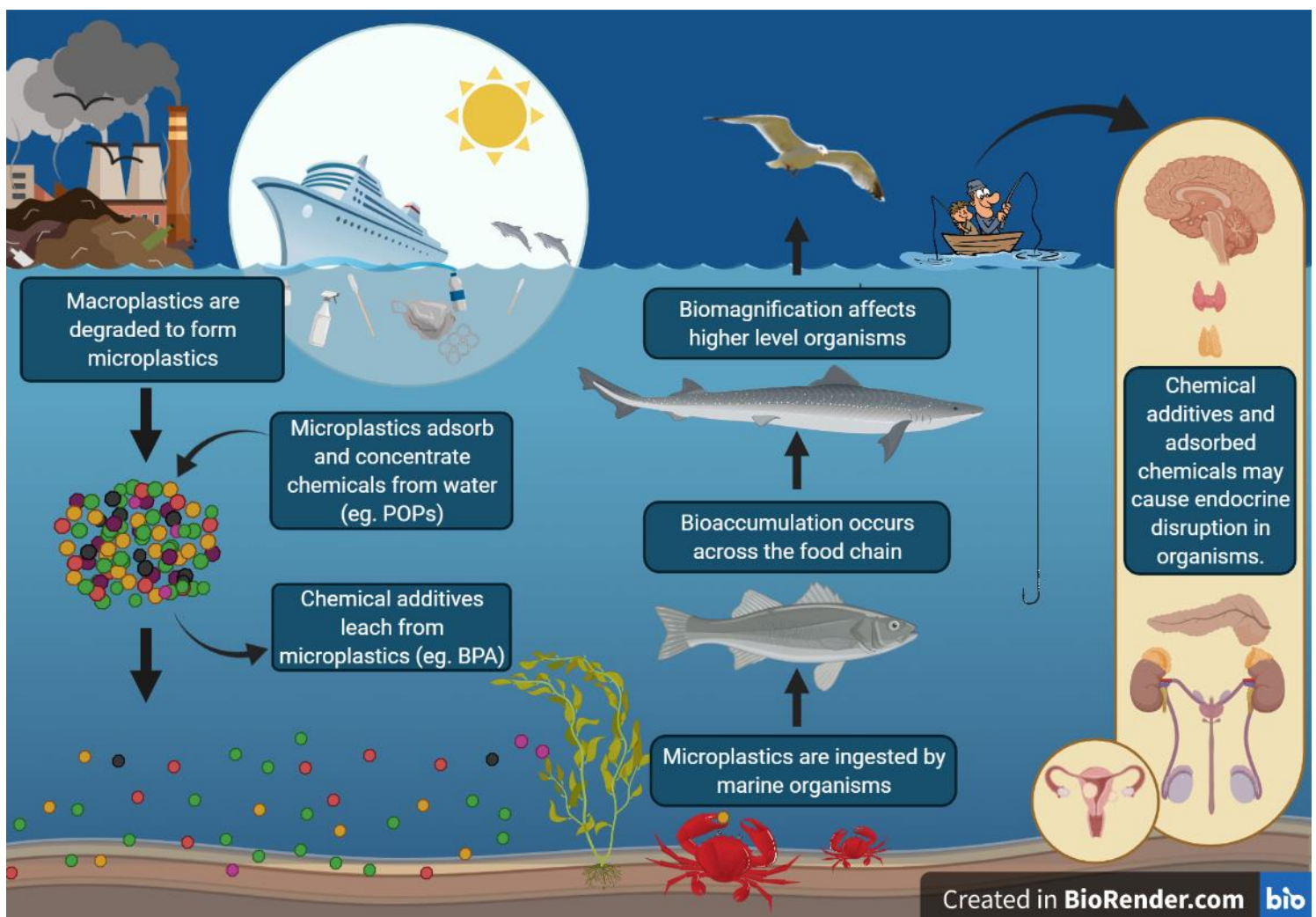


Figure 1: Leaching, adsorption and desorption of microplastics in the marine environment and the transport of the pollutants to the possible endocrine disrupting end point.

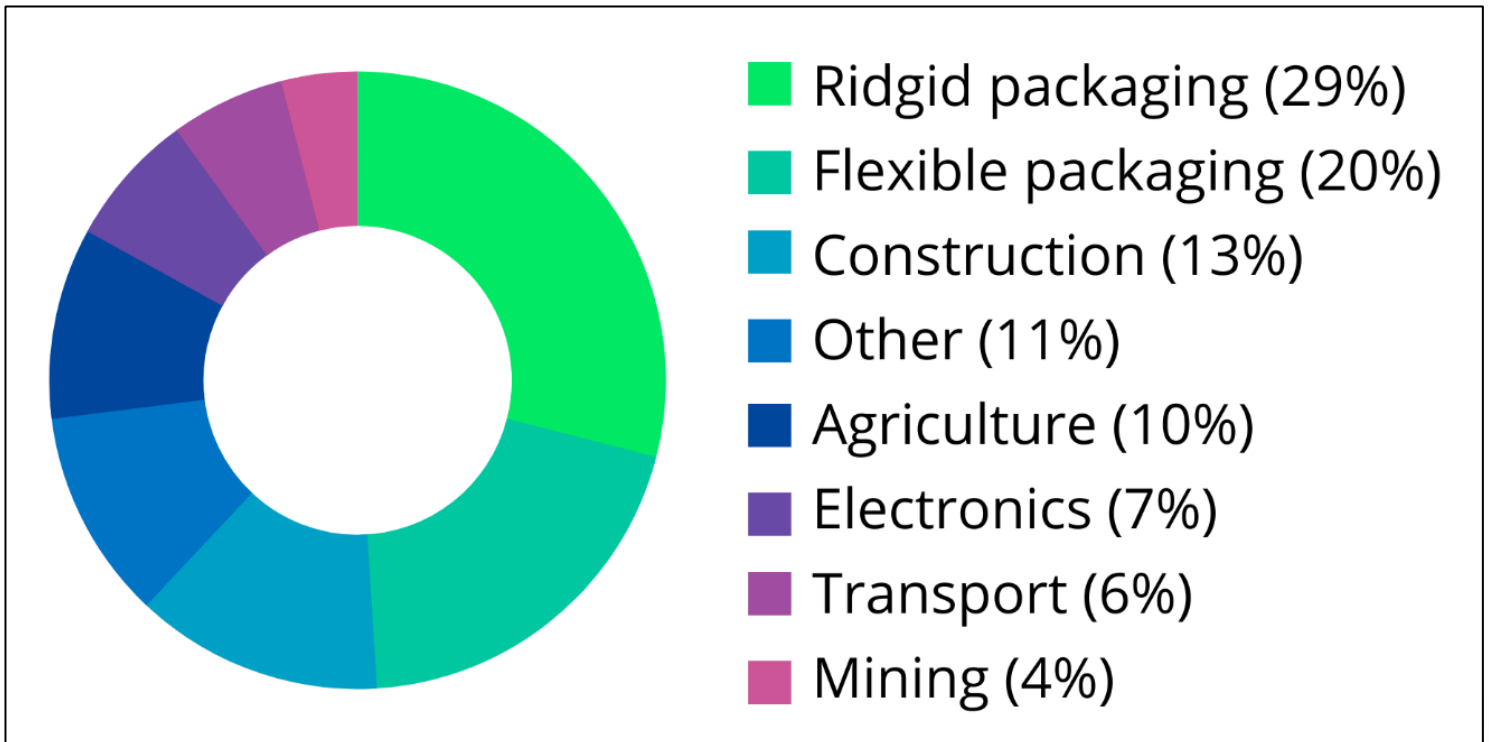


Figure 2: Market uses of plastic produced in South Africa in 2019.

Despite the abundance of studies on hazardous effects of MPs globally, research about it in South Africa is almost non-existent. What had been studied in SA is: Microplastic ingestion in juvenile fish, water-birds and off-shore fish. In an effort to decrease the amount of plastic consumption our government implemented a plastic shopping bag levy and private sector runs recycling programmes. However, recycling requires the addition of stabilizers to the plastic, which eventually becomes unrecyclable, ending in the waste system regardless, but now containing additional additives available for leaching.

Despite our attempts to reduce plastic, South Africa still produced over 1.8 million tonnes of plastic in 2019. Approximately 49% of this was used for packaging, where only 40% was used for construction, transport, electronics and agriculture (Figure 2). About 1.1 million tonnes ended up in the waste stream, and only 45.7% of that was recovered for recycling. Of the recovered plastic, only 352 500 tonnes became available for recycling as the rest was placed in landfills or incinerated. It boils down to only 19% of plastics produced here being recycled, whilst the rest ends up in landfills. According to [Plastics SA \(2020\)](#) the plastic equivalent of 24 million 2 L milk bottles is recycled daily

but more than that, the equivalent of over 1 billion milk bottles a day are not recycled. In South Africa the plastic consumption is 27 kg/capita/year. In a family of four, this is the equivalent of 59 plastic shopping bags per day.

Considering what we know about the hazards of MPs, their ubiquity in all environments and the extent of our plastic consumption, it is time that MP research reaches the forefront of our focus?

Further reading:

<https://www.plasticsinfo.co.za/wp-content/uploads/2019/10/All-About-Plastics-May2018.pdf>

<https://www.plasticsinfo.co.za/media-room/annual-reports/>

Much more than weeds: The multiple functions provided by forbs

Tomi Lois Olatunji & Frances Siebert

Plants of various life forms including trees, shrubs, climbers, herbs, grasses, and forbs contribute to the richness and diversity of an ecosystem. However, forbs (non-grassy herbaceous flowering plants) are often regarded as weeds. Consequently, there is limited research and knowledge on the ecological role of forbs - particularly their functional importance in open ecosystems, which include savannas and grasslands. Several forb species possess useful qualities and are not to be treated as “stuff” that get in the way of grasses. They are a highly diverse group of plants that contribute considerably to:

- (i) Livestock feed (e.g. members of the Fabaceae and Convolvulaceae families): Forbs are important nutritive dietary components of several browsers as components of mixed pastures and have been reported to contain higher levels of phosphorus and crude protein, and lower fibre levels than shrubs or grasses. Lower levels of fibre help in digestibility as it breaks down quickly in the rumen of animals (Hoiechek, 1984).
- (ii) Ornamental and ecological uses: Despite their weedy nature, different species of forbs have been used and are still used in gardening and landscaping, restoration, or reclamation.
- (iii) Food and medicinal use: A number of indigenous rangeland forb species are consumed as vegetables, thus forming a part of local people’s diet. They are economically useful crops that had bolstered food security historically when the main crops failed, and thus should be increased in production to solve the global food crises. Additionally, many of the forb species are used in traditional medicine to treat different ailments. Furthermore, the broad range of bioactive phytochemicals present in some forb species can be potentially employed for the treatment and prevention of several diseases in modern medicine. For example, in some members of the Convolvulaceae family, chemical compounds, including coumarins, resin glycosides, alkaloids, flavonoids, phenylpropanoids, etc., have been reported to exhibit potent central nervous system efficacies (Chen et al., 2018).

- (iv) Species richness in grassland and savanna ecosystems: Forbs form part of the herbaceous layer in open ecosystems and are valued for the diverse functions and services they provide (Siebert & Dreber, 2019). For example, forbs play an important role in the recycling of nutrients, water quality regulation, and storage of carbon. Through their root exudates with a high amount of minerals, forbs interact with the microbial population and impact the dynamics of soil minerals. Forbs also help to prevent soil erosion as they function as ground cover.



The Everlasting (*Helichrysum adenocarpum*) from the Drakensberg moist grasslands.



The Lion's eye (*Triliceras laceratum*) - a beautiful bushveld surprise.



A



B

The Porcupine Root (*Talinum caffrum*) (A) provides succulent leaves as forage to many smaller antelopes. Its large underground tuber is not only a delicatessen for porcupines, but are among the many forb species in grasslands and savannas that fulfil the important function of carbon sequestration, similar to the ecological functions provided by other grassland and savanna geophytes (plants with underground storage organs), such as the Ground Lily (*Ammocharis coranica*) (B).



The Wild Evolvulus (*Evolvulus alsinoides*) – a small plant with big impact as it provides important food resources to African game species and possess important medicinal properties. This is also the current plant species of interest in the Forb Ecology Research Group (FERG) lab under the supervision of Dr Tomi Olatunji.

Forbs not only make out the largest component of grassland and savanna diversity, it also supports the high diversity of insects and small antelope in these open ecosystems. Not all forb species are blessed with beautiful colours and shapes. Some forb species have small, inconspicuous flowers, although they still perform important ecological functions.

Despite evidence of the importance of forbs, they are still treated as subordinate plant groups and largely ignored in savanna ecology research. The Forb Ecology Research Group (FERG) is involved in various research projects aimed to improve and contribute to the understanding of the remarkable functions of forbs.

One of our current research projects is evaluating the nutritive values, antinutrients, and phytochemical constituents of selected indigenous forb species in the family Convolvulaceae, a plant family that is known to contribute to nutritious food items in the diet of livestock, wild herbivores and humans, and yet they have rarely been evaluated. Such assessments are extremely valuable as they will elucidate the importance and contribution of forb species to the nutrition of livestock and humans.



Dr Tomi Lois Olatunji and Patricia Padi (BSc Hons student in FERG) in the laboratory, evaluating the antinutrient content of the commonly browsed forb, *Evolvulus alsinoides*.

A short chronology of large-scale multinational field campaigns over the southern Africa subcontinent

Stuart Piketh

Southern Africa has been this location of several large-scale atmospheric research campaigns involving scientists from around the world. These included Southern African Fire Atmospheric Research Initiative (SAFARI'92), and Transport and Atmospheric Chemistry near the Equator-Atlantic (TRACE-A), which were initiated to investigate the presence of a large pool of elevated tropospheric ozone concentrations over the South East Atlantic Ocean during the Austral Spring ([Lindesay et al., 1996](#)). During this campaign, scientists from across the world descended on the sub-continent to understand the magnitude of biomass burning in southern Africa and the impacts that the emissions and atmospheric transport have on the regional scale atmospheric chemistry. A follow-up campaign (SA'ARI'94), which was much smaller in scale, was undertaken to evaluate the atmospheric chemistry in a non-biomass burning season ([Helas et al., 1995](#)). In 2000 The Southern African Regional Science Initiative (SAFARI-2000) was undertaken. This campaign was also a multi-national experiment that set out to address the many unanswered questions related to emissions, atmospheric transport, atmospheric chemistry and global change. This experiment covered large areas of the sub-continent and was closely associated with the

launch of the two NASA satellites, Terra and Aqua ([Swap, Annegarn and Otter, 2002](#)). More than a decade after this experiment the focus from the international scientific community again fell on southern Africa. Once again, the importance of the transport of emissions from the subcontinent was being investigated. Multiple experiments were organized, which included Observations of Aerosols above Clouds and their interactions (ORACLES) led by NASA, Aerosols, Radiation and Clouds in southern Africa (AEROCLOSA). Recently there have been two publications that have summarised the scientific activities in Namibia and the adjacent south east Atlantic Ocean ([Formenti et al., \(2019\)](#), and [Redemann, et al. \(2020\)](#)).

The Climatology Research Group at NWU was actively engaged in both these experiments. Broadly speaking both these experiments are set out to better understand the impact of aerosols, i.e. both above and below the stratocumulus cloud deck that forms off the southern African west coast, on the regional climate. These large-scale experiments have had a lasting impact on local and regional science and the understanding of the complex atmospheric environment of southern Africa.



Disaster risk reduction and academic publishing: past, present and future

Dewald van Niekerk

Since Henry Oldenburg (a philosopher and theologian) published the first volume of *Philosophical Transactions* (*Phil. Trans.*) in 1665, the process of academic and scientific publishing has remained largely the same. *Phil. Trans.* established the format of the scientific paper: title, abstract, introduction, literature review, methodology, results, conclusions, and list of references. It has proved to be an enduring vehicle for the presentation of scholarly research and debate. However, since the establishment of modern scholarship during the Enlightenment (or perhaps much earlier in the case of China), there has seldom, if ever, been a time of greater change than at present, and not only for Disaster Risk Reduction (DRR) academic publishing.

There are currently approximately 80 Anglophone journals that deal primarily with disaster risk reduction and allied topics (such as environmental management, geography, sociology, economics, public health, emergency management and the like).

This large array of publications signals a sustained, if uneven, growth in DRR scholarship, as well as competition between the offerings of different institutions and publishers. Our research, undertaken by the editors and members of editorial review boards of over 20 current and past publications in DRR, highlights the growth and challenges in the field of DRR academic publishing. The research found that the field is dominated by large, multinational corporations, with a few smaller commercial publishing companies. Some journals are published by societies, university research centres, networks of researchers and practitioners, and even some private companies (unfortunately mostly linked to predatory journals). Although there has not been any dedicated journal to the study of disasters and risk until the mid-1970s, books and reports on disasters have been issued since the start of field endeavours by scientific societies in the 1920s. There was some growth in journals focussing specifically on disasters and emergencies in the 1980s. Seldom, if ever, is the founding of a new journal in this field supported by an assessment of need among the academic community. Most commercial publishers and many societies rely on selling journals for income. One of the leading debates in journal publishing at the moment centres on open

access. The paywalls that constrict free access to journals have been contested and a new model of open access has emerged ([Schiltz, 2018](#)). However, the situation is complex. Commercial publishers have made handsome profits by limiting access to readers who pay fees. However, learned societies, for example, derive vital income streams from such revenue. One could also argue that the nature of DRR research and knowledge is a societal commons and should be free for all. There are also undoubtedly inequities in the ways that authors, editors, and reviewers provide their labour for free, while private companies reap the financial rewards. Another source of inequity concerns the popularity of bibliometric measures and the increasing trend within many national research evaluation systems to rely on quantitative indicators to determine the performance of researchers. Also, the combined hegemony of the English language and the Anglophone traditions of international academic publishing can marginalise scholars whose native language is not English ([Canagarajah, 2002](#)). Despite the massive upheaval in science, scholarship, and society owing to the digital revolution, the models of article structure and peer review have proved to be remarkably robust. This might be more the product of inertia than any especially positive outcomes delivered by the dominant approach. For the most part, printed journals are on the way out. Digital publication offers massive flexibility. Scholarly publishing of articles pertaining to DRR faces a double challenge. First, the field is changing rapidly as society itself evolves and mutates, natural and other hazards produce various forms and magnitudes of disaster, and vulnerabilities to impacts generally increases in many ways. To propose solutions to urgent problems, research must rise to the challenge of recognising and interpreting these phenomena. Second, academic publishing is in a phase of rapid change as the digital revolution opens up new possibilities and threatens to change radically the format of publication for the first time since the mid-seventeenth century.

The author herewith provides a summary of the published article: Alexander, D., Gaillard, J.C., Kelman, I., Marincioni, F., Penning-Powell, E., Van Niekerk, D., and Vinnell, L. 2020. Academic Publishing in Disaster Risk Reduction: Past, Present and Future. *Disasters*. <https://doi.org/10.1111/disa.12432>

For more information, see <https://beallslist.net/>

New book in Springer series Cities and Nature: Urban Ecology in the Global South

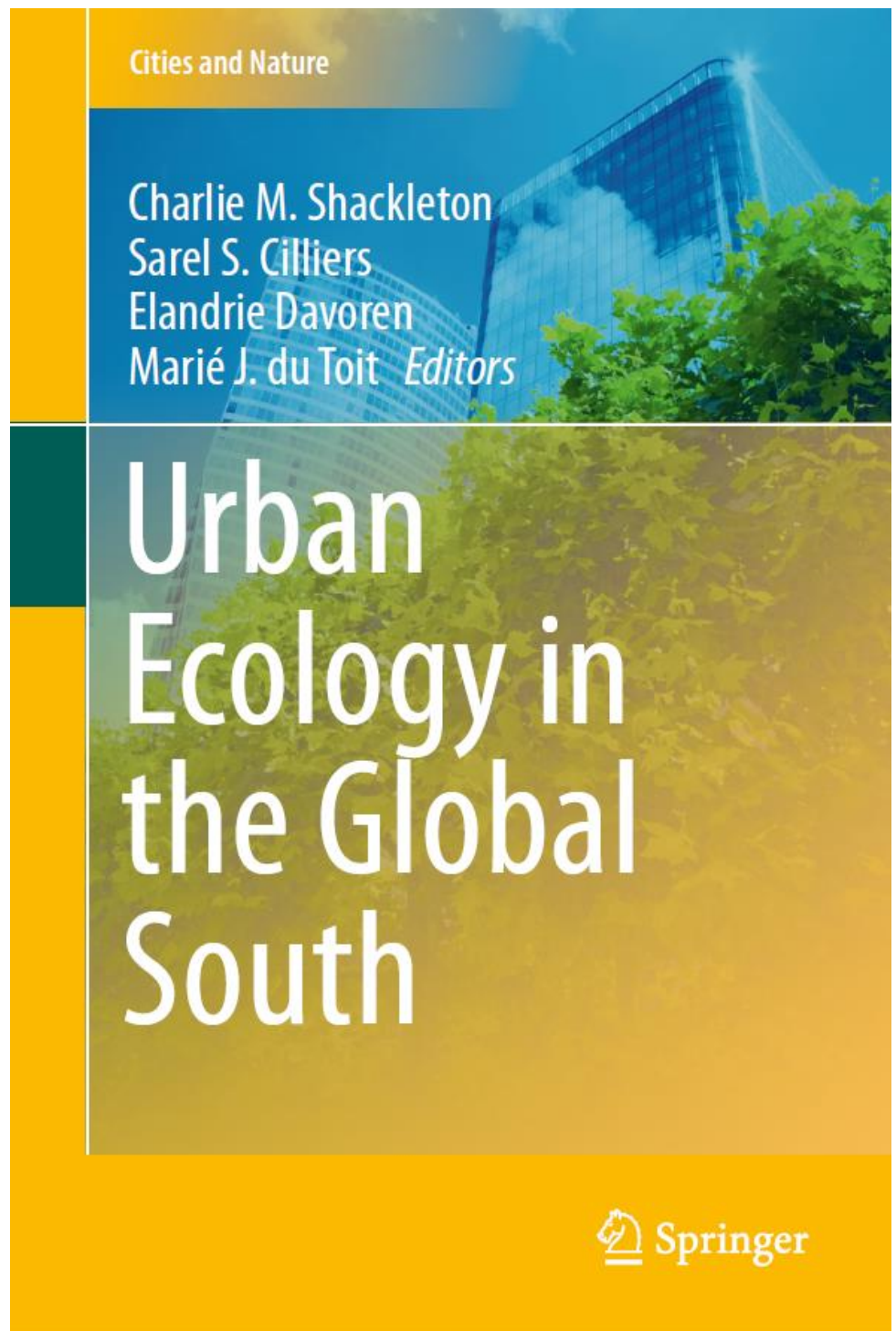
Editors: C.M. Shackleton, S.S. Cilliers, E. Davoren, M.J. du Toit

Sarel Cilliers

An excerpt from a recent feature story posted on the [World Bank website](#) highlights how critical sustainable and resilient cities are:

“One of the biggest lessons learned from the COVID-19 crisis is that sustainable, resilient cities were able to handle the pandemic better,” said Jan Vapaavuori, the Mayor of Helsinki, underscoring how it had revealed more than it changed, and given city leaders a better understanding of their cities’ attributes and strengths. “It is actually worth putting even more emphasis on sustainability issues than before,” he said at a recent World Bank event.

The ongoing pandemic reminds us just how fragile and vulnerable our cities and society can be. A key factor towards addressing shocks and disasters as highlighted by the excerpt above is building more sustainable and resilient cities. The discipline of Urban Ecology is uniquely positioned to understand and enhance complex urban socio-ecological systems. However, current knowledge of these systems is not equitably distributed across the globe. Much more is known about urban areas in the Global North (GN). Consequently, there is an appreciable knowledge gap in Global South (GS) settings. Addressing this gap is essential, as GS contexts are often unique and starkly different to that of



GN urban areas, and most of the future growth of cities is predicted to be in the GS. This timely book aimed to directly address the knowledge gaps through a global collaboration of 53 authors from 20 countries mostly in the GS. Throughout the book it is clear that although there are some generalities, the GS has unique environments, dynamics and realities that do not reflect GN situations, which emphasizes the importance of addressing the lack of research in this region.

The 17 book chapters revealed several recurring and emergent themes that dominates GS discourse, namely that of “rapid change; informality; vulnerability; legacies of colonialism; weak or constrained planning and implementation of policies, plans and regulations; connectivity; partnerships and local knowledge and action; biological invasions; environmental injustice; and context matters.” In the final chapter of the book eight themes are proposed on which future research efforts should be focused to advance and enhance urban ecological understandings of GS cities and how they fit into current GN framings. The future research themes include: “inequality; informality; urban–rural links; small and medium-sized towns and cities; urban green infrastructure, biodiversity and ecosystem services;

understanding and accommodating multiple worldviews of urban nature; human health and urban nature; and specific research approaches”. Urban ecology in the GS should no longer be treated as if it must “catch up” with the GN with only the failures in urban nature conservation, planning and management pointed out. The “success stories” as highlighted in this book need to be emphasized and reproduced.

We look forward to the book or selected chapters becoming core reading for researchers and students in various institutions all over the world, and ultimately in spurring greater research in the GS and contributions to global debates and frameworks in urban ecology.

The book was edited through a collaboration between scientists at the NWU (Sarel Cilliers, Professor in Plant Ecology and Marié du Toit, previously a post doc in Urban Ecology and currently an Extraordinary senior lecturer at the UESM) and Rhodes University (Charlie Shackleton, Professor and Research Chair in Interdisciplinary Science in Land and Natural Resource Use for Sustainable Livelihoods and Elandrie Davoren, post doc in Urban forestry). Davoren completed her PhD at the NWU in 2017. NWU personnel and alumni contributed to seven of the chapters in this book.



Planning for the unplanned: making the unheard voices of “squatters” heard

Selna Cornelius

Every year, around 70 million people leave their rural homes and migrate to the world’s cities. United Nations estimates indicate that, at this rate, there will be 3 billion squatters in the world by 2050. The world’s cities must build 35 million homes a year to keep pace with this influx – that is 66 homes per minute, one home every second ([Neuwirth, 2006](#)). In other words: unplanned and informal settlements will be an integral part of urban growth in the foreseeable future.

Africa is currently the fastest urbanising region in the world and the conundrum of planning for unplanned settlements, mushrooming around Africa’s towns and cities, has subsequently gained increasing attention from planning practitioners and academics. A plethora of prejudices regarding the residents of these unplanned or informal settlements (universally known as squatters) has the consequence that squatters are frequently neglected, disrespected and excluded by governments, politicians, the press, urban planners and the public. For many years, “community participation” and “participatory planning” were presented and explored as solutions to formalise unplanned settlements with the intended purpose to engage these squatter communities in taking ownership of the provided planning solutions. In South Africa, participatory planning has since become a fundamental part of democratic practice and good governance. Unfortunately, it has subsequently evolved into “spectator politics”, a process where especially the poor, oppressed and marginalised squatter communities have become the victims of “administrative manipulation” and “endorsees of pre-designed planning programmes”. The actual notion of participatory planning has been essentially reduced to a cumbersome ritual, an obligatory addendum required by the policy and legislative framework on local government level.

Involving final year NWU planning students as part of a SoTL (Scholarship of Teaching and Learning) project, this research investigates the employment of novel participatory planning methods in a case study area (Matlwangtlwang, Steynsrus). The site was purposefully



Site visit by final-year Planning students to Matlwangtlwang, applying community-based planning methods and interactive engagement with the squatter community.

selected for the particular planning challenges it poses in terms of the relocation of squatters and service delivery in a contested political landscape. A coalescence of community-based planning methods is employed in the squatter community by the NWU students, relating directly to the active involvement of the residents, local government, planning practitioners and academics in co-producing planning solutions for the challenges they are currently facing. These methods support the ultimate development of an extensive social network analysis that purposes to gain a proper understanding of the composition, expectations and general lifestyle of the squatter community, especially aiming to identify inherent planning solutions that they already offer, mostly unknowingly. In many instances, these residents have proven themselves to be active agents in constructing liveable circumstances rather than simply being passive victims of relentless structural processes beyond their control. Such actions by residents are challenging many Western rationalities that underpin the current South African planning approaches. The anticipated final output of this research is to offer a user-friendly novel participatory planning framework to the planning industry, academics, various governmental spheres and squatter communities, as an instrument in attaining community-based planning and in making the unheard voices of “squatters” heard.

A link to related published work:

<https://www.witpress.com/elibrary/wit-transactions-on-ecology-and-the-environment/223/36429>



Novel approach to reblocking of informal/unplanned settlements by making use of drone footage and recent aerial views of the Matlwangtlwang sites.



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- All the authors who willingly shared their community projects, hobbies and research with readers of this edition.

We appreciate every contribution.

Look out for the *Spring* edition 2021, coming soon.

Frances and Clarissa

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