





People's perceptions of ecosystem disservices in public urban green spaces (PUGS)

Elandrie Davoren



- "The benefits people obtain from ecosystems" (Millennium Ecosystem Assessment, 2003).
- Four categories, namely:
 - ≻Provisioning,
 - ≻Regulating,
 - Supporting and
 - Cultural services (Millennium Ecosystem Assessment 2003).



- UGS provide fundamental ecosystem services, such as:
 - reducing flood risks and surface runoff (Carter et al. 2015),
 - > ameliorating urban climate (Masson et al. 2014),
 - > provide medicinal plants, firewood and water (TEEB 2011),
 - habitat for the conservation, maintenance and restoration of biodiversity (Kong et al. 2010),
 - > provide areas for sport and recreation (Tzoulas et al. 2007),
 - > add to the cultural and aesthetic value (Wang et al. 2015).



 "Ecosystem generated functions, processes and attributes that result in perceived or actual negative impacts on human well-being" (Shackleton et al., 2016).





Tree roots breaking up pavements (Lyytimäki and Sipilä, 2009)





Animals as disease vectors (Escobedo et al., 2011)





Vegetation blocking views, utilities (Gómez-Baggethun and Barton, 2013) or street signs.



Drains blocked by leaves (Shackleton et al., 2016)







Invasive species (Wang et al., 2015).

Photo: Taken from Potgieter et al. (2019)



Introduction (continues)

Why study ecosystem disservices (EDS)?

- A search in Scopus revealed 211 articles concerning EDS compared to 35 195 articles about ES.
- The EDS concept has not been as widely introduced or integrated into ecological science as its counterpart, ES.



Introduction (continues)

Why is EDS important?

 Incorporating disservices into the ecosystem services frameworks will facilitate a better understanding of the effects and side-effects of ecosystem functions and thereby contribute to the development of better conservation and management plans (Lyytimäki, 2015; Von Döhren and Haase, 2015).



Aim and Hypothesis

The aim of this study is to

- determine people's identification and perceptions of UEDS in the public green spaces near their homes,
- does socioeconomic status have an influence on people's perceptions concerning UEDS and

We **hypothesise** that the number of UEDS will be smaller in more affluent towns or parts thereof than in poorer towns, since more affluent towns will have the financial means to manage public urban green spaces better than poorer towns.



Methods



Figure 1: Map of the study sites in the North West, Free State and Eastern Cape.



Methods (continues)

- Within each town, residential areas was categorized as either affluent, township/RDP suburbs and informal settlements.
- Random households were be selected for face-to-face interviews.
- 30 households per suburb per town (therefore 90 per town).
- Surveys were done during the week and on weekends to include employed residents.



- Questionnaire divided into three sections:
 - First section Respondents use of PUGS and their perceptions of ecosystem services and disservices in PUGS
 - Second section Municipal management of PUGS
 - Third section Respondent's demographics such as age, gender, education, source of income, etc.

Table 1: Do you make use of PUGS?

Towns	Residential	Township	Informal
King Williams	43 % Yes	30 % Yes	
Town	57 % No	70 % No	
Komani	70 % Yes	77 % Yes	97 % Yes
	30 % No	23 % No	3 % No
Sasolburg	80 % Yes	87 % Yes	83 % Yes
	20 % No	13 % No	17 % No
Virginia	60 % Yes	53 % Yes	53 % Yes
	40 % No	47 % No	47 % No
Mahikeng	23 % Yes 77 % No	73 % Yes 27 % No	
Stilfontein	80 % Yes	73 % Yes	70 % Yes
	20 % No	27 % No	30 % No



Table 2: Do you think having green spaces are important?

Towns	Residential	Township	Informal
King Williams Town	100 % Yes	100 % Yes	
Komani	100 % Yes	100 % Yes	100 % Yes
Sasolburg	93 % Yes 7 % No	100 % Yes	97 % Yes 3 % No
Virginia	100 % Yes	97 % Yes 3 % No	93 % Yes 7 % No
Mahikeng	97 % Yes 3 % No	100 % Yes	
Stilfontein	100 % Yes	100 % Yes	93 % Yes 7 % No



Table 3: Top three problems identified by respondents per town and the percentage of respondents who didn't perceive any problems in PUGS (openended question)

	Town	Affluent (A) %	Township (T) %	Informal (I) %	Mean
Uncofo (Criminal optivity)	King Williams Town	50	37		43.5
	Komani	50	63	53	55.3
Uncofo (Criminal optivity)	Sasolburg	70	17	10	32.3
Item Item Item Item Item Item Item Item	33	27	40	33.3	
	Mahikeng	67	50		58.5
	King Williams Town 50 37 43.5 Komani 50 63 53 55.3 Sasolburg 70 17 10 32.3 Virginia 33 27 40 33.3 Mahikeng 67 50 58.5 58.5 Stilfontein 20 37 17 24.7 King Williams Town 23 37 30 Komani 30 50 47 42.3 Sasolburg 10 7 0 5.7 Virginia 23 33 17 24.3 Mahikeng 40 23 31.5 5 Stilfontein 13 3 17 11 King Williams Town 37 20 28.5 5 Komani 7 43 57 35.7 Sasolburg 20 7 3 10 Virginia 20 33 27 26.7 Mahikeng <td>24.7</td>	24.7			
ittering legal dumping	King Williams Town	23	37		30
	Komani	30	50	47	42.3
Littering	Sasolburg	10	7	0	5.7
Littering	Virginia	23	33	17	24.3
	Mahikeng	40	23		31.5
	Stilfontein	13	3	17	11
	King Williams Town5037Komani5063Sasolburg7017Virginia3327Mahikeng6750Stilfontein2037King Williams Town2337Komani3050Sasolburg107Virginia2333Mahikeng4023Sasolburg107Virginia2333Mahikeng4023Stilfontein133King Williams Town3720Komani743Sasolburg207Virginia2033Mahikeng6337Stilfontein137Komani1310Stilfontein1310Stilfontein1310Sasolburg2073Virginia3023Mahikeng3317Sasolburg3343		28.5		
King Williams Town 50 37 Komani 50 63 53 Sasolburg 70 17 10 Virginia 33 27 40 Mahikeng 67 50 17 Stilfontein 20 37 17 King Williams Town 23 37 17 King Williams Town 23 37 17 Komani 30 50 47 Sasolburg 10 7 0 Virginia 23 33 17 Mahikeng 40 23 33 17 Mahikeng 40 23 33 17 King Williams Town 37 20 17 3 King Williams Town 37 20 17 3 10 King Williams Town 37 20 13 27 14 Mahikeng 63 37 10 17 13 King Williams Town <td>35.7</td>	35.7				
We well down in a	Sasolburg	20	7	3	10
lilegal dumping	Virginia	20	33	27	26.7
	Mahikeng	63	37		50
	Stilfontein	10	7	30	15.7
Unsafe (Criminal activity) Unsafe (Criminal activity) N Littering K K K S No problems K K S N N S S N S S S S S S S S S S S S S	King Williams Town	13	7		10
	Komani	13	10	27	16.7
Newselewe	Sasolburg	20	73	70	54.3
No problems	Virginia	30	23	20	24.3
	Mahikeng	3	17		10 18
	Stilfontein	33	43	37	37.7

Table 3.1: Top three problems identified by respondents per town and the percentage of respondents who didn't perceive any problems in PUGS (open-ended question)

	Town	Affluent	Township	Informal	Mean
	King Williams Town	50	37	(1) /0	43.5
Unsafe (Criminal	Komani	50	63	53	55.3
	Sasolburg	70	17	10	32.3
activity)	Virginia	33	27	40	33.3
	Mahikeng	67	50		58.5
	Stilfontein	20	37	17	24.7
	Mean	48	38.5	30	38.8



Table 3.2: Top three problems identified by respondents per town and the percentage of respondents who didn't perceive any problems in PUGS (open-ended question)

	Town	Affluent	Township (T) %	Informal	Mean
	King Williams Town	23	37	(1) 70	30
	Komani	30	50	47	42.3
Littering	Sasolburg	10	7	Û	5.7
	Virginia	23	33	17	24.3
	Mahikeng	40	23		31.5
	Stilfontein	13	3	17	11
	Mean	23	25.5	20.3	23



Table 3.3: Top three problems identified by respondents per town and the percentage of respondents who didn't perceive any problems in PUGS (open-ended question)

	Town	Affluent (A) %	Township (T) %	Informal (I) %	Mean
	King Williams Town	37	20		28.5
	Komani	7	43	57	35.7
Illegal dumping	Sasolburg	20	7	3	10
	Virginia	20	33	27	26.7
	Mahikeng	63	37		50
	Stilfontein	10	7	30	15.7
	Mean	26.2	24.5	29.3	26.7



Table 3.4: Top three problems identified by respondents per town and the percentage of respondents who didn't perceive any problems in PUGS (open-ended question)

	Town	Affluent (A) %	Township (T) %	Informal (I) %	Mean
	King Williams Town	13	7		10
	Komani	13	10	27	16.7
No problems	Sasolburg	20	73	70	54.3
	Virginia	30	23	20	24.3
	Mahikeng	3	17		10
	Stilfontein	33	43	37	37.7
	Mean	18.7	28.8	38.5	28.7
	moan	10.1	20.0	00.0	20.1



Table 4: Top four urban ecosystem disservices (UEDS) as perceived by respondents per town (open-ended question)

	Town	Affluent (A) %	Township (T) %	Informal (I) %	Mean
Untidiness due	King Williams Town	7	7		7
to uncut grass	Komani	17	3	7	9
	Sasolburg	7	7	0	4.7
	Virginia	7	7	7	7
	Mahikeng	0	3		1.5
	Stilfontein	0	0	0	0
Bad smell	King Williams Town	0	0		<u>0</u>
	Komani	0	0	0	0
	Sasolburg	0	0	0	0
	Virginia	0	0	0	0
	Mahikeng	0	0		0
	Stilfontein	27	0	23	16.7
Fear of	King Williams Town	3	7		5
dangerous	Komani	3	0	0	1
creatures	Sasolburg	0	3	0	1
	Virginia	3	0	0	1
	Mahikeng	0	0		0
	Stilfontein	0	0	3	1
Untidiness due	King Williams Town	0	0		0
to fallen plant	Komani	0	0	<u> 0 </u>	0
leaves	Sasolburg	0	0	0	0
	Virginia	0	0	3	1
	Mahikeng	0	0		0
	Stilfontein	3	3	7	4.3

Town Affluent (A) % Township (T) % Informal (I) % Mean Fear of dense King Williams Town 76.5 80 73 vegetation Komani 36.3 53 43 13 concealing Sasolburg 51.3 77 47 30 criminals/ Virginia 50 50 57 52.3 criminal activities Mahikeng 80 65 50 Stilfontein 63 43 57.7 67 Fear of green King Williams Town 80 60 70 space providing Komani 53 27 13 31 routes for Sasolburg 80 51.3 47 27 criminals into Virginia 30 50 42.3 47 suburbs Mahikeng 73 73 73 Stilfontein 47 70 37 51.3 Untidiness due to King Williams Town 75 70 80 uncut grass Komani 10 34.3 53 40 Sasolburg 73 53 27 51 Virginia 53 60 53 55.3 Mahikeng 63 47 55 Stilfontein 63 40 57 53.3 Untidiness due to King Williams Town 40 60 50 fallen plant Komani 30 27 20 25.7 leaves Sasolburg 53 13 31 27 Virginia 47 57 57 53.7 Mahikeng 55 67 43 24 Stilfontein 63 60 57 60

Table 5: Top four urban ecosystem disservices (UEDS) as perceived by respondents per town (selected from a list of UEDS)

Table 5.1: Top four urban ecosystem disservices (UEDS) as perceived by respondents per town (selected from a list of UEDS)

	Town	Affluent (A)	Township (T)	Informal (I)	Mean
		%	%	%	
Fear of	King Williams	90	70		76 E
dense	Town	00	13		70.5
vegetation	Komani	53	43	13	36.3
concealing	Sasolburg	77	47	30	51.3
criminals/	Virginia	50	50	57	52.3
criminal	Mahikeng	80	50		65
activities	Stilfontein	63	67	43	57.7
	Mean	67.2	55	35.8	52.7



Table 5.2: Top four urban ecosystem disservices (UEDS) as perceived byrespondents per town (selected from a list of UEDS)

	Town	Affluent (A)	Township (T)	Informal (I)	Mean
		%	%	%	
Fear of	King Williams	80	60		70
green space	Town	00	00		70
providing	Komani	53	27	13	31
routes for	Sasolburg	80	47	27	51.3
criminals	Virginia	30	47	50	42.3
into suburbs	Mahikeng	73	73		73
	Stilfontein	47	70	37	51.3
	Mean	60.5	54	31.8	52.7



Table 5.3: Top four urban ecosystem disservices (UEDS) as perceived by respondents per town (selected from a list of UEDS)

	Town	Affluent (A)	Township (T)	Informal (I)	Mean
		%	%	%	
Untidiness	King Williams	70	00		75
due to uncut	Town	70	OU		75
grass	Komani	53	40	10	34.3
•	Sasolburg	73	53	27	51
	Virginia	53	60	53	55.3
	Mahikeng	63	47		55
	Stilfontein	63	40	57	53.3
	Mean	62.5	53.3	36.8	51



Table 5.4: Top four urban ecosystem disservices (UEDS) as perceived by respondents per town (selected from a list of UEDS)

	Town	Affluent (A)	Township (T)	Informal (I)	Mean
		%	%	%	
Untidiness	King Williams	40	60		50
due to fallen	Town	40	00		50
plant leaves	Komani	30	27	20	25.7
	Sasolburg	53	27	13	31
	Virginia	47	57	57	53.7
	Mahikeng	67	43		55
	Stilfontein	63	60	57	60
	Mean	50	45.7	36.8	44.2



Conclusion

- Ecosystem disservices in South Africa are overshadowed by criminal activities, social and management issues in PUGS
- Most of the respondents only identified ecosystem disservices as problems once they were made aware of them
- Private companies can have a big influence in the towns they are based
- Community organisations can have a big impact in small towns



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The 480 people who were willing to participate in this study!

Thank you

