

https://dspace.org/

Testing the feasibility of community-based coppice management for sustainable fuelwood provision in rural South Africa

Mathebula, Norman

2017

https://hdl.handle.net/10539/24169

Mathebula, Norman (2017) Testing the feasibility of community-based coppice management for sustainable fuelwood provision in rural South Africa, University of the Witwatersrand, Johannesburg, <http://hdl.handle.net/10539/24169>

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

NAME: NORMAN MATHEBULA

STUDENT NUMBER: 588888

CANDIDATE: PhD

SCHOOL: ANIMAL PLANT AND ENVIRONMENTAL SCIENCES

CORRECTIONS FOR FINAL SUBMISSION

Title:

Testing the feasibility of community-based coppice management for sustainable fuelwood provision in rural South Africa

Guide

In order to keep record of the page numbers from the original/first document, the new page numbers are indicated in brackets which are for the corrected version. The title of each chapter has been described only for the first examiner. Thus, the reader might need to refer to this examiner while reading the second and the third examiner. The new or added information have been italicized to distinguish them from the old ones.

Examiner 1

Chapter 2: Description of the community-based coppice management intervention in study villages

- Presented the chapter in a third person.

Chapter 3: Fuelwood harvesting and use patterns before and during the harvesting trial

- Page 65 (69): Created subsections for methods.
- Page 91 (95): Data on woodland condition were not collected in Makhuva, thus data relating to the comments of the preferences of *Sclerocarya birrea*, e.g. the additional analysis, among others, could not be addressed. However, the fact that people have resorted to harvesting of *S. birrea* indicates that there is shortage of fuelwood in Mathura as this has been reported in villages where fuelwood is very scarce..
- Page 91 (95): The fact that each table occupies two pages means that putting the appendix in the main text would translate into six pages in landscape orientation without text.

Chapter 4: The ecological feasibility of the community-based coppice management intervention.

Comments addressed

- S 4.2.2: 107 (110): Added p values to significant results.
- Page (123-125): (Improved the flow of ideas removing irrelevant aspects). 4.4.2 and 4.4.3. Could not change the presentation of data from tables to figures because this would translate

to about five pages in landscapes orientation without text thereby affecting the flow of information. This is something that was considered before making the first submission.

- Page (116): Explained the village demand in text to link with village-demand table. "*These species constituted much of the observed harvest during the harvesting trial to meet the village demand which is indicated below (Table 4.5)".*
- Page (107): The question on the basis of sustainability is well captured under methodology as proposed by the examiner. For instance, "*The extrapolated supply would be considered to be sustainable provided there would be adequate supply of biomass in all coupes to meet the village demand since this would enable local resource users to harvest at least one year in each coupe*." The village demand is well presented in table 4.5 with predictions in table 4-6-4.9.
- I have addressed the repetition of information on 4.3.2.
- Added the following to address relevant questions. Page 127 (132): However, it is evident that the ecological sustainability could happen in villages with a small user community and sufficient woodland in reasonable condition *since the contribution of coppice in such areas could be adequate to meet the village demand as seen in Thorndale and Peningotsa.*

Chapter 5: The social feasibility of community-based coppice management

- Chi-square analysis have been used which also indicated the relationship between resource users and socio-economic factors.
- Page 150 -5.4.2: Improved the flow of ideas, that of the language and the method.
- Page 154: (Added studies offering a similar approach to CBCM) 5.4.3, Haglund *et al.,* 2011.
- Responded to questions 1 and 2. Page 151 (158).

Chapter 6: Capacity of local governance systems to successfully implement community-based coppice management

- Improved the flow of information in the introduction.
- Could not do the flow diagram in section 6.3.1. As per the relevant objective, I feel the bottom line of this study was to identify all relevant institutions to CBCM as opposed to their institutional linkages.
- Page 169 (6.3.2): Tabulated the findings on number of rangers which is one of the indicators of material capacity (Table 6.4).

- Non-material capacity (6.3.3) could not be presented in tables since it involves a number of intangible factors.
- Fixed the two sections of 6.3.3, deleted the second section that had the same numbering 6.3.3.
- Have made improvement on the presentation style of the discussion.

Chapter 7: Synthesis and general discussion

- The fact that small group would be better and easier to manage for successfully CBCM is a finding in this study and happens to support a number of scholars in the broader CBNRM projects.

Examiner 2

Chapter 1

Key comments

- Separated governance and relevant institutions (page 25).
- I did not add brief overview since this was optional.

Minor comments

- 1: Put text before and after the Figure in Chapter 1, which also provides transition to Chapter 2.
- 2 Edited text in Figure 1.2, correcting Basec to *basic*
- 3 (Reference formatted and addressed the inconsistencies of the punctuation of in-text references throughout the document) chronological order
- 4: Added missing references, Shackleton and Williams, 2002; Lawes et al., 2004 in the reference list.
- 5: (page 1) Backed statement with references. Interventions aimed at closing the "energy gap" or solving the "fuelwood crisis" have had little impact (*Arnold et al., 2006* (page 1). There is concern about unsustainable harvesting of fuelwood (*Twine et al., 2003a; Shackleton et al., 2004a; Shackleton et al., 2007a*).

- 6: Changed wood to *fuelwood* throughout the document.
- 3: (Reference formatting throughout) e.g. Campbell et al, then Hughes et al., 2010.
- 6: Changed fuel wood to *fuelwood* throughout.
- 7: Addressed syntax errors throughout.
- 8: (page 13) Added. Pruning the resprout resulted in a reduction in the time required before re-harvesting, with remaining resprout shoots growing more rapidly than those *for the no-pruned plants*. After four growing seasons, mean shoot length *for the single* shoot pruning treatment was 54% greater than *for the no prune-treatment*, whilst the double shoot pruning was 40% greater.
- 9: Justified text (page 11).
- 10: Deleted irrelevant information that were not in the context of South Africa) (1.2.1): *In Nicaragua, rare species not frequently encountered in production systems, yards, and pastures, such as Haemotoxylon brasilettum, constituted a significant proportion of the total fuelwood in the fuelwood market (McCary et al., 2005)*. (1.2.6.2) *In other countries such as China, Fang et al. (2011) observed that the highest total sprout biomass per stump was achieved in the treatment with a cutting height of 5 cm with two sprouts reserved on stumps (reaching 4.76 kg stump^{-1}), while the lowest was found in the treatment of 100 cm stump height with no sprout thinning (only 2.82 kg stump^{-1}).*
- 11: (page 8) Showed transition from one paragraph to the next. *Ensuing the damage or removal of the above ground parts, many savanna woody plant species resprout or coppice vigorously, growing new shoots from roots and stumps (Shackleton, 2000).*
- 12: Added contents for table 1.1.
- Comment 13: The recommendations by this comment are well captured under subsection 1.2.6. *Factors influencing coppicing responses*.
- 14: Edited. Deleted case study below.
- 15: Formatted. Putting LG on the glossary.
- 16: Addressed inconsistencies on the use of full stops (on glossary).
- 17: Added text on 1.2.7.2 subtopic.
- 18: Addressed grammatical issues.
- 19: Converted Indian currency, Rps to US dollar (page 21).
- 20: Page 20 (24) Evidence of the relevance of case studies: *The National Forest Act makes a distinction between woodlands and forests, thus paves the way for participatory woodland management through a locally managed coppice system that has been recommended in communal woodland areas (Neke, 2004).*

- 21: Page 21 (22): I did not see any problem with numbering
- 22: Page 27 (29): Explained Payment for Ecosystem Services
- 23: Page 29 (33): Introduced Figure 1.1 in the next page of its introduction
- 24: Deleted attitudes and perceptions (page 29)
- 25: page 31-32. *For instance, the number of shoots from which biomass would be derived for future supply of fuelwood would be affected by the density of the stumps or coppice stools created when harvesting fuelwood during the trial, the higher the stem density the higher the number of coppice shoots and this can to a certain degree translate to more biomass and vice versa. Village consumption patterns would affect the usage of fuelwood, where the majority of local people depend entirely on fuelwood for cooking the majority would use fuelwood during the trial. This can increase the amount of fuelwood used per annum because local resource users in the study villages would not compete with outsiders for fuelwood resource nor fear the rangers but harvest freely within the agreed rules.*
- 26: Corrected Phd (PhD) (page vii and 229).

Chapter 2

Key comments addressed

- More clarity on selection criteria: 36 (38) *Cultural homogeneity:* Tsonga-speaking rural villages under communal tenure in former homeland areas were selected in order to factor out the influence of cultural group on results.

Minor comments

- 1: Completed sentences in 2.1. Page 36 (38).
- 2: The size of the population (less than 1000) was used as an estimate for the preferred population the researcher preferred to work with.
- 3: Written in third person throughout e.g. chapter 2.
- 4: Consistently used TA throughout after writing it in full in the first mention throughout.
- 5: Italicized *Combretaceae.*
- 6: Indicating all the study maps on one map would congest the information.

- 7: Although Makhuva had high number of people employed, the majority were employed as labourers and not as professionals, which is the reason for many also qualifying for child grants.
- 8: Provided full stops for sentences.
- 9: Moved socio-economic information gathered by the researcher from Table 2.1 to Appendix 14.
- 10: Unlike modern system, the traditional leadership is achieved through a consensus based approach, thus the headmen consulted local people to determine if they had preferred to have the project piloted.
- 11: Translated the rules into English (Appendix 2 and 3).
- 12: Corrected syntax: e.g. The headman allowed community members to formulate harvesting rules. However, he emphasized that women should decide on harvesting rules since the project related more to them than *it did to* men.
- 13: Clarity (Replaced petition with request).
- 14: Added a sentence to make a paragraph: As in Thorndale, regarding the punishment after breaking agreed harvesting rules in CBCM, it was decided that the headman was the only person who could decide the extent of punishment similar to traditional natural resource management (NRM). *Therefore, similar to Thorndale, decision on the severity of the punishment of the offenders did not change with the intervention also in Peninghotsa*.
- 15: (page 62) Added the type of sampling approach used (systematic sampling).
- 16: Justified the text.
- 17: Added sentence to provide transition to the next chapter: However, the researcher was able to overcome such challenges by sticking to what the local leadership would tell him in community meetings or *during discussions with the council members, regarding aspects of fuelwood harvesting.*

Chapter 3

Key comments addressed

- Explained CBNRM in a way that demonstrates its relevance to the study. Page 64 (67): Such initiative can be implemented in the form of community-based natural resource management (CBNRM). *This is because CBNRM models work to strengthen locally*

accountable institutions for natural resource use and management, enabling local groups of people to make better decisions about the use of natural resources (Roe et al., 2009).

- Introduced coppice logically in paragraph 2. Page 64 (67): This is because CBNRM models work to strengthen locally accountable institutions for natural resource use and management, enabling local groups of people to make better decisions about the use of natural resources (Roe *et al.,* 2009). *Therefore, through CBNRM local resource users can work in partnership with local institutions to initiate a coppice system which is aimed at the production of fuelwood and small or medium sized material up to pole size (Von Maltitz and Shackleton, 2004).*
- *The categories of the independent variable, survey period (1st survey and 2nd survey) were put in the columns of the crosstab table, and those of the dependent variable in the rows (e.g., three nominal variables, harvest, buy and harvest and buy).*
- Provided p values for t test analysis on Table 3.9 which was on page 81 but currently on page 84.
- Revised abstract, especially in the beginning and the end.

Minor comments

- 1: Clarity in the abstract: Incapacity problems replaced by lack of "*lack of adequate number of rangers to enforce rules*".
- 2 and 3: Added: (page 66) to avoid similarities with the opening sentence in page 1"*Throughout the developing world in both urban and rural environments, fuelwood is the primary energy source for domestic purposes* (Von Maltitz and Scholes, 1995; Campbell *et al.,* 2003; Ejiqie 2007; Madubansi and Shackleton, 2007).
- 4: Consistency: Changed wood to fuelwood throughout.
- 5: Addressed syntax where necessary throughout.
- 6: (Clarity) page 65 (68) How does the fuelwood harvesting access and the species preference change with the implementation of CBCM, *and how does this compare and contrast with fuelwood harvesting access and the species preference under traditional harvesting rules*?
- 7: Formatted, put figure 3.1 under text to reduce empty spaces.
- 8: Page 70 (72): *The proportion of sampled households using electricity for cooking increased in Thorndale and Peninghotsa during the harvesting trial.*
- 9: Added full stop in the last sentence of the first paragraph on page 46 (was on 44).

- 10: Clarity: 71 (75) More than 80% of local resource users harvested fuelwood from the communal woodland, with only few harvesting in their own fields (Table 3.3). *The fact that this did not change significantly over the observation period was not surprising because few people harvested from their own field before the* trial.
- 12: (Added statistics) 81 (84) In both Thorndale and Peninghotsa, the mean time spent getting to the harvesting areas decreased during the trial, but only significantly so in Peninghotsa (*e.g. by mean of 30.62 minutes*) while that of actually harvesting decreased significantly in the two villages (*by an average of 120.62 minutes in Thorndale and in 89.17 minutes in Peninghotsa*).
- 13: Explained superscripts in the table 3.9 " a" and "b" 82 (85) *Superscripts represent significant differences.* Different superscripts denote significant differences.
- 14: Changed all the sentences that had begun with "That" by *The fact that*
- 15: Consistency: Changed live wood to livewood.
- 16: 9 Replacement: e.g. This has been the case by) 93 (97) (by) *Similar findings has been found in this*, for instance, in Thorndale, where the resource density was high from the stems in the most preferred size classes, local resource users spent less time harvesting than in all the study villages.
- 17: Moved appendices to after the reference list.
- 18: (Using British English) Changing minimize to minimise throughout the document.
- Improved methods and other sections.

Chapter 4

- 1: Highlighted the practical and intellectual contributions in the abstract. *By implication, this means that CBCM would be ecologically feasible particularly in villages with small population size where resource users have access to intact woodlands*. Changed wood stock to fuelwood stocks.
- Corrections: 98 (101) Savannas provide a number of ecosystem services to society, including fuelwood (Shackleton, 2000; Scoones, 1993).
- 2: Consistency: 5 (5) 97 (100) Changed wood stock to fuelwood stocks.
- 3: (Fixed reference formatting) 99 (102) (Shackleton *et al.* 2004b vs Jagger et al. 2003).
- 4: Corrected grammas: 99 (102) Furthermore, they result in the loss or decreased availability of other important *ecosystem products* provided by multiple-use woodlands, such as edible fruits (Shackleton *et al.,* 2004b).

- 5: Determining ecological sustainability: *Fuelwood harvesting would be considered unsustainable if it caused persistent changes in the woodland biomass such that the quality of fuelwood is diminished for a length of time that negatively impacts human well-being, resulting in a decline in social and economic capital (Shackleton et al. 1994; Scholes 2009).*
- 6: Although there are no questions under each objective indicating the implications of the study, the discussions revolve around the implications of the study across all objectives.
- 7: Sentence revised: 105 (108) *In the extrapolation process, aspects that can affect the supply of biomass such as dieback and self-thinning were factored in in each coupe*
- 8: Avoided the use of colloquial language 105 (108) (replaced "kicks in" by "starts").
- 9: Added statistical results in the text: 107 (109).
- 11: Adjusted figures 4.3 A and B to be of same size, 110 (113).
- 12: Moved some material belong to methods: e.g. the predictions of the biomass supply from new coppice shoots were based on harvested stems of the preferred sizes.
- 13: Revised and shorted caption of table 4.5: Observed harvest, i.e. biomass removed in the harvestable size class during the harvesting trial, on a rotation of six months (x2=harvest observed in six months were multiplied by 2 to get an estimate of the total harvest over a one year period).
- 14: Deleted irrelevant information to the result section: 117 (120) To manage coppicing on a sustainable basis, estimates of standing biomass need to be combined with predictions for the rate of fuelwood growth (Kennedy, 1998).
- 16: Corrected: 121 (126) Moyo was cited twice in the sentence, therefore, removed one
- 17: Consistency: 121 (126) Changed 50 % to 50%.
- 18: (Corrected) 122 (125) For instance, their harvesting stopped during the harvesting trial. Thus, this means that local extension of fruit trees which have been reported, i.e. in villages around Bushbuckridge (Gandar, 1997) can be prevented through CBCM thereby continuing to offer other *ecosystem products* such as fruits.
- 19: Added full stop: 123, first sentence (125) last sentence.
- 20: Consolidated conclusion.

Chapter 5

Key comments

- Adding text in the introduction to position the paper: *These socio-economic factors also influence the perceptions and the attitudes of local people (Racevskis and Frank, 2006) which affect their collaboration in CBNRM (Lingani et al., 2013). On the other hand, the direct benefits resulting from CBNRM projects, influence the development of positive attitudes and perceptions of the local resource users (Mbaiwa, 2004).* Including direct observation in methods: *Direct observations were also used especially to collect data in community meetings*.
- Consolidated abstract and methods (in terms of how participation was assessed).
- Inserted a table (Table 5.3 (143) indicating the total number of respondents, the composition of focus groups and how focus group participants were selected are not mentioned.
- Specified themes (from focus group data) that were analysed.
- Removed some of the quotes that were not too relevant.
- Removed some aspects that belonged to Chapter 6, especially in the Methods.
- Some of the comments were addressed by consolidating the methods such as the relevance of sections on typology of participation.

Minor comments

- 1: Removed the first sentence 128 (131) and consolidated the whole abstract. The last provided general overview of the implications of the findings: *As a result, this implies that in certain communal woodland areas, in South Africa, social conditions are conducive to community-based coppice management*.
- 2: Addressed errors and grammar issues
- 3: Moved information from results to literature, e.g. 135 (to 148) *Perceptions, in turn affect people's attitudes towards management practices either positively or negatively (Ormsby and Kaplin, 2005).*
- 4: Reference formatting throughout.
- 5: Written in full, Community based natural resource management in the first mention.

- 6: Linking text with table 5.2 (was 5.1): *Aspects that demonstrated that local resource users participated in the project were assessed against the typology, and these included decision making and creation of harvesting rules by local resource users in community meetings*.
- 7: Consistency in the presentation of quotes: Took it out from text to be on its own "*The chief is excited about the project. He asked me where I found you. He wants it to be implemented in all his villages*. *We were happy when you came here that time but worried that you do not come back so that we start the project, we thought you disappeared*," said the headman.
- 8: Linked background and socio-economic results (subsection 5.3.6): *Nevertheless, communities are rarely homogenous groups but are differentiated according to gender, age, income, level of education, distance of household from the forest among others (Cunningham, 2002). These socio-economic factors also influence the perceptions and the attitudes of local people (Racevskis and Frank, 2006) which affect their collaboration in CBNRM (Lingani et al., 2013).*
- 9: (Revised 5.4.1 subtopic) The impact of perceptions and attitudes on community-based coppice management and cooperation.
- 10: Moved information belonging to results in the discussion section) 150 (was captured in 181) For instance, although there was a selected patrol committee of 15 in Thorndale and 20 in Peninghotsa which conducted patrols, it was primarily the responsibility of every village member to report violators to the patrol committee.
- 11: Consistency: Changed Peningotsa to Peningotsa throughout the document
- 12: Employed scientific writing: Replaced "aforementioned scholar" by "relevant scholar" (see Neke, 2004).
- 13: (Clarity) Academic period replaced by feasibility study period.

Chapter 6

Key comments

- Elaborated on the difference between formal and informal CBNRM: Page 155 (160): *Where CBNRM takes place on an informal, 'traditional' basis, the costs involved in administering management regimes are likely to be relatively minimal, and to be met entirely by local people (Roe et al., 2009). Contrary to informal CBNRM, formal type of CBNRM requires a high quality capacity building component and initial start-up costs such as paying for*

technical expertise, equipment etc., and ongoing management costs such as staff salaries and vehicles (Roe et al., 2009).

- Defined CBNRM and institutions in the context of the project: *CBNRM is a term to describe the management of local natural resources by collective, local institutions for local benefit. CBNRM can be based primarily on subsistence uses of resources such as Non-Timber Forest Products (NTFP) (Roe et al., 2009) which include fuelwood (Ninan, 2006).*
- Definition of institutions in this study: *Traditional authority is a type of leadership in which the authority of a ruling regime is largely tied to tradition or custom (Lumen, 2005), have weakened in many areas in southern Africa (Campbell et al., 2001; Twine et al., 2003; Shackleton and Shackleton, 2004b; Turner, 2004; Twine, 2005).*
- Specified names of study villages to avoid assumption that audience know the names of the research were undertaken. *Both qualitative and quantitative methodologies were used across the study villages, Thorndale, Peninghotsa, Homu 14B and Makhuva.*
- Relevance of Ostrom design principles: *(Refer to chapter 2 and Table 6.1).*
- Methods consolidated giving clarity on aspects of data collections such as focus group and the assessment of effectiveness of the two systems.
- Improved the flow of arguments.
- The researcher did not make any choice regarding the rangers but interviewed those in charge of each of the Thorndale and Peninghotsa. Furthermore, data collected through questionnaires were not biased because they were distributed to randomly sampled chosen households across the study villages.
- Added some information for clarity which specifying variables measured: Focus group discussion with the headman and his council were undertaken on two separate occasions to explore and compare the levels of effectiveness of the traditional NRM and CBCM systems. *Central to the discussion was the capacity to deal with harvesting problems such as the ability to not only ensure that only local resource users harvest, but that they adhere to agreed rules while doing so while cooperating with other relevant institutions*. Therefore, capacity, cooperation as experienced and/or perceived by resource users the chieftaincy were some of the key variables measured, see tables 6.2 and 6.3. Supporting information such as quotes by the headman were used to measure the perceived efficacy.
- The design principles from Ostrom (1990) were reviewed and used as yardstick against which aspects related to performance of the CBCM governance system was assessed (Table 6.1). *They were chosen over other principles because they are regarded as key in measuring*

the effectiveness of common property resource management in participatory approaches such as CBNRM (Ostrom, 1990).

Minor comments

- 1: I feel the contents in Table 6.1 were self-explanatory and explaining them in text would lead to repetition.
- 2: Removed some of the quotes, e.g. "*Rangers use bicycles and take time to come here as they patrol many villages.*" said the headman in Thorndale."*We have problems of people coming from towns such as Acornhoek to harvest from our villages, and hope the involvement of our people would help since we do not have enough rangers to patrol the villages*," said the chief in Thorndale in the first meeting.
- 3: Adjusted figures to have same size 168 (172).
- 4: Removed irrelevant subsections 6.3.3.1 (e.g. Leadership style).

Chapter 7

- Added the following (page 199): *This indicates that although CBNRM is advocated as key to addressing natural resource management problems in communal woodland areas, it is not panacea.*
- Added the following (201): *Thus, this suggests that in such areas CBCM can contribute to poverty alleviation because of the strict boundary control undertaken by local resource users*.
- Added the following analysis (203). Added the following: *As evidenced by the patrol committee which patrolled voluntarily on a daily basis, it is given that ecological sustainability under CBCM can be achieved with limited resources from relevant government and this can be a cost saving to the government because such resources could be spent to other services. However, this will also depend on how long could people volunteer to patrol voluntarily which is something that could be not observed due to time limitation. Nonetheless, if improved access to fuelwood is in itself an adequate incentive to patrol voluntarily means that they can patrol for a very long time. This can create long term conditions in which the local chieftaincy and local resource users can cooperate, thereby leading to mutual benefits.*
- (Analysis) 201 (206): This indicates that the sense of ownership or feeling attached to the resource base would be important for the compliance of harvesting rules and that it is those

who have permanent resident who are likely to comply with harvesting rules as *opposed to outsiders and those originally from other countries such as Mozambicans*.

- (Analysis) (page 205) Similar findings have been found by Cunningham (2002) that people residing in less degraded woodlands are likely to cooperate and defend their resource base. *This indicates that participation of local resource users in area where CBCM projects are implemented may occur also because of the value attached local resource users attach to fuelwood resource which has been the case in this study.*

Examiner 3

Key comments

Abstract

- Page iii, providing reasons why compliance is higher in Thorndale and Peninghotsa: Levels of compliance by resource users with the agreed CBCM rules were high in Thorndale and Peninghotsa *because they were given an opportunity to decide and agree on harvesting rules that were conducive to their harvesting practices.*
- Page iii continues: Possible reasons for difference in coppice shoots growth: Based on the growth rate data averaged across species, coppice shoots would reach the harvestable diameter of 4 cm in 3 years in Thorndale and 4 years in Penninghotsa. *The difference can possibly be explained by species differences in these villages, e.g. Terminalia sericea which coppices vigorously was one of the predominant species recorded in Thorndale*
- Page iv: I feel strongly that my perceptions are correct regarding the inflexibility of certain leaders as supported by their words that I quoted in text.
- List of figures generated automatically and edited.

Chapter 1

- Page 3 (3): Added "a": Contrarily, in The Gambia reduction in fuelwood usage was observed as *a* result of improved access to kerosene and electricity (Prasad and Visagie, 2006).
- Page 4 (4): Replaced "limb" by "aboveground biomass".
- Page 10 (10): Justified text.

- Page 13 (13): Added verb: In Miombo woodlands Luoga *et al.* (2004) *highlighted* that the coppicing effectiveness, mean number of shoots per stump, varied among species investigated.
- Section 1.2.7: Adding information: *The area of coupe/s available for harvesting per year equals the total usable area of the communal woodland divided by the number of years required for one harvest rotation cycle. One or more can be harvested per year as long as the combined area is proportional to the rotation time in years. Each coupe is harvested once per rotation cycle (Gandar, 1997).* Also added strength and weaknesses to the table 1.1. Page 16 (17).
- Page 15 (15) section 1.2.7.1: Added "be" to correct grammar: This can *be* done through leaving relevant species until it reaches diameter size for pole class (4 to <10 cm) (Luoga *et al.,* 2004).
- Page 16 (17) and 17 (18): Use the standard font style used in the dissertation (font size 10, Calibri).
- Page 19 (19): Deleted "been" in the sentence: For instance, this is *been* noted from the widely known Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe which is the pioneer of CBNRM in Southern Africa and CBNRM in Africa (EGSSAA, 2009).
- Page 20 (20): Added "red" to change the verb to past tense "occur".
- Page 21 (21): Changed tense from current to past tense (are to were)
- Page 22 (23): Re-written section 1.6.10.3 especially the first two paragraphs. Have also started with defining participatory woodland management. *Participatory woodland management is a strategy to achieve sustainable woodland/forest management by encouraging the management or co-management of forest and woodland resources by the communities living closest to the resources themselves (Roe et al., 2009).* Removed worlds that reported in the present tense such as "currently"
- Page 27 (29): Provided references for each point in the rationale, second paragraph.
- Page 29: For tractability, this study focussed only on the subsistence use of fuelwood, hence market is not included in the conceptual model.
- Page 32 (34): Corrected grammar: Ecological and socio-economic baseline data were collected in *January 2014 and January 2015.*

Chapter 2

- 2.1: Page 36 (38): Clarity on cultural homogeneity as one of the criterion used in selection of the study villages: *Tsonga-speaking rural villages under communal tenure in former homeland areas were selected in order to factor out the influence of cultural group on results*.
- Page 37 (39): Edited: Deleting "the" in the sentence -The total number of *the* households.
- Page 43 (45): Completed sentence: Makhuva also has high number of employment with the majority depending on government grants as *in other villages under the same municipality* (Makhado *et al.,* 2009).
- Page 44 (46): The examiner was referring to Makhuva as it was in this village where the project was not terminated. This is also supported by the page number. (Reason): *This was because of reasons such as the absence of chief to give a go-ahead to the study since he had granted the study permission. However, there was also high polarized views among local people which suggested the need for more meetings before getting their buy-in.*
- Page 47 (49): Given examples of changes made in a public meeting: *"For instance, these included replacing patrol committee members in Thorndale who had left patrol activities due to job opportunities in the nursery in Kruger National Park and restricting women to patrol only from nearby places"*.
- Page 50 (52): Given reason why *D. cinerea* was harvested indiscriminately: "*because it hindered grass growth which provides grazing resources for livestock.*" "Indiscriminate" was used because it was the wish of the headmen that harvesting of *D. cinerea* be done not sparingly, but in a manner that undermine their sustainability.
- Page 52 (54): (Given reason why the headman in Thorndale preferred to have many women in the patrol committee) "*because they were the ones who harvested fuelwood for domestic purposes*".
- Page 48-52: Advice about summary when submitting for publications noted.
- Page 59 (61): (Editing), a rule was designed *that a total number* of six plots would be sited when the distance between the last household or field and the boundary marking the communal end in the coupes was 800 m and less, and nine plots when *the distance was more than 800 meters but less than 1 600 m*.
- Page 59 (61): Corrected grammar: In order to promote *objectivity*, a rule was designed that a maximum *of six plots* would be sited when the distance between the last household or field

and the boundary marking the communal end in the coupes was 800 m and less, and nine plots when the distance was more than 800 meters but less than 1 600 m.

- Page 60 (62): Justified text for ethical consideration section 2.9.

Chapter 3

- Page 62 (66): Indicated the total number of questionnaires administered: Household interviews were conducted using a questionnaire before and during the harvesting trial in order to gather data on fuelwood harvesting and consumption patterns, such as energy mix, species preference, and distance travelled. Households were randomly sampled in the four study villages as follows: 30 in Thorndale, 30 Peninghotsa, 70 in Homu 14B and 120 in Makhuva.
- Page 63 (65) (Addressed the vagueness in the use of free-regarding collecting fuelwood) sentence)): free *monetarily*
- Page 70 (72): (Presented a figure from Table 3.1 in the sentence). Fuelwood was the most widely used energy source in all four study villages in the first and second survey rounds *with more than 80% across the study villages using it*.
- Page 71 (73): Edited: Deleted "insignificant increase" to remove the statistical connotation in the sentences for data which were not analysed (of Table 3.1).
- Page 72 (73): (Given a percentage that refers to Table 3.3). More than 80% of local resource users harvested fuelwood from the communal woodland with only few harvesting in their own fields. Corrected the degree of freedom for Homu 14B in Table 3.3.
- Page 73 (75 and 76): Created space for tables.
- Page 81 (84): Added p values for significant difference results.
- Page 83 (86): Added p values for significant difference results.
- Page 84 (87): Created space between the two tables (Table 3.10 and 3.11)
- Page 85 (88): *The slight increase in the proportion of those who used electricity can be explained by the fact that some of the households received electricity during the trial period. This means that those who could afford electric appliance and electricity bills also had the option of using it for cooking.*
- Page 90 (93): Deleted "the" and "that of" In terms of *the* species preference ratio, it was *that of D. cinerea* that changed noticeably in Thorndale during the harvesting trial.
- Page 91 (95): Addressed grammar: However, *this suggests the need to have more research undertaken in order to determine if mopane caterpillars prefer large mature trees or if they*

also use coppice shoots. Added "the fact that" to start a sentence. *The fact that S. birrea* was the third most preferred species after *C. apiculatum* in Makhuva was surprising because it was a protected species as per the National Forest Act No. 84 of 1998.

- Page 93 (96): Added "fuelwood" which missing: Given a choice deadwood is preferred over livewood (Gandar, 1997; Williams and Shackleton, 2002), which provides evidence of the scarcity of *fuelwood* because if they were harvesting in nearby they would spend less time before the trial.
- Page 93 (96): Improve readability of the sentence. *The fact that resource users travelled long distances and spent more time harvesting fuelwood before the trial implies that harvesting was not done in the vicinity of the village, probably to minimise their chance of being caught*.
- Page 93 (97): Replaced that with "the" in the first sentence of the second paragraph.
- Page 93 (97): Inserted "as" to read switch to modern energy sources such *as* electricity
- Page 94 (97): Deleted discussion without significant results. (*The change in the harvesting frequencies suggests that CBCM can offer local resource users, especially women, an opportunity to develop and agree on the harvesting calendar that favours them, but this will also depend on the type of leadership*).
- Page 94 (98): Re-wrote the sentence to improve readability. *The fact that many resource users* shifted from harvesting in winter *to any time,* regardless of the season, provides evidence for this because households choose to collect fuelwood in a manner that minimises the cost to the household (Cooke, et al., 2008).
- Page 95 (86): Moved findings that were discussed but not mentioned under the relevant results section (section 3.2.7- fuelwood consumption). *During the last survey, few households were found without fuelwood piles in Thorndale during the estimation of the daily fuelwood consumption*.
- Page 95 (99): Added "energy" between village demand (and also where was necessary).

Chapter 4

- Page 97 (100): Deleted some of the biomass data, e.g. *New coppice shoots from plots were monitored over a period of nine months, with their contributions to the resource base assessed similar to the pre-existing coppice shoots.*
- Page 100 (104): Improved methods: *Tree species were identified through the assistance of the research assistants and a local expert fully conversant with tree species in the local*

village. Where uncertainty existed in the identification process, a specimen of the bark and leaf was taken for identification using the field guide. Siting of plots is well captured in chapter 2, while the parameters measured and equipments used are indicated under section 4.2.1. Allometric equations of other scholars and why they were not preferred has been indicated such as that of Tietema (1993), on page 105.

- Page 119 (124): The tittle is not missing but indicated below after the figures
- Page 121 (125): There was a similar pattern in the total standing stock observed in Thorndale and Peninghotsa but not in Homu 14B. *This can be explained by the differences in the effectiveness of traditional management systems in the villages since in Thorndale and Peninghotsa there was some level of effectiveness in enforcing harvesting rules.*
- Page 121 (125): Edited text and closed brackets for White 1979
- Page 124 The difference in rotation times has been explained in the abstract i.e. that this may be due to species biology).
- Page 124 (128): Given reason: *The differences in the projected growth of coppice shoots between the two villages can be due to factors such as species biology and edaphic factors since they are known to affect coppicing ability of savanna species (Kaschula et al., 2005).*
- Page 125 (129): The author cited rainfall from Neke (2004) and not other rainfall resources.
- Page 125 (126): Added pollen production as one of the ecosystem services.
- Page 126 (130): Added: *For instance, it was only in this village that the headman did not conduct patrols*.
- Page 127 (130): Grammar: Replaced “different” with “difference”

Chapter 5

- Page 130 (133): Edited: Replaced compatible with practicable and impossible with difficult to address the vagueness: This is not *practicable* with the current energy consumption patterns in many areas in communal areas (Fabricius *et al.,* 2004) because it has become *difficult* for harvesting fuelwood without breaking harvesting rules that prohibits harvesting of livewood in southern Africa (Fabricius, 2004).. Line 5-8
- Page 131 (135): Improved methods: E.g., number of focus group conducted, composition of respondents, captured in the table 5.1, type of sampling methodology used-purposive sampling etc.
- Page 134 (139): Added on *the effectiveness of community based coppice management* (subsection 5.3.1).

- Page 135 (139): Section 5.3.1: Indicated data gathering techniques from which quotes were derived or originated.
- Page 136 (141): Adding text: Perceptions and attitudes of the local government institutions *on the effectiveness of community based coppice management* (subsection 5.3.2).
- Page 140 (145): Data collection method used to gather and assess participation of local resource users. *As observed during community meetings*, not only did local people designed the rules of the project but the implementation of the project but its implementation was contingent upon their involvement after the project was conditionally accepted by the headmen.
- Page 143 (148): Presenting tables of compliance under 5.3.6 will negatively affect the flow of information because this section analysed the same data, which means it had to be presented before.
- 143 (148): High frequencies of those who acknowledged incompliance with rules in the first survey were in the middle-aged class (35–60) across the study villages, and also turned to be significantly higher during the trial in Thorndale χ (6)=12.450, p<0.05) and Peninghotsa χ (8)=22. 154, p<0.05). *This indicates the existence of relationship between the age of resource users and fuelwood harvesting. For instance, those in the middle class are women who are responsible for cooking in the households, therefore, they are the ones who suffer most in the scarcity of fuelwood and vice versa*. Regarding education, the majority of those who reported to have not complied with harvesting rules before had primary education whose number turned to be significantly high during the trial in Thorndale χ (9)=31.221, p<0.001). *This also indicates the availability of relationship between education and resource users because those with tertiary education are likely to be employed as professional, therefore, can afford electrical appliances.*
- Page 143 (148): Clarity: Across the study villages, all the chiefs showed positive perceptions towards CBCM with all their headmen *except one of the headmen* in Makhuva.
- Page 150 (155): Moved information to the results section such as the number of members who undertook patrols etc.
- Page 156 (162). Noted. Decided not to move.

Chapter 7

- No improvements were required for this chapter.