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**Recycling, integrated pest management
and protecting wildlife at UCT:
a situational report for 2022**

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(with Noelene le Cordier, Kayleigh Cornish,
Danielle du Plooy, Fritha Langerman, Reggie Mayman,
Harro von Blottnitz, Justin O'Riain, Shahir Singh, Zoe
Woodgate, second year biology students who helped with
the wildlife survey, and students from the Green Campus
Initiative)

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Recycling, integrated pest management and protecting wildlife at UCT: a situational report for 2022

Abstract

The Khusela Ikamva initiative at the University of Cape Town (UCT) seeks to make the campus more sustainable, and to do this through collaborative research and engagement with contractors, students, and academic staff. This paper reports on activities aimed at improving waste management and recycling (to improve UCT's contribution to the circular economy) and to introduce integrated pest management (IPM) so as to reduce the need for rodenticides and other pest control measures harmful to wildlife. In 2022 the Khusela Ikamva initiative sought to raise awareness on campus about the need for recycling, to monitor recycling behaviour, to study biodiversity on and around the campus, and to engage with managers and contractors to promote IPM. We found some improvement in recycling behaviour, but UCT's contribution to the circular economy was undermined by poor management of waste once it left the bins and when it was collected by contractors. A survey by students of biodiversity revealed that there was a rich diversity of wildlife on campus and also predators that could potentially be exposed to secondary poisoning from rodenticides. Unfortunately, despite aiming to improve IPM, UCT once again failed to change its pest control contracts to facilitate IPM. UCT's failings on waste management and IPM are unacceptable given its situation on the urban edge of Table Mountain.

1. Introduction

This working paper reports on activities by members of the Khusela Ikamva initiative at the University of Cape Town (UCT) to improve waste management and protect wildlife. Khusela Ikamva aims to improve environmental sustainability on campus. This part of the project does so by focusing on recycling – and important contribution to the circular or green economy (Loiseau et al., 2016) and reducing the need for environmentally unfriendly poison. These objectives are linked through integrated pest management (IPM) which seeks to

reduce food and harborage for pests, and thus reduce the need for rodenticides and other poisons that pose danger for wildlife (Nattrass, 2022).

We begin with an updated audit of external bins on University Avenue, the main thoroughfare on UCT's upper campus. Our earlier report (le Cordier et al., 2022) documented the history of recycling at UCT and presented the results of an intervention conducted in 2021 to improve recycling by introducing enhanced signage on selected bins. In this update, we document the results of a subsequent audit of the same external pebble dash bins, and compare it to the previous result. We also report on efforts on the part of students from Michaelis School of Fine Art to raise awareness about the problem of plastics and the need for recycling on campus. The section on recycling concludes with some reflections on UCT's poor recycling record and highlights the key challenge facing management: to improve the management of recyclables once they have left the bins.

The key message from 2022 is that recycling behaviour has improved in that a greater proportion of recyclables is going into the correct bin (though there is room for further improvement on that score). However, this improved recycling behaviour on the part of students and staff at UCT has, unfortunately, been undermined by poor management at UCT and by UCT's waste contractors. UCT's waste management and recycling system has three distinct components:

- 1) cleaning staff must place the correct bin liners in the correct bins (black bin liners in yellow non-recycling bins destined for landfill and clear bin liners in green recycling bins destined for the recycling yard);
- 2) people must place recyclables in the correct bin; and
- 3) contractors must take the clear bags for recycling, and black bags to the landfill site.

As we show in this situational report, there have been some improvements in the second stage, but UCT still struggles at times to get adequate supplies of clear and black bags to cleaners, and there are probably ongoing challenges in ensuring that cleaning staff inside buildings are adequately trained and monitored. The biggest problem, however, pertains to management failures after the bags are removed from the bins, stored and then collected. UCT's waste management statistics show that most of the waste ends up in landfill. This is obviously bad for the environment, but it has also deprived UCT of revenue as the current waste contractors pay a share of the income from recycling to UCT.

The Khusela Ikamva project includes various student activities to promote environmental awareness through student organizations such as the Green Campus Initiative and student projects in the Michaelis School of Fine art. We briefly report on these initiatives as well as results from student-linked survey of wildlife at UCT by the Institute for Communities and Wildlife in Africa (iCWild).

The survey showed that there is substantial biodiversity on and around UCT, including owls, genets, caracals, mongooses and domestic cats. All of these animals run the risk of being exposed to harmful rodenticides – which is why IPM should be a priority. Unfortunately – and despite significant engagement through Khusela Ikamva (see policy brief in the Appendix) – UCT has yet to revise its pest control contracts appropriately. This is a significant failing – and fixing it will be a key priority for 2023.

2. Bin audit: some limited signs of improved recycling behaviour

The Khusela Ikamva rubbish audit is very much an ‘action research’ project, or what development economist Jean Drèze calls ‘research for action’, that is, to pursue knowledge as a collective endeavor to achieve practical change (Drèze, 2017: 4-8). Rather than research being a spectator activity, where research is conducted ‘on people’, action research entails the ‘participatory assessment’ of problems and their solutions (McNiff, 2017). This approach adopts ‘good-enough’ measures, rather than ‘best-practice’, when the former is more feasible and practical given constraints on everyone’s time and related resource requirements. The UCT Khusela Ikamva recycling project followed this approach in adopting simple methods and in engaging in collaborative research between academics, students, and university support staff. The small team could not possibly monitor all bins, so opted to conduct a follow-up study of the external bins surveyed in 2021 to get an indication of whether behaviour had improved or not. This targeted study was supplemented with analysis of overall recycling and waste collection (and associated revenues from recycling) for UCT as a whole.

In 2021 the Khusela Ikamva team comprised two members of staff from Grounds and Gardens (Noelene le Cordier and Reggie Mayman), an academic (Professor Nicoli Nattrass) and an honours student in economics (Refilwe Mofokeng). That team conducted audits of bins inside and outside buildings along University Avenue, the main thoroughfare on upper campus. The objective was not to complete a full rubbish audit (in which every item, including food waste is ideally be identified and weighed), but rather to see if even the most ‘basic recycling’ was evident on the part of those using the bins. It followed the methodology adopted by Fritz et al. (2017) in their study of a university in Texas, and Felske (2020) who used a similar measure at a university in Missouri. These studies counted items to estimate ‘correct recycling’ and did not do any weighing or further sorting of waste. In the 2021 UCT study, correct recycling was operationalized as the percentage of recyclable items (cans, bottles (plastic or glass), food containers and other clear plastic items) that had been placed correctly in the green bin, for each paired set of bins. In other words, if there were 60 recyclable items in a green bin,

and 40 in the yellow bin, then for that pair of bins, correct recycling was $60/(60+40) = 60\%$ (see le Cordier et al., 2022 for more detail).

The 2021 UCT study explored whether there were differences between recycling inside and outside buildings (there was not) and whether improved signage on bins made a difference (it did not). In the 2022 study reported below, a Khusela Ikamva team comprising Noelene le Cordier and Reggie Mayman from UCT Grounds and Gardens, Kayleigh Cornish, Danielle du Plooy and Shahir Singh from Michaelis School of Fine Art, and Nicoli Nattrass from iCWild conducted an audit on 17 March 2022 of the 21 pairs of external bins (42 bins in total) that had been surveyed on 17 August, 17 September and 28 September in 2021. Permission for the project was granted from the Commerce Research Ethics Committee.¹

Table 1 presents the results from 17 August 2021, 17 September 2021, 28 September 2021 and 17 March 2022 for the 17 pairs of bins for which the percentage of correct recycling could be calculated in each of the four audits.²

Table 1: Recycling (cans and bottles and food containers) in pebble-dash bins prior to the intervention

Percent of basic recyclables in paired bins that were correctly placed in the green bins			
17 August 2021 65%	17 September 2021 58%	28 September 2021 54%	17 March 2022 70%
Mean: 0.648 Std deviation: 0.197 variance: 0.039 Obs: 17	Mean: 0.579 Std deviation: 0.127 variance: 0.016 Obs: 17	Mean: 0.543 Std deviation: 0.295 variance: 0.087 Obs: 17	Mean: 0.699 Std deviation: 0.129 variance: 0.015 Obs: 17
t-test of the difference between 17 August 2021 and 17 March 2022		t=-0.89 Ha: diff!=0 Pr(T > t)=0.38	
t-test of the difference between 28 September and 17 March 2022		t=-2.002 Ha: diff!=0 Pr(T > t)=0.05*	

* Statistically significant at the 5% level.

Table 1 shows that recycling performance declined in 2021 (though not statistically significantly) and that the result for 17 March 2022 was better than any of the results in 2021. The table shows that the improvement between September 2021 and March 2022 (from 54% correct recycling to 70%) was statistically significant at the 5% level. One possible explanation for the

¹ As there were no human subjects, research ethics approval was not required. We wrote to the Commerce Research Ethics Committee and this was confirmed – the project was granted an exemption (EX2021/04/001).

² If the paired bins had no recyclables, the result for percent correct recycling was missing. The analysis in Table 1 includes only those 17 pairs of pebble dash bins that had valid data for all four surveys.

improvement in recycling behaviour is that the 2022 intake of students was more environmentally aware than previous years. Another possible explanation is that we might be seeing the impact of new signage and better bins that were placed inside UCT buildings early in 2022. This might have helped raise awareness about recycling in general, and this effect might have spilled over into improved behaviour with regard to the older, external bins too. It remains to be seen whether this level of improved performance is maintained – and whether UCT can do even better to improve performance, given that 30% of basic recyclables are still being placed in the yellow bins destined for landfill.

As noted above, the 2021 audits included an experimental design in which the bins on University Avenue that were studied in June 2021 were provided additional signage (the large posters depicted on the bins in Figure 1) and additional bins on University Avenue were added to the sample but left ‘untreated’ (meaning no additional signage was provided). The results of subsequent audits indicated that there was no statistically significant improvement in the treated bins and, at best, providing additional signage had slowed the deterioration in recycling performance in those bins (le Cordier et al., 2021). In the March 2022 audit, there was no statistically significant difference between the treated and untreated bins. This probably indicates that the effect of the improved signage as a nudge factor has worn off. This is consistent with the hypothesis that there is a generally higher level of awareness at UCT about recycling in 2022 compared to 2021.

2.1 Bin liners

In the 2021 bin audits, researchers recorded whether bin liners (black for yellow bins, indicating that the bag should be sent to the landfill, and clear plastic for green bins, indicating that the bag should be sent to the recycler) were placed in the correct bin. Our earlier study reported that there were management problems because the bin liners were not necessarily placed in the correct bin.

This problem remained evident in the March 17, 2022 audit of external bins: only one of the green bins had a correct clear liner. All the other bins, whether yellow or green were given black liners by the cleaning staff. Figure 1 shows bins in a food court area outside the library. It shows that the bins are overflowing (inadequate for purpose) and that the green bins had the incorrect liner.

We investigated the issue and discovered that there had been a ‘backlog’ in the supply of clear bin liners. While we understand the difficulty, the situation does point to clear limitations to the existing system. When black bin liners are placed in green bins, then all the effort people have made to put recyclables in that bin literally goes to waste as the bag is transported directly to landfill.



Figure 1: Green bins with black liners (incorrect).

Subsequent opportunistic inspection of bins after the audit revealed that once the supply problem had been addressed, the external bins had the correct bin liners. From anecdotal observations, there nevertheless appeared to be persisting problems with bins inside the buildings, where black bin liners were often used in green bins. Investigation revealed that those ordering the bin liners were experiencing supply shortages, but some managers were more proactive than others in sorting out the problem. What was particularly concerning was that those supervising bin management inside buildings appear never to have alerted the recycling company or the refuse trucks or make appropriate arrangements to ensure that recyclables were not sent incorrectly to the landfill. There is a clear need for improved management of cleaners working inside buildings.

3. Raising awareness about plastic pollution

The Khusela Ikamva initiative on recycling in 2022 included students (Kayleigh Cornish, Danielle du Plooy, Shahir Singh) from the Michaelis school of Fine Art. These students participated in the rubbish audit and created an art installation to draw attention to the problem of plastic waste (Figure 2).

The installation, which adorned the Jamie steps on Sarah Baartman plaza in May 2022, was inspired by a series of photos by photographer Chris Jordon, which captured how birds consumed plastic. Kayleigh Cornish told journalists: ‘From Chris’s photographs we were inspired to create this intestine filled with waste and bursting at different points to illustrate and capture the violent effect pollution has on wildlife,’ (<https://www.capetownetc.com/events/arts-and-culture/uct-students-create-a-giant-fabric-intestine-to-promote-recycling/>). The idea was to

pique the interest of passing students and staff, and to draw attention to the fact that so much of South Africa’s waste ends up in rivers and oceans (which is why the intestine looked like a worm going down into a storm water drain). When the installation was over, the waste was returned to UCT bins for recycling and the mutton cloth membrane was washed and used by the UCT Art Department as scrap fabric for cleaning.



Figure 2: The plastic intestine art installation

Students from the Green Campus Initiative were also active in raising awareness about plastic pollution and the need for more sustainable lifestyles. This included activities and education during the ‘Green week’ held on campus earlier in the year, and organised beach clean-ups (Figure 3).



Figure 3: Students from the Green Campus Initiative at a beach clean-up

4. Breakdown in the rubbish collection system

The most concerning aspect of waste management at UCT in 2022 was the apparent breakdown in the collection of recyclables. Waste collection is outsourced to a private contractor who is supposed to pick up recyclables (in clear plastic bags) on particular days of the week and take them to a recycling yard for further sorting. On other days, the contractor is supposed to pick up the black bags and take them to the landfill.

There have, for several years, been persistent complaints about the truck drivers picking up all the waste, whatever the day and whatever the colour of the bag, and driving off with it to destinations unknown. When such observations were reported to the contractor, the typical response was to question the report (implying it was not true) or accepting that there was a problem and blaming it on the truck driver. Our team did not have the capacity to monitor the trucks systematically because the trucks do not collect waste at the same time each day.

The problem appeared to us, from anecdotal evidence, to have worsened in 2022. For example, on Thursday March 31, at about 8.30am, three of us (Noelene le Cordier, Reggie Mayman and Nicoli Natrass) observed that the waste collection site at UCT's nursery was full of a mixture of black bags and clear bags taken from the pebble dash bins (Figure 4). This should not have been the case if the company was picking up clear bags on dedicated days and black bags on other days. Noelene phoned the company to ask if the trucks were still collecting black bags full of garbage on Monday, Tuesday, Thursday, and Saturday (and the recycling, in clear bags, on Wednesday, Friday and Sunday). We were told that this was the case. The presence of mixed clear and black bags was explained as deliberate sorting: if the workers with the trucks saw a heavily contaminated clear bag (as in containing a lot of wet food waste) then they would leave it for the next day's truck, and it would go straight to landfill.

At about 9.30 am, we observed the truck arrive and collect *all* the bags – irrespective of whether clear plastic bags were obviously contaminated with wet food waste or not (Figure 4). The workers appeared to believe it was their job simply to load all the bags into the truck. As this was a Thursday, this implied that all the recyclables were destined for the landfill. We spoke to the driver who told us that his 'controller' had told him to take all the bags and he did not know if any of this went to recycling. He gave the impression that it was his understanding that all the rubbish collected from UCT went to the landfill. The driver said there 'used to be' a system where they collected different bags on different days but that this had not been the case for months. We informed the company about the problem and were told it would be addressed.



Figure 4. The refuse truck takes all the bags, irrespective of whether these were full or recyclables or general rubbish (31 March 2022).

Two months later, on 16 May, Prof Von Blotnitz (who is also part of a Khusela Ikamva energy-related project but has substantial expertise in recycling and has long sought to improve UCT's recycling performance) complained to the contractor that all the bags, irrespective of colour, were being collected simultaneously and placed in the same truck. He was told that all the bags were being taken to the recycling yard for sorting and the non-recyclables would then be taken to the landfill. Prof Von Blotnitz questioned why the bags were all going into the compactor, where recyclables would be crushed and contaminated, and thus become unusable for recycling. He did not get satisfactory answers.

On 17 May Reggie Mayman watched and photographed the truck taking all the bags (black and clear). He and Noelene raised the issue again with the company and were told that it had been a 'back-up' crew that should have known better, but that the problem would be fixed. In other words, in a matter of 24 hours, the waste contractor had produced two different explanations for why the trucks were picking up all the waste and no longer following the protocol. Prof Von Blotnitz was told that all the waste went to the recycling yard, and Noelene le Cordier was told it was a backup crew – an aberration, in other words.

It is clear that the system of collecting waste is under strain and is poorly monitored. It is possible that the waste contractor has largely given up trying to recycle, given that so many of the bags are contaminated or perhaps because the prices for recyclables has fallen. UCT clearly needs to have a full and frank

discussion with the waste management contractors to obtain the information necessary to design appropriate contracts.

5. UCT’s ongoing poor recycling performance

As documented by le Cordier et al. (2022), UCT has long struggled to introduce a sustainable recycling system on campus. From the mid-2010s, the system devolved into a mostly two-bin system (green lids for recyclables, yellow for non-recyclables). In some buildings paper was collected separately by outside contractors, but these systems were inconsistently managed and tended to collapse. In the student residences, ‘wet’ food waste was recycled to protein (fly) farms, and the ‘dry’ waste remained unsorted. Refuse removal trucks which were supposed to pick up recyclables on some days, and general waste on others, also collected the refuse from student residences, presumably taking the combined waste to recycling or landfill depending on the day. Sometimes, however, recyclers would be called directly to residences to pick up cardboard or plastic bottles if there had been a dedicated drive by students to promote recycling. Such actions by students probably account for most of the money for recycling received by UCT.

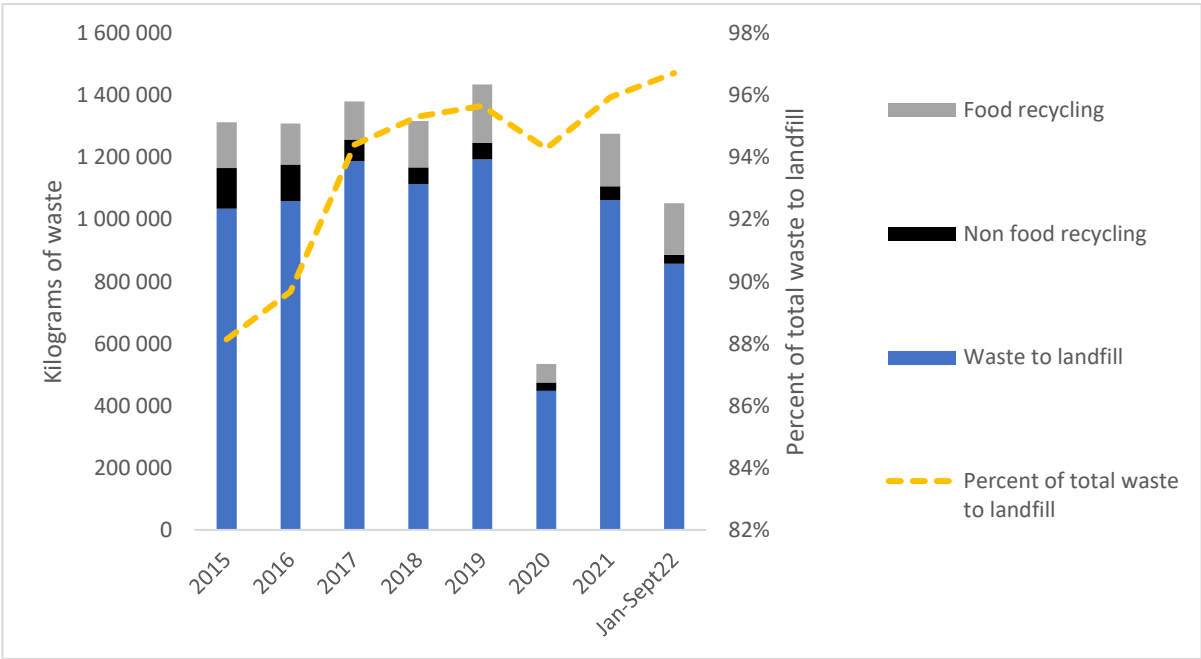


Figure 5: Volume of waste at UCT: 2015 to September 2022

Figure 5 shows trends in total waste at UCT broken down into three categories: waste to landfill, food waste, and non-food recyclables (data provided by the waste contractor). Total waste declined in 2020 largely due to the COVID-19 lockdown, and it was down in 2021, probably due to only partial opening of the university for part of that year. As can be seen from the figure, by far the largest

category is waste to landfill and this has been rising from 88% in 2015 to 96% in 2021. As of the end of September 2022 (the most recent data available), 97% of UCT’s waste was going to landfill. This is consistent with our anecdotal observations that recyclables were being placed into the general waste – and that this probably means most was taken straight to landfill.

Figure 6 provides a breakdown of the different categories of (non-food) recycling waste (in kilograms) collected at UCT from 2015 until the end of September 2022. The figure includes (dotted line) information on how much revenue UCT earned from its share of recycling. It fell sharply from 2015 to 2020, increased in 2021 but, as of September 2022, it seems likely that the total for 2022 will once again be lower.

It is likely (but impossible to tell from the aggregate data) that the increase in recycling revenues in 2021 had to do with the collection of used water bottles and delivery packaging from student residences (Figure 6 shows that cardboard recycling increased in 2021 with a slight increase in the PET group). Due to ongoing COVID-19 restrictions, students were given water bottles at mealtimes and there was probably an increase in delivery packaging. That recycling revenues appear to have fallen in 2022 as these restrictions lifted, is consistent with this hypothesis.

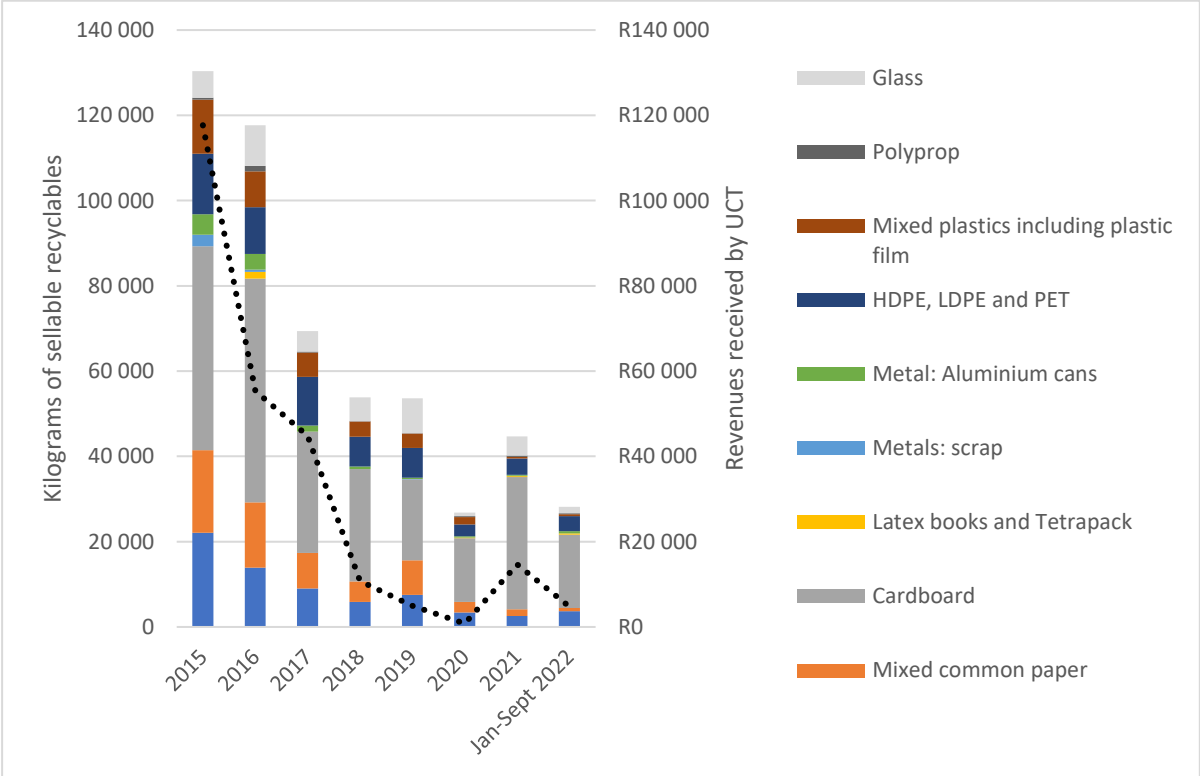


Figure 6: The collapse of recycling at UCT: 2015 to 2022

UCT's contracts with external contractors are in the process of being reviewed. Contracts with waste controllers and pest control companies have been rolled over on a year-by-year basis for the past few years and this might well be contributing to low commitment on the part of all concerned to sort out the system as it currently operates. This needs to change urgently.

6. Integrated Pest Management? UCT has a long way to go

The Khusela Ikamva initiative on waste management is not simply about improving UCT's contribution to a circular economy through recycling: it is about reducing waste and ensuring that UCT's waste management system is part of integrated pest management (IPM). In an earlier report (Nattrass, 2022) attention was drawn to the problem posed by poor waste management for pest control, which resulted in excessive use of poison.



Figure 7: Waste on the ground providing food in a rat-friendly area

Poor management of waste continues to provide food for rodents at UCT. Figure 7 shows two photographs, taken on UCT's middle campus, of a bag, supposedly for recycling, but in practice full of other food and thus highly contaminated. The bag is on the floor, because the bins are full. This provided an opportunity for rodents to chew through the bag to get to the food. It is likely that the rodents were living underneath the ground ivy. The photographs illustrate the need for co-ordination across different lines of management, as well as the ongoing need for improved recycling behaviour. It suggests that UCT needs to do much more to provide bins where people can separate food waste from recyclables. These bags must be adequately stored. Rodent harborage, such as the ground ivy, needs to be replaced by plants that provide less cover for rodents close to buildings. IPM thus requires co-ordination between cleaning staff and Grounds and Gardens staff, as well as improved behaviour by staff and students.

UCT's Properties and Services division is committed in principle to IPM but, as previously reported (Nattrass, 2022), has struggled to adapt its pest control contracts and its silo-based management structure to facilitate IPM. Members of the Khusela Ikamva team have engaged with the pest control company, but despite enthusiasm to go poison-free on the part of the contractor it is clear that the current contract does not provide the company with sufficient funding to implement IPM. Strong poisons and prophylactic use of poison remains standard at UCT, especially in high-risk areas such as outside residence kitchens, where waste management is poor and the risk of attracting pests is great. Introducing IPM at UCT would entail additional resources for pest control contractors for monitoring (to replace prophylactic use of pesticides and rodenticides) and probably additional inhouse costs – such as the appointment of a new co-ordinator to ensure that UCT's cleaning staff, gardening staff, waste control contractors and pest control companies are working together to implement IPM. Current cost pressures on the university may well be working against this.

IPM is not rocket science, but it does require bureaucracies, that are currently operating in silos, to co-ordinate with each other (as in Grounds and Gardens, Residences, Building Maintenance, Cleaning and Catering, etc.) – and it probably requires additional resources to facilitate the co-ordination. UCT is currently in the process of trying to adjust various contracts and make proposals for the necessary co-ordination, but this has proved frustratingly time-consuming and fraught with anxiety at every level of line management about financial restrictions.

It is nevertheless unacceptable that UCT will, once again, be rolling over its standard pest control contracts rather than embarking on the IPM strategy it claims to support. UCT's wildlife and the environment will continue to pay the price.

7. Wildlife at UCT

The Khusela Ikamva initiative focusses on the connection between waste management and pest control because excessive use of poisons, and rodenticides in particular, poses danger to wildlife, notably owls, caracals and genets, that predate on rats. It also poses danger to domestic cats that live on the UCT campus.

As part of the Khusela Ikamva initiative, Prof Justin O'Riain and Dr Zoe Woodgate conducted a camera trap survey of UCT campus and the surrounding area to gain an estimate of species richness and density. Undergraduate students from the Department of Biological Sciences assisted with the survey and used the data to conduct occupancy modelling of different species.

A study area of about one square kilometer was identified, extending from the central Sarah Baartman Hall to approximately 800 meters into Table Mountain National Park. To allow for optimal micro-placement of cameras to increase probability of detection of most species, but retain the randomisation required for biodiversity surveys, the study area was subdivided into 200m² random grid cells. Camera traps with infrared active sensors were placed in the grids, mounted approximately 40cm above ground to a) metal stakes, b) natural structures (e.g., woody vegetation, rocks) or c) urban infrastructure (e.g. fence poles). Camera traps were operational for a minimum of 30 consecutive days to improve the probability of detecting rare species (e.g., water mongoose (*Atilax paludinosus*)) and species with large home ranges that exceed the size of the sample site (e.g., caracal (*Caracal caracal*)).



Figure 8: UCT Wildlife survey, March-May 2022, camera trap locations and species' presence (white circle: cats; yellow circle: caracal; light blue circle: Cape porcupine; light orange circle: genet; green circle: grysbok; black circle: water mongoose; grey circle: rodent; dark orange circle: grey squirrel; light grey triangle: birds)



Figure 9: Predators on and around UCT campus (owl, genet, water mongoose, caracal, cat). The third row shows a caracal in the bottom corner catching a guinea fowl – and a close-up of that.

Figure 8 shows that there is rich diversity of wildlife in the area between the campus and Table Mountain National Park, and that predators such as genet (*Genetta tigrina*) and caracal come close to campus and are thus potentially in danger from poisoned rodents. Figure 9 provides some images of predators from the camera trap survey. Note the caracal catch of a guinea fowl (third row – photo on the left shows the caracal in the bottom right corner and a guinea fowl escaping in the top left corner; photo on the right is a close up of the caracal taken a second later). Caracals are also adept at catching and killing cats, and it is interesting that no cats were photographed on camera traps where the presence of caracal were recorded (Figure 8).

There were surprisingly few detections of rodents, and none on campus, which might indicate that UCT has been successful at controlling them on campus. This may have been partly because of two small colonies of feral cats on upper campus (there were several photographs of cats with rodent prey from the survey). However, it is also possible that rodents are being controlled through poison use, especially in high-risk areas near residence kitchens, food courts, rubbish collection sites and the like (see further discussion in Natrass, 2022). If so, then this clearly poses danger to predators that might eat poisoned rodents.



Figure 10: Cats amongst refuse outside a UCT residence

There were many photographs of cats scavenging amongst rubbish bins, presumably for left-over food from the residence kitchens but perhaps also for rodents that might have been attracted to the bins. The bottom row of Figure 9 shows a cat scavenging in an overfull rubbish bin. Figure 10 provides an image of a cat alongside an enormous pile of rubbish bags – an image that also speaks to UCT’s inability to prevent large piles of refuse from spilling out of containing bins; this presents UCT’s contractors with a very messy pile of mixed refuse to deal with. The contents of the bags, all of which are clear and thus destined for recycling, clearly contain a large number of used polystyrene food containers and

thus are presumably highly contaminated – perhaps to the point of rendering all the recyclables unusable.

8. Conclusion

UCT has a long way to go. Despite some indications of improved recycling behaviour, the management of waste remains very unsatisfactory. This can be seen in poor recycling statistics, problems in storing waste, and problems with the collection of waste. UCT's contribution to the circular 'green' economy is miniscule. When bags of mixed rubbish lie on the ground they attract rodents and scavengers (as can be seen in Figure 7) and thus possibly also predators. In the absence of proper IPM, pest control companies have little option other than to resort to pesticides. This flies in the face of UCT's commitment to environmental sustainability and is totally unacceptable for a university on the urban edge of a national park.

The Khusela Ikamva initiative seeks to facilitate change by building a 'community of practice' and to develop 'living labs' (see: <https://uct.ac.za/transformation-sustainability-sustainability-projects/khusela-ikamva-sustainable-campus-project>). It seeks to do this through collaboration across disciplines and between academics, students, support staff and outside contractors. This is a lofty ideal which implicitly assumes that the key problem is lack of information or social contact between people engaged in different tasks within the university. It fails to appreciate or adequately confront the managerial and bureaucratic obstacles and challenges involved in facilitating campus sustainability. Change is not easily achieved when there are real budgetary constraints and strong institutional incentives to leave the system as it is.

Nowhere is this clearer than in dealing with the vexing problem of ensuring that UCT's recyclables are actually collected and delivered in a way that allows UCT to contribute to the circular economy and earn revenues through its share of recycling. The problem is evident also in the frustrating inability to introduce IPM.

A lesson for the Khusela Ikamva initiative is that institutional power and managerial prerogative matter, and can have a deadly dampening impact on necessary institutional change. No amount of collaboration and goodwill between 'stakeholders' can create a solution when it is blocked by institutional interests and inertia. Leadership from the very top – the executive – is required, and for UCT's commitment to sustainability to reflect also in its budgetary allocations.

References

- Drèze, J. 2017. *Sense and solidarity: Jholawala economics for everyone*. Oxford University Press.
- Felske, H. 2020. *Using visual prompts and a raffle to increase recycling on campus*. MSU Graduate thesis, 3469, Missouri State University, Summer 2020. Available: <https://bearworks.missouristate.edu/theses/3469> [2022, November 18].
- Fritz, J.N., Dupuis, D.L., Wu, W.L., Neal, A.E., Rettig, L.A. & Lastrapes, R.E. 2017. Evaluating increased effort for item disposal to improve recycling at a university. *Journal of Applied Behavior Analysis*, 50(4), 825-829.
- le Cordier, N., Mayman, R., Mofokeng, R. & N. Natrass. 2022. Recycling at UCT: A brief history and situational report for 2021. *CSSR Working Paper No. 467*. Cape Town: Centre for Social Science Research, University of Cape Town.
- Loiseau, E., Saikku, L., Antikainen, R., Droste, N., Hansjürgens, B., Pitkänen, K., Leskinen, P., Kuikman, P. & Thomsen, M., 2016. Green economy and related concepts: An overview. *Journal of Cleaner Production*, 139, 361-371.
- McNiff, J. 2017. *Action research: all you need to know*. Sage, Los Angeles
- Natrass, N. 2022. Waste, rodents and integrated pest management at UCT. *CSSR Working Paper No. 469*. Cape Town: Centre for Social Science Research, University of Cape Town. Available: <http://www.cssr.uct.ac.za/cssr/pub/wp/469> [2022, November 18].

Appendix: Policy briefing: Integrated Pest Management

This policy brief summarizes the case for integrated pest management (IPM) at UCT. It draws on a [background paper](#) and on recent discussions with stakeholders at UCT, pest control practitioners, and colleagues involved in UCT's [Khusela Ikamva initiative](#).

- UCT has for years declared its commitment to IPM but its actual service level agreements are not in line with IPM. Rather, they have facilitated old-fashioned, environmentally unfriendly pest control procedures such as regular spraying of buildings and stormwater drains with insecticides, and the use of rodenticides in bait stations irrespective of whether there is a pest problem or not. This prophylactic use of poison is wasteful and poses danger to human health and to wild animals (owls, caracals, mongooses, etc.) that might eat poisoned insects and rodents.
- IPM adopts a very different approach. It prioritizes monitoring of pests, identifies specific problem areas (such as UCT's [poor waste management](#)) and addresses them specifically. The key principle is to deny pests access to food and shelter (prevention and exclusion) and to use poison only as a last resort.
- For example, rather than spraying residence bedrooms regularly, an IPM approach monitors bedrooms, checks insect traps and engages in targeted interventions where necessary. Rather than regular spraying of stormwater drains (which pollutes the Liesbeek river and the ocean), IMP calls for the monitoring of drains and addressing problems on a case-by-case basis. Rather than poisoning all rodents outside buildings (including harmless indigenous four-striped mice), IPM monitors rodent populations such as through the inspection of non-toxic monitoring baits. Where problems are identified, these are also addressed on a case-by-case basis to prevent them recurring. If poison is deemed necessary, only the most environmentally friendly poisons are used.
- IPM has a different cost structure to standard pest control (higher monitoring costs, especially initially) but it has been shown to be more cost-effective in the medium term and infinitely better for human health and the environment.
- IPM requires a different approach to complaints. Rather than seeing them as evidence of pest control failure, IPM reframes complaints as information. IPM means seeing more insects, rodents and wildlife. People need to be informed about this, and about which insects and rodents are harmless. Ideally people should be provided with mechanisms such as

online systems, QR codes, phone numbers to allow them to report suspected problems. This can feed into the monitoring process.

- This will be challenging. However, UCT has a duty to protect its people and wildlife – especially given its position as a leading South African university and its unique position within a national park. Other South African universities, notably UKZN, whose Howard College and Westville campuses form part of conservancies, and UWC, which supports a neighbouring nature reserve, no longer utilize poison prophylactically. They are putting us to shame. We can and must do better.
- The current process of reviewing UCT's service level agreements is timely. It is important for UCT to seize the moment and become a genuine environmental steward even though this will entail new thinking and teething pains.

The Khusela Ikamva initiative has drawn together many people who are keen for UCT to adopt more environmentally friendly policies including IPM. We stand ready to assist through education interventions and monitoring.

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The **Sustainable Societies Unit** (SSU) explores the social and institutional dimensions of economic development and the interaction between human society and the natural world. Its current foci include agricultural practices, human-wildlife conflict, winners and losers in South Africa's growth path, and the impact of the climate crisis. The SSU collaborates with the University of Cape Town's *Khusela Ikamva* Sustainable Campus Project, assisting with research on recycling and integrated pest management. The **Adolescent Accelerators Research Hub** generates evidence on which development accelerators – alone and in synergy with each other – can support adolescents in Africa to reach multiple Sustainable Development Goals. The Accelerate Hub is a partnership between governments, international agencies, NGOs, donors, adolescents and academics in Africa, Europe and North America. The **Safety and Violence Initiative** (SaVI) contributes to understanding and responding to violence and promoting safety. Its current focus is on the roles of parents in promoting the safety of children and adolescents.

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