

https://dspace.org/

Stakeholder participation in surface water and groundwater quality management in the Waterberg area: Limpopo Province, South Africa

Cornelus, Lesley-Ann Jolene

2018

https://hdl.handle.net/10539/24951

Cornelius, Lesley-Ann Jolene, (2018) Stakeholder participation in surface water and groundwater quality management in the Waterberg area: Limpopo Province, South Africa, University of the Witwatersrand, Johannesburg, https://hdl.handle.net/10539/24951

Downloaded from a DSpace repository. https://dspace.org/

Response to Examiner 1 **29 January 2018**

This research paper discusses "Stakeholder Participation in Surface Water and Groundwater Quality Management in the Waterberg Area, Limpopo Province, South Africa". As the author of the research paper, I appreciate the detailed and constructive feedback from the examiner. Below are the examiner's comments being in bold, while the author's response is in italics. The examiner's comments have been addressed as follows:

GENERAL COMMENTS

"This research report describes a study into surface and ground water quality in the vicinity of three communities (Marapong, Steenbokpan and Lephalale) in the Waterberg area, and the stakeholder perceptions of water quality in the area. Water quality data from up-, mid- and down-stream locations of the Mokolo River were obtained from DWS and analysed for differences between locations and change through time. Groundwater data from one location was also included. Questionnaire surveys of residents in the 3 study communities were carried out, along with stakeholder interviews from a range of organisations and experts in the field. While the study provides some interesting observations, it is poorly designed and the linkages between the 3 parts of the study are very weak and need to be made much more explicit from the start.

It is clear from the start that the candidate does not really have clear aims and objectives; the stated aim in 1.3 was "to assess the status of water quality in a selected area of the Waterberg from 1995-2015 and to gain insight into the perceptions of stakeholders about water management". This does not match the title of the report which is "Stakeholder participation in SW and GW quality management in the Waterberg Area; Limpopo Province, South Africa". So – is the study about perceptions, or about actual participation in management?

Objective 1 is poorly defined – what are you comparing historical WQ data with? Standards? Looking for trends?

Objective 2 suggests that the study will assess the degree of participation of stakeholders in managing SW and GW quality (which to me at least implies an engagement with the IWRM literature, CMAs etc) – yet this is never done. This objective aligns with the report title, but not the stated Aim.

Objective 3: does stakeholder participation… influence the quality of water in the area – this Objective is also lost along the way and not referred to in the results/discussion."

GENERAL RESPONSE

The comments from the examiner are acknowledged. I had overall difficulty linking the three parts of the study once the data from the quantitative and qualitative approaches were obtained. The initial idea was that the perception of what a water user deemed as participation and actual participation in water management should not be separated from this. Which, in my opinion, made the study more social than scientific and resulting in its complexity and disconnect in the different components. If executed correctly, the study would have made an excellent full dissertation or PhD.

Objectives 1 of the study have been re-written to be consistent with the title. Objective two will be addressed by including more extensive literature on Integrated Water Resource

Management. Objective 3 is emphasized more in the results and discussion to strengthen the linkage between stakeholder participation and water quality.

CHAPTER 2 LIT REVIEW COMMENTS

"IWRM is briefly mentioned and should form a key part of the review."

CHAPTER 2 LIT REVIEW RESPONSES

The comment by the examiner is acknowledged and applicable text has been added to the chapter under Section 2.4.7.

CHAPTER 3 METHODS AND SITES COMMENTS

"Research design: Why did you choose upstream, mid- and downstream locations, given that all your study respondents were in the downstream area? And why choose a wastewater discharge for your midstream location? This is not comparable with your other sites. Why did you include groundwater – was it assumed that some residents would use borehole water? The reader has to work hard to try to understand how your experimental design will address your research questions, and much is left to guesswork. You need to clearly draw out how each task addresses an objective linked to the overall aim. Was the rationale that some people might use river water directly, others using groundwater? If so, was this assessed in the survey part of the study? How did this impact on perceptions and/or participation in water management?
For the different sections of the questionnaire, you must explain why the questions are relevant to your study and what you are trying to find out in relation to your aims.
The questionnaire data, albeit from a very small number of respondents, does provide hints of interesting links between perceptions in each community and socioeconomic factors, but these are not explored properly and not linked to the physical water quality data that were analysed.
Where is the link between the questionnaire data and the participation of locals in IWRM?"

CHAPTER 3 METHODS AND SITES RESPONSES

The up-, mid- and downstream locations were chosen (by the researcher) for comparison purposes of surface water and groundwater quality. The wastewater discharge point was not chosen by the myself, but by what was an available surface water sampling site provided by Department of Water Affairs (DWA): Resource Quality Services, to use as a midstream reference point. Groundwater sites were chosen based on the fact that the area is a water scarce area and most users will be making use of boreholes. Which would make just focusing on surface water quality inaccurate, especially based on the large scale industrial and mining activities taking place. It is understood that the different sources of water for the users should have been included in the survey to better asses each participant's perception and/or participation in water management. Short paragraphs have been included within the different

sections of the questionnaire to explain its relevance and relation to each other and research objective two.

There was difficulty linking the questionnaire data to the physical water quality data. To address this comment an entirely new questionnaire is required and a larger group of participants. Applicable text has been added to Chapter 2, Section 2.4.7 to link the questionnaire data and the participation of locals in IWRM.

CHAPTER 4 RESULTS COMMENTS

"Lots of issues here in terms of format of data presented, whole sections repeated from earlier chapters, and lack of specific detail on the data presented. Also, not at all clear what the relevance of comparing time periods is for your study.
Choice of statistical techniques is not explained and in some cases, seems completely inappropriate e.g. ANOVA apparently used to compare three counts – how?"

CHAPTER 4 RESULTS RESPONSES

This chapter was the most difficult for me to interpret, especially due to a lack of statistical knowledge. The feedback on data representation and lack of detail have been recognised. The fact that the quantitative portion of the study was dependent on large scales of data to produce relevant patterns, personal data collection was out of the question due to time constraints.

CHAPTER 5 DISCUSSION COMMENTS

"In this chapter, much more could be done to link the results from both water quality analysis and survey data to the aims and objectives; little attempt is made to draw out the key findings and demonstrate their relevance to the stated questions and overall aims. Some of the existing text could be much clearer if the purpose of each task had been clearly outlined in the methods chapter."

CHAPTER 5 DISCUSSION RESPONSES

There is a clear gap between the qualitative and quantitative approaches used in the study. The missing IWRM seems to be the much needed but missing component to link these two approaches. To better demonstrate the key findings and relevance to the objectives in the discussion chapter, the following major changes are required to the study:

1. *Reinterpreting the water quality data and using different statistical methods to present the results.*
2. *Redesigning the questionnaire for a more detailed outcome on IWRM from the general water user.*
3. *Using Integrated Water Resource Management as the main research focus point for the study.*
4. *More detailed and relevant description of findings.*

OVERALL COMMENTS

"There are lots of typos, missing words, problems with sentence structure and subject/verb agreement and also with random use of commas. The report needs a very thorough edit.
While there does appear to be sufficient data collection for a Research Report, treatment of the results is not clearly explained and in some places incorrect. As outlined above, much more explanation of the research design and its links to stated aims/objectives is required to demonstrate that the candidate clearly understands the purpose of each aspect of data collection and analysis in attempting to answer the research questions."

OVERALL RESPONSES

The comment regarding basic structure and syntax by the examiner has been acknowledged and changes have been made in the text. The need is recognised by the researcher that the data required a clearer and more detailed explanation, and that the overall research design is unfinished, resulting in the disconnection in the objectives.

SPECIFIC COMMENTS AND RESPONSES

COMMENT	RESPONSE
1. Abstract – state your aims and objectives briefly here. Madupi or Medupi? Check throughout. What is a "semi-distribution"? Not surprising to find differences between SW and GW! Penultimate sentence "the in full"? Last sentence on p2 should simply state "No data were available for the midstream site".	*Suggested changes were implemented*
2. P3 line 2 socio-economically	*Change was implemented*
3. P3 You need to explain why there is dependency on Eskom and Exxaro	*The dependency on Eskom and Exxaro is largely due to their high level of influential development. Improvements and maintenance on basic service from these structures to the surrounding communities form part of their off-set programmes to continue major development in the area.*
4. P3 para 3 first sentence very poorly worded. Which two approaches?	*Changes were implemented*

5. **P16 first sentence – surely not southern Botswana*?***	*Change was implemented*
6. P16 para 3; what has greatest capacity, and 6km from what?	*Changes were implemented*
7. Figure 1.1 What is the purpose of the map of Lephalale, as only one of three study areas?	*Figure 1.1a indicates the main municipal region of Limpopo along with the main residential area within that region. Figure 1.1b has been removed.*
8. P17 1.1 title – major ions (rather than just ions)?	*Change has been implemented*
9. P17 para1; "different between extraction and the recharge"? What does this mean?	*Changes have been implemented*
10. P18 line 1 not a sentence	*Unclear to which sentence the examiner is referring to since p18 line 1 is the end of one sentence and the beginning of another.*
11. P18 Why were those ions chosen?	*These specific ions were chosen because, together with the other variables, they were the most common amongst the chosen sites and because they had the most consistent amount of data available for the chosen time period.*
12. P18 para 3 first line not a sentence	*Sentence has been restructured*
13. P19 line 2 et al = "and others" hence plural. "Nare et al (2010) suggest that… practices start at a.."	*Change has been implemented*
14. P19 para 2 Surely you can find a more recent DWS ref than 2002 – try the NWRS (2013) document	*Referenced has been replaced*
15. P22 last line – here you introduce IWRM which I assumed would be a fundamental part of your study, yet it is barely mentioned again	*Applicable text relating to IWRM has been added (as mentioned in Chapter 2 responses)*
16. P23 end of para 1 – not a sentence	*Sentence has been restructured*
17. P24 para 2: RSA now has 9 WMAs, please update your lit review!	*Changes have been implemented*
18. P24 2.1.3 para 1; Nothing approximate about 115,746	*Change has been implemented*
19. P24 para 4 – needs a REF to support first sentence about GW quality being poor	*Reference has been added*

20. P24 last sentence – water quality refers to suitability for a given purpose, not to measurement per se	*Suggested change has been made to the sentence*
21. P25 2.2 Do not start a sentence with "Per"	*Change has been implemented*
22. P26 para 1 last sentence needs rewording	*Sentence has been restructured*
23. P26 para 3; first sentence does not make sense, surely 20th century records ARE historical. Do you mean earlier records are absent?	*Suggested change has been made to the sentence*
24. P26 last para; line 1; different to what?	*Changes have been implemented*
25. P27 first sentence does not make sense. Neither does second sentence of following para.	*Sentences have been restructured*
26. P27 para 2; why are water quality changes "irreversible"?	*A brief explanation has been included*
27. P27 para 3 Switches here between global context and local situation; needs better structure	*Changes have been implemented*
28. Fig 2.1 is very old now!	*Comment acknowledged*
29. P29 2.2.2 para 1 Sentences need rewording	*Sentence has been restructured*
30. P29 para 3 last sentence is opinion and not factual, avoid this kind of language. Last para – needs a REF	*The sentence in question has been removed. The last paragraph does have a reference (Van Vuuren, 2011)*
31. P30 para 3 – does not have context, needs more explanation	*Context has been added*
32. P30 2.2.4 geographical area	*Change has been implemented*
33. P31 final para; "It naturally also loses, which…" ?	*Sentenced has been restructured*
34. P32 para 3 – in SA or globally?	*Changes have been implemented*
35. P32 final sentence – not sure what you mean here?	*Sentence has been clarified*
36. P33 WQI's introduced here, but not used in results/discussion?	*Comment noticed and acknowledges that a more elaborated use of WQI's should have been used in chapter 4 and 5*
37. P34 final para; Not usual for water samples to be stored long term as many analytes are not stable	*Changes have been implemented*
38. Table 2.2: Manganese standards don't look right, why would drinking water standard be higher than domestic?	*Standard has been corrected*
39. Table 2.3 Species not specie	*Correction has been made*

40. P35 water uses known to the Waterberg? DO these differ from elsewhere?	*Change has been implemented*
41. P36 2.3.4 Besides the natural processes… NB surface runoff can also be natural. Loads may be enriched…	*Changes have been implemented*
42. P36 last line – assume you are referring to acid deposition here?	*Change has been implemented*
43. P37 para 2; neither wind speed nor vegetation cover are "external human activities or natural processes"	*Change has been implemented*
44. P37 final para – water temperature is normally measured in situ! Dissolved organic matter generally turns water brown, algae may turn it green	*Changes have been implemented*
45. Table 2.4 Explain TCID under "Viruses"	*Explanation has been added*
46. P40 line 3 – so what is the more recent literature? Refs?	*Reference has been added*
47. P40 2.4.1 Not clear how this section links to your study. Second sentence makes no sense. Word missing in last para " a definite to the decision…"	*Changes have been implemented* *This section theoretically portrays (in my opinion) the importance of stakeholder involvement from the beginning of the decision-making process*
48. P41 para 1; last sentence is not a sentence! Likewise first sentence of 2.4.2.	*Changes for both sentences in question have been implemented*
49. P41 2.4.2 para 2 – so what is the tool box approach and why is it relevant? "perceived to projects…"?	*Changes have been implemented*
50. P42 para 1 – again, this seems to have no relevance to your study as currently written, unless you really do add a discussion of stakeholder participation. In fact the relevance of the whole of p42 to your study is unclear.	*Section 2.4.3, 2.4.4 and 2.4.5, in my opinion, describes the foundation of the importance of stakeholder engagement in any project development. Although, these sections lack linkage to the stakeholder component of the study*
51. P43 2.4.7 second sentence is not a sentence! This section is where a discussion of the IWRM literature would have fitted in	*Changes have been implemented*

52. P45 para 3 last sentence does not make sense. You use both Madupi and Medupi on this page	*Sentence has been removed and Medupi is the correct spelling and used throughout*
53. P46 3.1.1 Are you referring to secondary catchments? You could divide into many more than 6. Is the whole catchment affected by coal mining, or just the lower reaches?	*Changes have been implemented*
54. Figure 3.2 It is not at all clear why you selected your sampling points as you did. Was this simply because they were the only available data? It makes little sense to compare a wastewater discharge with other areas of the river unless you are interested in the wastewater per se.	*Figure 3.2a shows the entire Limpopo catchment. Figure 3.2b only shows a section of the Limpopo catchment that is of interest to this study. As mentioned before the up-, mid- and downstream locations were chosen (by the researcher) in relation to the area of interest, for comparison purposes of surface water and groundwater quality. The wastewater discharge was not chosen by the researcher, but by what was an available surface water sampling site provided by Department of Water Affairs (DWA): Resource Quality Services, to use as a midstream reference point.*
55. P48 3.1.2 Didn't you only get 5 responses – so that your 20% is actually 1 person?	*Yes, that is correct*
56. P49 Line 1 primarily	*Change has been implemented*
57. P49 para 2 last line is vague and 10 years ago does not refer to 10 years before present	*Change has been implemented*
58. P49 How did you select your respondents from general residents? Also 3.2.2 can you really call your selection random?	Changes have been implemented
59. P52 para 2 – the listed aspects of your surveys do not all appear in results e.g. level of participation, indigenous knowledge etc	*Comment acknowledged*
60. P52 3.3.1 How do you "construct in Excel… to be comparable to standards"?	*Changes have been implemented*
61. P53 para 1 – suggests your choice of WQ monitoring sites was poor?	*Those were the only monitoring sites available from DWS:RQS database within the area of interest*

62. P53 para 2 Why are you comparing your data with a previous study? How does it link to your aims?	*An explanation has been given*
63. P53 para 3 Not sure what is meant by "the number of mean sample values". Most of this para is redundant detail which could be omitted, as it is previously mentioned	*Change has been implemented and second comment acknowledged*
64. P53 3.3.2 How can you calculate mean, variance etc and do ANOVA on numbers of people employed and educated? These are not appropriate methods for comparing count data! Relevance of Point 3 is not at all obvious, though presumably related to assessment of socioeconomic status – though you do not say how or why this might be relevant to your study	*As mentioned before applying statistical methodology is not my strongest point. The numerical methods used for these results is what I was advised on. Suggestions for stats that are appropriate for count data is welcome for future improvement.* *Changes to point three have been implemented*
65. P54 How does Resource Usage link to your aims? Relevance of points 1, 4 and 5 in Section B is unclear. Section C is more relevant but still not clearly linked to stated aims and objectives.	*Water Resource Usage is linked to to the 2nd objective of the study. Section B numerically measures the outcome of general water users' choices. Section C attempts to measure the level of consciousness on which those choices were made.*
66. P55 Why an "essay report" on interviews? There are established methods in the social sciences for analyzing such data. Where is the comparison with newspaper articles etc?	*Comment noted and a suggested approach by examiner 2, is the use of Thematic Analysis; a method used to identify meaningful patterns across qualitative datasets.*
67. P55 the whole section simply lists what tables will be presented in results, rather than providing details on methods!	*Changes have been implemented*
68. P57-8: Here you repeat three tables which were already used in the lit review section! Please remove the duplicates	*The use of these tables in the Literature Review was encouraged to visualize the text it relates to. But the ones in the Results chapter were removed and the text will refer back to the tables in Chapter 2*
69. P60 Table 4.5 Need to state number of samples (n) in any tables such as this. Data for 1 month could be one data point, or mean of weekly or even daily data. Lots of other	*Change has been implemented*

cases where it is not clear whether summary or raw data are presented	
70. P60 last para – second sentence not a sentence. What is the relevance of these comparisons?	*Changes have been implemented*
71. P61 Figure 4.2 caption – annual mean of monthly data? Somewhere you must state number of samples used. Did you use geometric mean for pH (which is on log scale)?	*1) Changes has been implemented to this figure (now figure 7)* *2) Geometric mean was not used for the pH*
72. P61 Can stated pH value really be 4.6 +/- 0.0001 – spurious precision! What is meant by "No clear difference between pH levels…at both sites"? Do you mean between sites?	*Comment acknowledged and require changes have been implemented*
73. P61 Table 4.6 What is the value in comparing data over the period 2011-15 with 1999-2011 for different locations?	*The value of this table is to compare changes in pH levels in the same area based on different studies: 1999-2011 (Bruyns, 2015) 2011-2015 (Cornelius, 2017)*
74. P62 para 1 again, relevance of these comparisons? What stats did you use?	*1) The relevance is to describe the overall pH dataset used for each site* *2) Refer to column marked 'statistical description'*
75. P62 para 2 How did you carry out ANOVA (which software)? Show results of ANOVA outputs.	*1) ANOVA calculated in Microsoft Excel* *2) Comment acknowledged*
76. P62 last para – what does the first word "This gives" refer to?	*Changes have been implemented*
77. P63 4.3.2 As far as I can tell, no ions were measured for this study, only existing data were used?	*Changes have been implemented*
78. Table 4.8 What is meant by "The number of mean sample, for selected ions…"?	*Changes have been implemented*
79. Table 4.9 Needs to show 'n' for each year. Are zero variances real? What does X=has no variance mean? Only 1 sample?	*Changes have been implemented*
80. In Table 4.9 it took me several reads to work out that each section represents a different site, as this information is hidden in a footnote to each table – move to main caption	*Changes have been implemented*
81. P66 Tables hard to interpret and details of which sites are	*Changes have been implemented*

represented in each table hidden in footnote – must be clearly stated in the table captions.	
82. P66 4.3.2.1 First 2 sentences directly contradict each other, shows poor consideration of the data. It is subsequently explained that the high NH4 was regarded an outlier (but why? No justification given – the precise point of WQ monitoring is to identify incidents which this appears to show)	*Change has been implemented*
83. P67 para 2: cannot assume that because one standard (NH4) is met, water is safe	*As mentioned within the general response, an additional, more recent standard for water quality is necessary (for example SANS 241-1: 2015)*
84. P67 4.3.2.2 8.9mg/L is very high for phosphate and suggests possible sewage. Which again begs the question, why choose this monitoring site at a wastewater discharge. Last line of the page states the obvious by suggesting a point source of pollution is a possible source of the high nutrients, such as discharging waste into the river. But this is a wastewater discharge monitoring site!	*AS mentioned before, this chosen surface water midstream site is the only available monitoring site within the area of interest from the DWS: RQS database* *Changes have been implemented to text based on the first and last comment*
85. P68 4.3.2.4 what could have caused the large drop in Na?	*Dilution caused by possible heavy rainfall and/or flood events*
86. P70 4.3.2.7 Completely untrue that NH4 and PO4 do not affect EC, not sure where this is coming from	*Change has been implemented*
87. Fig 4.3 Not useful, need either separate y-axes for SW and GW or separate figures. Very odd to say in caption that SW Marapong site is included, and then in next para to say that the figure shows there are no data!	*Changes to (now Figure 8) have been implemented*
88. P71 para1/2 all EC units are incorrect	*Corrections have been made*
89. Table 4.10 what is going on with Rietspruit data for 1995-2010? Please explain the ANOVA and	*Changes have been implemented*

show the results – was it between periods, or between sites?	
90. P71 final para: avoid very vague sentences (or non-sentence in this case) such as "Indicating that these three ions are mostly affected by a specific activity within this section of the river."	*Change has been implemented*
91. P72 4.4.1 It is not at all clear what the relevance of these questions is to your study, where do you explain what information you were trying to obtain and link to water quality, or perceptions of water quality? Likewise on p73 – no idea what the relevance is of marital status in different areas?	*As mentioned before, a description of the relevance of each section and their relation to each other and the project aim, have been added*
92. P74 Table 4.12 How has ANOVA been used here? Where are the results? How can you perform ANOVA on count data between 3 sites – the raw data tell you everything you need. This section suggests you have no idea what ANOVA does and what kinds of data it can be applied to.	*As mentioned before applying statistical methodology is not my strongest point. The numerical methods used for these results is what I was advised on. Suggestions for stats that are appropriate for count data is welcome for future improvement.*
93. P75 Table 4.14 Presumably the location/selection of people in each location may determine their employment status – needs more information on how you avoided bias in your selection.	*No changes have been made, but the comment has been acknowledged. To gain more information it will require going back to these respective communities.*
94. P75 Final para – I have no idea what the relevance is of people's perceptions about whether they can afford a flat screen TV?	*This question was an indirect manner of establishing the financial status of a household without directly asking how much an individual earns*
95. P76 Table 4.16 This type of comparison is completely misleading, you interviewed different numbers of people in each area. What can the mean value possibly tell you? You could have compared the percentage of respondents in each area giving a specific answer. Likewise, Fig 4.4 simply repeats data in the table and is not at all useful	*The comment has been acknowledged and no changes have been made*

96. P77 Your conclusion in the first line is not supported by the data. If you interviewed 10 people in Lephalale and only 5 in the other areas, this will strongly bias your conclusions if you use count rather than % data. Subsequent tables/figs use % data which is more defensible	*Changes have been implemented to (now) Table 18 and Figure 9*
97. P79 Fig 4.7 There are so many problems with this figure it is hard to know where to start. How can there be 25 participants in Lephalale if you interviewed 10? What are you correlating with what? How did you order the areas? For correlation you would need to plot number of participants on both y and x axes – but even then, with only 3 data points would not be meaningful	*The execution of the figure may have been incorrect, but the idea was to show the relationship of having access to basic services against where it is that the participants live. Ultimately linking better basic services to socio-economic stability.*
98. P80 How could you assess sig diffs in garden ownership?	*The goal of the questions around garden ownership was to indicate an additional, but significant use of water in an already water scarce area.*
99. Table 4.21 Again you need to show % rather than count data here. Fig 4.9 is then redundant	*Changes only to (now) Table 23 have been made*
100. P82 Again you are using a larger number of interviewees from Lephalale in the wrong way to produce spurious % values	*14 of the overall participants who indicated that they are aware of water pollution were looked at as a whole (100%). The percentages 28.56%, 14.30% and 57.14% were derived from the count data of participants from the respective residential areas. The same method was applied to the number of participants unaware of water pollution.*
101. P90 4.5.1 Where is this information coming from? Lit review? Conclusions from interviews? Why are you comparing potable and wastewater treatment here?	*1) Information in Section 4.5 is what was gathered from the interviews* *2) The two treatments are compared to illustrate that the responsibility of these different processes are claimed to be separated between Eskom and Lephalale Local Municipality*
102. P91 Again, what is the source of data in para 2 "many complaints… mentioned sewage leakages…"?	*As mentioned before, the entire Section 4.5 is based on information collected during the interviews.*

103. P91 last para; second sentence does not make sense	*Sentence has been restructured*
104. P92 first sentence – source?	*Change has been implemented*
105. P92 para 2 last sentence – need to ascribe a source to such statements e.g. Respondent 1 (water expert)	*Not if the respondent does not want to be associated with specific information*
106. P92 para 3 Did you have permission to quote Interviewees? It is one thing to have permission to name them in the list of interviewees, but direct quotations generally require explicit permission.	*Appendix B – a consent form for interviews (of which each respondent completed): Nr. 9 specifically asks permission to be quoted or not.*
107. P93 Para 1 As above – have these respondents consented to having these comments ascribed to them? The last sentence of this para is your own conclusion and needs to be reworded in a less subjective way	*1) Appendix B - refer to nr. 7, 8 and 9 of the interview consent form completed by all respondents* *2) Sentence has been restructured*
108. P93 penultimate line "cubic litres"? This section needs references	*1) Change has been implemented* *2) As mentioned before, all information in section 4.5 were gathered during interviews. The specific information in question was provided by a respondent and his/her line of work. He/she did request that certain knowledge not be linked to his /her name, which could possibly reveal the company name (which was NOT permitted)*
109. P94 4.5.4 Para 1 Avoid using the word "fact" in this context. Last sentence needs rewording	*Changes have been implemented*
110. P95 5.1.1. reword first sentence	*Sentence has been restructured*
111. P96 para 2 "Thus, suggesting that from 1989 to 1998 the pH levels in the river remained steady" This does not follow from your previous text, but you should in any case be able to look at the primary data.	*The information was derived from findings in previous studies (as mentioned in the paragraph)*
112. P96 final para – GW is not "alkane"!	*Sentence has been removed*
113. P97 sentence 2 – not clear what is meant here?	*Changes have been implemented*
114. P98 Line 1; nitrite or nitrate?	*Change has been implemented*

115. P98 para 2 last sentence does not make sense	*Sentence has been restructured*
116. P98 para 4 "variation of the little amount of data"?	*Sentence has been restructured*
117. P99 line 1 result in changes	*Spelling has been corrected*
118. P99 para 2 line 1 "levels…were…"	*Change has been implemented*
119. P99 para 3 – the point is exactly the opposite – substances that dissolve DO contribute to EC! The term "flux" is used incorrectly in this paragraph	*Changes have been implemented*
120. P99 last sentence "high increase rate"? Why do EC changes support the link with Na and Ca (presumably they change at the same time/rate?)	*EC = inorganic compounds with a charge (sodium carries a high charges) and organic compounds that dissolve oxygen*
121. P100 para 2 Second sentence needs rewording. What is a "degradable activity"?	*Change has been implemented*
122. P100 final line – where do you actually assess involvement of stakeholders in water quality management? Not at all obvious. Your questions relate more to perceptions of water quality than to whether there is participation in its management?	*Only after analysing the questionnaire data did I realize that I only scratched the service of stakeholder of general water users in section C and D. These superficial questions are contributing factors to the difficulty I had linking the qualitative and quantitative approaches. Thus, I would suggest that the questionnaire be re-evaluated and redone. However, I do believe that the information gathered from the interviews do interpret the indepth involvement (or lack thereof) of influential stakeholders.*
123. P101 Final sentence – not clear how you arrive at this statement from your results?	*Sentence has been restructured and reworded*
124. P102 para 1 not written in sentences. How is it linked to your aims?	*Change has been implemented*
125. P102 para 2 In this paragraph it appears that your interpretation of "water quality management" relates to treating one's own domestic water. But stakeholder engagement and participation more generally (as understood in IWRM literature) refers to involvement in decision making processes as "management". You	*Why should is just as important two be separated? In my opinion, the literal and individual interpretation is just as important as being involved in the management decision making processes. This is how local knowledge is generated.*

seem to have adopted a very literal and individual interpretation here. Likewise you talk in next paragraph about water recycling initiatives as a form of WQ management – which is ok if this is the basis of your research aims and objectives.	
126. P102 final para – sentences need rewording (none are grammatically correct)	*Sentences have been restructured*
127. P103 para 2 last line "are under stress"	*Change has been implemented*
128. P103 para 3; all the points you raise here are not conclusions (as you appear to present them) but opinions of one or more respondents	*Change has been implemented*
129. P104 5.3 para 1 again, sentences poorly constructed	*Sentence has been restructured*
130. P105 How is "it proven many times"? Your data have not been used in any environmental decision making!	*Sentence has been restructured*

Response to Examiner 2 **29 January 2018**

This paper discusses "Stakeholder Participation in Surface Water and Groundwater Quality Management in the Waterberg Area, Limpopo Province, South Africa". As the author of the research paper, I appreciate the detailed and constructive feedback from the examiner. Below are the examiner's comments being in bold, while the author's response is in italics. The examiner's comments have been addressed as follows:

All spelling, sentence structure and grammar mistakes indicted by the examiner has been made on the original documentation. Some of the comments could not be accurately addressed due to grammar or spelling mistakes, which made it difficult to respond to.

GENERAL COMMENTS

The candidate has chosen a challenging topic. It really is important to tackle integrating knowledge across disciplines and with local social knowledge. I commend the candidate for taking this on. I appreciated particularly the understanding demonstrated that is important to include people and their knowledge, with conventional scientific data, in water resource management. It is because of this level of difficulty I have passed the candidate. A creditable effort has been made.

GENERAL RESPONSES

I appreciate the positive feedback on the overall intent of my research project and I am thankful that my effort has been recognised in communicating the importance of social knowledge in water resource management.

WORK CHALLENGES AND RESPONSES

COMMENT	RESPONSE
1. There is insufficient use made of recent literature. In particular the use of resource quality objectives in conjunction with guidelines for users.	*Comment has been acknowledged*
2. I am not familiar with the CSIR document that seems to be a combination of all the separate SAWQG documents – these should be used and referenced separately as DWAF documents.	*Changes have been made and each volume of the South African Water Quality Guideline have been referred to separately.*
3. There is insufficient consistency in whether the health of the aquatic environment is being considered or just water service delivery, or both.	*Recognition is given to the lack of consideration of the aquatic environment in the study and should have been included as an important use of water*
4. SA water governance institutions and their relationships are not accurately described.	*Changes have been implemented as suggested*
5. The variables selected from the DWS data base are strange – sulphate is a notable omission in coal mining area.	*The variables from the DWS database were chosen based on the commonality amongst the chosen sites and because they had the most consistent amount of data available for the chosen time period. Sulphate, even though a vital variable to focus on for this study, did not have enough data available for any of the chosen sites or for the selected time period to work with.*
6. There is insufficient understanding demonstrated of the significance of the selected variables. when pH is related to salts the argument is not credible.	*Lack of knowledge admitted on water chemistry*
7. The interview questions are not focussed enough to link	*The need is recognised for redesigning the questionnaire with questions aiming for a*

responses to water quality variables and their monitoring or impacts	*more detailed outcome on integrated management of water and linking the response to surface water and ground water quality*

SPECIFIC COMMENTS AND RESPONSES

COMMENT	RESPONSE
1. Abstract p. 2, para 2, line 8: surely there would have been anticipated and included in research design?	*The different languages in the area were catered to by including a translator to assist with the surveys during the site visits. However, the concept of the study was difficult to communicate where illiteracy was a challenge. This change has been implemented*
2. Abstract p. 2, para 3, line 8: meaning?	*Change has been implemented*
3. Abstract p. 3, para 3, line 1: But this can be accommodated in the TD – transdisciplinary approach and using the concept of complex social-ecology systems.	*Noting that there is an approach to bridge the gap between the social and ecological approaches used in the study.*
4. Figure 1.1 p. 17: It would be useful to have a map of the overlapping catchment – showing rivers – and if possible ground water areas. Also, this is may is labelled inaccurately: this is a map of the Waterberg district municipality and the Lephalale local municipality is part of that.	*Figure 1.1b has been removed. A map of the Mokolo Catchment and the area/river of interest is shown in (now) Figure 4*
5. 1.1 p. 17, para 1, line 6-7: What about the ecological reserve?	*It is acknowledged by the researcher that not enough focus was given to the quality management and stakeholder involvement of the water required for the ecological reserve.*
6. 1.1 p. 17, para 3, line 1- 2: Reiterate the purpose on relation to the selection of variables e.g. coal mining is predominant – and col related variables are EC, and particularly sulphate – with pH related changed dues to AMD also being important	*Suggested information added*
7. p. 18, para 2, line 2: Why these and not sulphate?	*These specific ions were chosen because, together with pH and EC, they were the most*

	common amongst the chosen surface water and groundwater sites and because they had the most consistent amount of data available for the chosen time period. Sulphate is an important ion in relation to the coal mining and coal fired power stations in the area. a second data collection source would have been ideal, but inaccessible
8. p. 18, para 2, line 3: How are these related to water?	*Changes have been implemented*
9. p. 18, para 2, line 6: Why not ROOs?	*Unaware of what 'ROO's' are*
10. P. 18, para 3, line 2: ref	*Reference has been added*
11. 1.2 p 18, para 2, line 3: These are statutory bodies – catchment management forums are critical not statutory govt- supported institutions in participatory governance	*Suggested changes have been implemented, however I believe that the stationary bodies are just as important because they are responsible for mobilizing catchment management forums*
12. p. 19, para 1, line 3: Specify responsibilities for water supply – delivery and water and waste water treatment	*Suggested text has been added*
13. 1.4 p. 19, first objective question: surface/ground/ drinking?????	*Change has been implemented*
14. P. 20, third objective question: and vice versa??	*Change has been implemented*
15. Chapter 2 p. 21, line 3: ? Provincial?	*Change has been implemented*
16. 2.1 p. 21, line 1: emerge from	*Change has been implemented*
17. 2.1 p. 21, line 2: Institutions	*Change has been implemented*
18. 2.1 p. 21, line 3: law and policy are not "guidelines"	*Change has been implemented*
19. 2.1.1 p. 21, first paragraph final reference: More recently	*This old reference refers to the old Millennium Development Goals. The literature is updated later in this section with the current Sustainable Development Goals using (UN, 2015) as a reference*
20. P. 25, para 2, line 1: this is really out of date	*Information has been updated*
21. P. 25, para 2, line 8: What?	*Change has been implemented*
22. 2.1.3 p. 25, para 1, line 3: The regional area using municipal boundaries of the Water berg DM. Using catchment boundaries, it is the Limpopo WMA.	*Changes have been implemented*

23. 2.1.3 p. 25, para 2, line 3: Need to be clearer – guidelines for water – there are different one for ecosystems and the users	*Changes have been implemented*
24. 2.1.3 p. 25, para 2, line 7: is this groundwater or interflow/baseflow recharge?	*Changes have been implemented*
25. P. 26, para 1, line 3: Again no mentionof RQOS – sued now. Very little current use of gudielines for ecosystems – they = the minimally altered class of a ecosystem	*1) Unaware of RQO's* *2) As mentioned before, I acknowledge that the importance of water quality for aquatic ecosystems have been neglected*
26. P. 26, para 2, line 4: From mokolo dam?	*Correction has been made*
27. P. 26, para 3, line 4-5: No comment on the current overallocation of the Crodile (west) itself	*Suggested text has been added to the paragraph*
28. 2.2 p. 26, line 1: Why not start with the right in the NWA: basic human rights and the ecological Reserve – the Reserve? Then go on to show how these relate to rights in the Water Services Act – you have not mentioned the WSA in the section on water law. This paragraph then muddles in rights in the constitution without being explicit	*Changes have been implemented*
29. 2.2.1 p. 27, line 1: Useful to put these into the water reserved for eocosystems ad basic human needs the Reserve	*Unsure what the examiner means by this comment*
30. 2.2.1 p. 27, first paragraph reference: Again back to really old literature,	*Reference has been updated*
31. 2.2.1 p. 27, para 2, line 1: Abrupt change from SA to global	*Change has been implemented*
32. 2.2.1 p. 27, para 3, line 4: In current contest water restrictions in Cape Town have been reduced from 100 to 80 l p/d	*The paper was written before the strict water restrictions were enforced in Cape Town*
33. 2.2.1 p. 27, para 4, line 1: different from what?	*Changes have been implemented*
34. P. 28, para 1, line 2: this is a really weird statement.	*The sentence has been restructured*
35. p. 28, para 2, line 3: Also produces chrome – and chrome 6 is very toxic!	*Change has been implemented*

36. P. 28, para 2, line 6-7: this sentence does not follow logically from the one before	*Changes have been implemented*
37. P. 29, para 2, line 1: ? mammals, reptiles, birds inverts????? Terrestrial ??	*Change has been implemented*
38. P. 29, para 3, line 5: Give categories - water contact and non water contact. I have never seen a sport quality guideline – maybe canoeing but I am not sure its formally required	*Volume 2 of the South African Water Quality Guidelines of 1996 refers to a set of water quality guidelines for water used for recreational purposes.*
39. P. 30, para 1, line 1: be careful of absolute statements.	*Change has been implemented*
40. 2.2.2 p. 30, para 1, line 2: Don't start a sentence with a number. 25l is the bhn Reserve WSA promises 6000lper household per day potable water	*Changes have been implemented*
41. 2.2.2 p. 30, para 2, line 3: You really need to have checked more recent references – This is very unlikely to be accurate now.	*Reference has been updated*
42. 2.2.2 p. 30, para 2, line 5: Most don't have the option	*Changes have been implemented*
43. 2.2.2 p. 30, para 2, line 5: 16 years ago.	*Change has been implemented*
44. 2.2.2 p. 30, para 2, line 6: Supplied to everyone but aims to give respite to poorer people – this is 6000l per household per month. Does not help people getting water directly from a river.	*The sentence has been restructured*
45. 2.2.2, p. 30, para 4, line 1: so far not any recent references	*The use of more recent references were applied*
46. 2.2.2, P. 30, para 4, line 2: ref	*A more recent reference has been used for this paragraph*
47. P. 30, last para, last line: Correct reference use.	*The use of more recent references were applied*
48. 2.2.3 heading: there are many	*Change has been implemented*
49. 2.2.3 p. 30, para 3, line 1: what about the indigent list?	*Changes have been implemented*
50. P. 31, para 1, line 2: General also important to note the WSP and WSA often in the same municipality raising the problem of gamekeeper-poacher/referee player	*Additional text has been added*

51. P. 31, 2.3 para 1, line 1: repeat	*Sentence has been removed*
52. P. 31, 2.3 para 1, line 4: what about the over allocation?	*Changes have been implemented*
53. 2.3.1 p. 31, para 1, line 3: what naturally loses what	*Changes have been implemented*
54. 2.3.1 p. 31, para 1, line 4: this is not a loss	*Ground infiltration is a loss of surface water because it now becomes groundwater*
55. 2.3.1 p. 31, para 1, line 7: generalised – urban and rural so different also is in the settlement or the relevant authority that is responsible?	*First part of the comment addressed and suggested changes added.* *Unclear what the examiner meant with the second part (highlighted) of the comment*
56. P. 32, para 3, line 7: and quality	*Suggestion has been added*
57. 2.3.2 p. 32, para 1, line 2: Again, this is very outdated thinking	*The use of more recent sets of guidelines have been mentioned in the recommendations*
58. 2.3.2 p. 32, para 1, line 2: There are many	*Change has been implemented*
59. 2.3.2 p. 32, para 1, line 6: not only important but legally required	*Change has been implemented*
60. Table 2.1, p. 32: a nonsense reference	*Reference has been corrected*
61. P. 33, para 3, line 1: these are the same	*Change has been implemented*
62. P. 34, line 1: But is that not what you have just argued - see first sentence of this paragraph	*Changes have been implemented*
63. 2.3.4 p. 36, para 1, line 3: Why should sediment be enriched with nitrogen And phosphorus	*Changes have been implemented*
64. 2.3.4 p. 36, para 1, line 8: Nice to see a more recent reference.	*Comment acknowledged*
65. 2.3.4 p. 36, para 1, line 9: If this is a local name in italics otherwise marula tree	*Correction has been made*
66. P. 37, para 1, line 1: I think this is the first mention of the Waterberg district – make this clear in relation to lephalale municipality early on	*Changes have been implemented (refer to comment nr. 22)*
67. P. 37, para 1, line 3: If coal is major problem the ions don't come from deposition but rock being from being exposed to air and then water	*Suggestion has been added*
68. P. 38, para 2, line 3: and yet groundwater does become polluted.	*Less susceptible does not mean completely incapable of being polluted. Groundwater can be contaminated through recharge,*

	surface- and groundwater interaction ect. - just to name a few
69. P. 39. para 2, line 4: I am not sure of the relevance of this	*I was asked by my supervisor to define the physical properties that play a role in surface water and groundwater quality. Not sure whether I should remove them based on a difference in opinion.*
70. P. 43 before 2.4.7: section above is good	*Comment acknowledged*
71. P. 44, end chapter 2: section above is good.	*Comment acknowledged*
72. 3.1 p. 45, para 3, line 7: Are you sure? This term usually refers to the municipality providing water to people – this sounds more like a raw water supply	*Change has been implemented*
73. 3.1 p. 45, para 3, line 8: These given are the actions of water service providers	*Change has been implemented*
74. 3.1 p. 45, para 3, line 10: green drop of more interest to environmental water quality	*Additional text has been added*
75. P. 46, figure 3.1: useful to link to the map in the introduction	*Change to the description of the introductory map has been implemented with a referral to the figure 3.1*
76. 3.1.1 p. 46, para 1, line 2: Water Management Area ? see NWRS2	*Update has been made in relation to suggested document*
77. P. 47, para 2, line 1: show these on your map	*Changes have been implemented*
78. P. 47, para 2, line 6: they have sulphate data- so important with coal mining	*Yes, DWS: RQS does have sulphate data available, but not enough within the selected time period of the chosen surface water and groundwater monitoring sites within the area of interest. Therefore, I made a conscious decision to not include the gapped and incomplete sulphate data*
79. P. 47 figure 3.2: Maps are too small a scale – this figures needs to be at least one full page and the site and focus areas need to be clear	*Change have been implemented*
80. P. 47 figure 3.2: According to this there are 2 gauging weirs – but are these DWA water quality monitoring sites? Are your sampling sites at DWS sites ? Need more clarity	*The chosen surface water and groundwater sites were chosen from the DWS: RQS database. The site numbers are referred to in the first column of table 3.1*

81. P. 47, para 3, line 2: Which site number on your map? – for all sites described below	*The chosen sites are colour coded: pink for surface water sites and yellow for groundwater sites with a description of its position to the Mokolo River. Each site chosen from the DWS: RQS database comes with a number, which is referred to in the first column of table 3.1*
82. P. 48, para 1, line 3: Need to be able to related the text easily to the marked labels on the maps	*Changed have been implemented*
83. P. 49, 3.2 heading: No reference to mixed methods literature	*Comment has been acknowledged and addressed within the section that refers to clear-self criticism*
84. P. 49, 3.2, para 2, line 3: what sort? Closed open?	*Change has been implemented*
85. 3.2, p. 49, para 3, line 1: ? interviews?	*Change has been implemented*
86. 3.2, p. 49, para 3, line 2: closed	*Change has been implemented*
87. 3.2.1, p. 50, para 1, line 2: All these monitoring sites have numbers – these should be clear and on the maps or refer to table below	*Refer to (now) Table 5, column one*
88. 3.2.1, p. 50, para 1, line 4: how was this assessed	*Change has been implemented*
89. 3.2.1, p. 50, para 2, line 3: no need for caps	*Change has been implemented*
90. 3.2.2, p. 51, para 1, line 4: where is this described?	*Included within section 3.1 the description of the study site.*
91. 3.2.2, p. 51, para 1, line 5: How was this selected?	*The number of participants were decided on based on how many individuals could complete a questionnaire within two short site visits but it also had to be a large enough number to retrieve a relevant amount of data from. The number was not increased because I also had the individual interviews that added to the qualitative approach. Suggestion has been included in this section*
92. 3.2.2, p. 51, para 1, line 7: Acknowledge that these venues do stratify the population	*Change has been implemented*
93. 3.2.2, p. 51, para 2, line 2: how was this judged – refer to literature	*Changes have been implemented to the referred text*
94. 3.2.3, p. 51, para 1, line 2: called purposive sampling	*Change has been implemented*
95. p. 52, para 2, line 8: be specific – surface ground treated	*Change has been implemented*

96. 3.3, p. 52, para 1, line 4: specify which tests and why	*Changes have been implemented*
97. P. 53, para 2, line 1: I don't think you can do a mean of pH because it is log scale – check	*Change has been implemented*
98. P. 55, 3.3.3 heading: Thematic analysis would have been possible	*Acknowledges that thematic analysis would have been a better approach to analyse the interview data. It is a method used to identify meaningful patterns across qualitative datasets.*
99. P. 57, table 4.1: What about aquatic ecosystems	*Water quality for aquatic systems have overall been neglected and should have been included in the study*
100. P. 62, para 3, line 7: But you have not requested sulphate data	*Sulphate is not included in this study due to a lack of data on the chosen sampling SW and GW sites. Information from a previous study on this area (Bruyns, 2015) only focused on SW sites and from my knowledge had a different area of interest, providing him with a different set of data where he was able to include sulphate*
101. P.62, para 4, line 1: what	*Change has been implemented*
102. P. 63, table 4.8: this does not make sense	*Change has been implemented*
103. P.64, table 4.9 (a-d): give unit these look too low for mS/m	*Change has been implemented*
104. P. 67, line 1: if you have a good reason to understand a pattern - a point it is not an outlier. Of what value are the means in understanding the water quality ??	*Additional text has been added*
105. P. 71, para 2, line 2: this is not a unit for EC – correct throughout	*Mistakes have been corrected throughout*
106. P. 72, para 1, line 5: this is not unexpected!!	*Change has been implemented*
107. P. 73, last para, line 4: 2-7	*Change has been implemented*
108. P. 76, after Section B questions: In each questionnaire, how do these questions relate to the aims of the project **And what is the meaning of mean and variance values?**	*1) A short description of the relevance of each section and its relation to the project objectives have been added before the questions.* *2) Mean and variance give a description of the average amount of people out of 20 that have access to electricity, water and sanitation across the chosen residential areas.*
109. P. 76, figure 4.4: What is the gree horizontal line ?	*Unsure what the examiner is asking*

110. P. 77, para 1, line 5: show this	*Changes have been implemented*
111. P. 78, Table 4.19: Personal washing	*Change has been implemented*
112. P. 78, Figure 4.6: inaccurate	*Axis and figure description has been corrected*
113. P. 90, 4.5.1, para 1, line 2: these are 2 of the services provided by water service providers	*Change has been implemented*
114. P. 91, 4.5.2, para 2, line 6: in what way and how does this link to use of the water	*Changes have been implemented*
115. P. 93, 4.5.3, para 2, line 7: what does this mean	*Sentence has been clarified*
116. P. 93, 4.5.3, para 2, line 10: which water where	*Change has been implemented*
117. P. 96, 5.1.2, para 1, line 6-7: Again why were these variable helpful to the purpose of the project?	*These specific variables were chosen because they were the most common amongst the chosen surface water and groundwater sites and they had the most consistent amount of data available for the chosen time period.* *The idea was to choose variables that can be link to specific water uses for example sulphate increase can be related to coal mining and power generation activities.*
118. P. 96, 5.1.2, para 3, line 5: But why – here you need to explain about the role of carbonate as a buffer and in EC	*An explanation has been added to the paragraph*
119. P. 97, para 2: Yes but why – and how does this relate to coal mining – are carbonates associated with alkaline water buffering system from acid ??? where could carbonates come from.	*An explanation has been added to the paragraph*
120. P. 97, 5.1.2.2, para 2, line 2: Which you repeated say is affected by sewage discharge	*Change has been implemented*
121. P.97, 5.1.2.2, para 2, line 4: not all erosion is natural	*Change has been implemented*
122. P. 97, 5.1.2.2, para 2, line 6: Yes but where does the data you have allow this??	*Additional text has been added*
123. P. 98, para 3, line 3: but why should it be	*There does not have to be a linkage, but more information would be required to eliminate the possibility*

124. P. 99 after section 5.1.2.2: There is little clear indication of a real understanding of the significance of water quality variables, their relationship to user groups, and their possible interactions.	*The comment has been acknowledged*
125. P. 99, 5.1.2.3, para 1, line 5: This is so basic it does not constitute a result	*The comment has been acknowledged*
126. P. 99, 5.1.2.3, para 2, line 2: this is about geology	*Sentence has been clarified*
127. P. 100, para 1, line 5: You don't need the conversion to determine fitness for use – there are two ways of measuring "salts" EC (conductivity meter)and TDS (evaporation and weighing) – TDS includes the organic fraction which is small.	*Sentences related to the subject has been restructured.*
128. P. 100, para 2, line 1: But better references could be made based on the literature which is barely mentioned in the discussion	*Changes to the text of this paragraph have been implemented*
129. P. 100, para 2, line 5: which refs?	*Sentence has been restructured*
130. P. 100, 5.2.1, para 1, line 1: what about interpreters???	*Two fellow students who speak Sotho accompanied me on two separate site visits to assist with translation. I did the Afrikaans translation myself.*
131. P. 101, para 1, line 4: Environmental and social concerns are not clearly and consistently addressed	*Comment has been acknowledged, however, the first two sentences of this paragraph deals with the gap in environmental concerns only based on the lack of interest from environmental experts*
132. P. 102, para 1, line 3: Again too obvious to be a discussion point	*Comment has been acknowledged and a minor change has been made*
133. P. 102, para 1, line 4: this is not a sentence	*Sentence has been restructured*
134. P. 102, para 4, line 2: But here you are relating your results to the literature	*Comment acknowledged*
135. P. 103, para 1, line 2-3: Evidence from your study?	*Evidence from the study has been added*
136. P. 103, para 2, line 1-2: this does not make sense	*The sentence has been restructured*
137. P. 104, para 1, line 2: What is the relationship of this to national	*The sentence has been reworded and restructured*

government in the supply of raw water ??	
138. P. 104, para 1, line 3-4: Rephrase for clarity	*Change has been implemented*
139. P. 104, para 1, line 7: Jump now to sanitation	*Unsure what the examiner means by this comment*
140. P. 104, 5.3, para 1, line 1-2: That is the challenge of transdisciplinary work and should have been addressed in the study design, there needed to be a better link between the water use and variables requested from DWS data, and a better link again to the actual questions in the questionnaire.	*Comment acknowledged and addressed in the overall comments*
141. P. 104, 5.3, para 2, line 1: Too much grouping of users and not enough clarity about each – here mining is missing	*Mining has been included. And I felt that the grouping of users describes the types of human activities, without the need of giving clarity on each as it has already been described in the literature review.*
142. P. 105, para 2, line 1: Factual? empirical ??? what do you mean	*Information that is supported by actual data*
143. P. 105, para 2, line 2: so do social-science data	*Change has been implemented*
144. P. 105, para 2, line 9: maybe demonstrated but not proven	*Change has been implemented*
145. P. 105, para 2, line 11: Has this really been shown?	*Changes have been implemented*
146. P. 105, 5.4, first recommendation: one source of what?	*Change has been implemented*
147. P. 105, 5.4, second recommendation: Well there were others available eg RQOs	*Unaware of RQS, but mentioned in the recommendations*
148. P. 109, ref nr. 9: Why not NWRS 2013??	*The old reference has been replaced with the suggested reference*
149. P. 113, ref nr. 9: Incorrectly reference – there is a set of DWAF WQG	*Reference corrected in list as well as intext references*

PERSONAL CHANGES

The following changes have been made to the revised document:

1) *All figures and tables have been renumbered;*
2) *The (now) Figure 4 and Figure 5a and 5b have been enlarged and placed in landscape view;*
3) *ESKOM and EXXARO have been changed to Eskom and Exxaro throughout;*

4) *All pages have been renumbered. The first 16 pages are numbered with roman numbers; and*
5) *The list of abbreviations have been updated.*

CLEARSELF CRITICISM

All of these impacts on the coherence of the study and the ability of the candidate to present a compelling discussion. There are too many vague generalisations.

As a researcher, I realize that I was too optimistic when taking on this project in the allocated time frame. The challenges of making use of a qualitative and quantitative approach in the study were not clear at the beginning. As a researcher, I feel I lacked certain skills when generating this paper:

1. Statistical techniques;
2. The use of recently published literature;
3. Detailed writing; and
4. Structuring my thoughts onto paper in and understandable manner for the reader.
