

**GUIDELINES FOR PREPARATION AND SUBMISSION OF DISSERTATIONS/
THESIS/ RESEARCH REPORTS/ RESEARCH PAPERS AND OTHER SCIENTIFIC
PUBLICATIONS**



Fifth Edition

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PREFACE

Sokoine University of Agriculture regulations requires that every dissertation/thesis/ research report/ research paper submitted for consideration for an degree award must be satisfactory with respect to format and literary presentation. Failure to observe some of these regulations may delay students to complete their studies. Preparation of good quality dissertation/thesis/report will greatly minimize frustrations to students; simplify the work of the supervisors and examiners; and help the readers. Thus, this document has been primarily prepared to assist students in preparation of Dissertations, Theses, Research Reports and Research Papers. It is expected that it will also be useful to supervisors, examiners, researchers and editors of scientific documents published at Sokoine University of Agriculture, to ensure uniformity of the writing style.

It should be noted that this document does not include the details on how to write or prepare scientific writings. For this subject, students are advised to contact relevant books, research manuals and supervisors.

This is the fifth edition of the first issue of the document, which was produced in 1993, the second edition in 2002, the third edition in 2007 and the fourth edition in 2008. The document reflects on the current 6th Edition of SUA Regulations and Guidelines for Higher Degrees which was reviewed in 2021 to accommodate the 3rd Edition of Standards and Guidelines for university education in Tanzania released by the Tanzania Commission for Universities (TCU) in December 2019. This document provide clarification of some issues/points, that were not clear or deficient in the previous guidelines. It also includes changes in the design and format of the thesis/dissertation cover and printing format. The revised document was approved by the Senate at its 277th meeting held on the 17/02/2022.

During the revision of this document, some individuals provided comments and suggestions, including members of the Senate Postgraduate Studies Committee who scrutinized the document before recommending it to the Senate. May I take this opportunity to thank all who in one way or another contributed to the revision, editing and finally printing of this Fifth Edition.

Prof. Raphael T. Chibunda
Vice-Chancellor

18/02/2022

1.0 OVERVIEW

The fifth edition of the Guidelines for Preparing Thesis/Dissertation/Research Report, Research Paper and other Scientific Publications at *Sokoine University of Agriculture* (referred to as the *Guideline* throughout the remainder of this document) was revised from the 2008 version. Some important changes have been adopted to be in line with 2021 revised Regulations and Guidelines for Higher Degrees at SUA. Likewise, clarification based on student and instructors questions has been incorporated throughout the document. Therefore, this document provides important information concerning the dissertation, thesis and report layout and other formatting considerations.

2.0 DISSERTATION, THESIS, RESEARCH REPORT, RESEARCH PAPER LAYOUT

This portion of the *Guideline* describes the required and recommended sections for a dissertation, thesis or report. Required sections must be included in the order indicated. When optional sections are included, they should appear in the order recommended in this section of the *Guideline*.

2.1 SECTIONS LAYOUT IN THE PRELIMINARY PAGES OF DISSERTATIONS, THESES AND REPORTS

(a) **The cover (required for the Dissertations, Theses, Research Reports and Research Papers)**

i. **The Front Cover**

Should contain the following information:-

- Institution's name (i.e. Sokoine University of Agriculture) typed using Arial 24 Front Type and Size
- University Logo positioned at the centre and two spaces after the institution's name and before qualification attained.
- Qualification attained (eg MA for Master of Arts, MSc for Master of Science, PGD for Postgraduate Diploma, PhD for Doctor of Philosophy, etc.) followed by the type of document (eg Dissertation, Thesis, Research Report, Research Paper). It should be typed using Arial 24 Front Type and Size.
- Full title of the dissertation/thesis/research report/research paper. The title should not be more than 20 words and must be typed using Arial 20 Font Type and Size. The title should also describe the content of the dissertation, thesis, report or paper accurately and concisely
- Candidate's names starting with the first name followed by the middle name (if available) and surname
- Date of submission indicated by a month and a year of graduation typed using Arial 20 Front Type and Size.
- The dimension of the book should be 6" x 9"

The front cover background should bear a light green colour while the text should be in white.

ii. **The Back Cover**

Should contain the following information:-

- Candidate's passport size photo taken on white background colour and measuring 35 X 45 px. The image must be placed on the top left corner of the page and wrapped with texts (usually, a summary of the dissertation, thesis, report or paper) on the right and at the bottom. The resolution of the photo shall be 600 dpi at the minimum.
- Summary of the dissertation/thesis/research report/research paper not exceeding 150 words in length and typed using Arial 11 Front Type and Size.

The back cover background should bear a light green colour while the text should be in white.

iii. **The Spine**

The writing on the spine should read from the bottom to the top and should bear the following information:-

- the surname and initials of the candidate
- the acronym for the degree for which the dissertation/thesis is being submitted (eg. PhD, MA, MSC or PGD)
- the year of degree award

The spine background should bear a gold colour while the text should be in dark purple.

iv. The quality/weight of the cover should be 300g.

v. The sample cover is shown in Appendix A.

(b) **Title page (required for the Dissertations, Theses, Research Reports and Research Papers)**

The title page is the page that comes after the front cover. The typeface, style and size of the text should be the same as that used for the body text of the document (see Section 3.0). A page number is not placed on this page, but it is included in the page count. The title page shall give the following information in the order listed:

- i. The full title of the dissertation/thesis/report/paper. The title should not be more than 20 words and should describe the content of the dissertation, thesis, report or paper accurately and concisely
- ii. That "The dissertation/thesis/report/paper is submitted in fulfilment/partial fulfilment of the requirements for [Postgraduate Diploma in ...(insert as applicable), Master Degree in ...(insert as applicable) or Doctor of...(insert as applicable)] of Sokoine University of Agriculture, Morogoro.
- iii. The full name of the candidate (starting by the first name) followed, if desired, by any qualifications.
- iv. Name(s) of the Principal Supervisor and Co-supervisor(s) if relevant, of the study.
- v. The Department and College/School/Centre/Directorate in which the student was registered for the study.
- vi. The month and year of submission of the dissertation/thesis/report/paper to

the university for examination. If a dissertation/thesis/report/paper is submitted for re-examination, the resubmission month and year is the one that should be listed. The sample title page is shown in Appendix B.

(c) **Abstract/ Extended Abstract (required for the Dissertations, Theses, Research Reports and Research Papers)**

- i. The research report or research paper must contain an abstract of not more than 300.
- ii. The dissertation/thesis must contain an extended abstract of not more than 1000 words.
- iii. The abstract/extended abstract shall concisely indicate the problem investigated, the procedures and research methods employed, the general results, new contributions made and the major conclusions reached.
- iv. While the rest of the dissertation/thesis/report/paper is written in the English Language, the abstract/ extended abstract and keywords should be provided in both English and Swahili Languages.

(d) **Declaration Page (required for the Dissertations, Theses, Research Reports and Research Papers)**

Every dissertation/thesis/report/paper submitted for an award at SUA must be accompanied by a declaration by the candidate to the satisfaction of the Senate, stating that it is the candidate's original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution. The declaration should be structured as follows:

I {insert the names of candidate starting with the first name}, do hereby declare to the senate of Sokoine University of Agriculture that this *dissertation/thesis/report/paper* is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

Moreover, the declaration must be signed by the candidate and approved by all members of the academic staff who served as supervisors (or co-supervisors, if applicable). The supervisor(s) approval of the declaration imply also that they have approved the dissertation, thesis, report or research paper. The candidate shall also submit a plagiarism report as evidence for a plagiarism check.

(e) **List of published papers/manuscripts: (required for Dissertations and Theses)**

All published papers or manuscripts included in the document must be listed on this page.

(f) **Copyright page (required for the Dissertations, Theses, Research Reports and Research Papers)**

The *dissertation/thesis/report/paper* shall contain a statement of copyright by the author written as follows:

No part of this dissertation/thesis/report/paper may be reproduced, stored in

any retrieval system, or transmitted in any form or by any means without prior written permission of the author or Sokoine University of Agriculture in that behalf.

(g) **Acknowledgements (required for the Dissertations, Theses, Research Reports and Research Papers)**

The acknowledgements page should be used to thank those who have helped in the process of obtaining the postgraduate qualification. Permission to quote copyrighted material is listed here, as well as acknowledgement for grants and funding sources. If students must include a disclaimer stating, for example, that the views expressed in the thesis, dissertation, report or paper are not necessarily the views of the agency or institution that funded or supported the research, they should do so on this page.

(h) **Dedication (optional)**

Dissertations, theses, reports or papers may be dedicated to an individual, several people or a group. The word “dedication” is usually not needed on this page. Customarily, the dedication is short, such as, “To my parents.” This page is not numbered if included but is included in the page count.

(i) **Table of contents (required for the Dissertations, Theses, Research Reports and Research Papers)**

Each chapter or section heading, except for the table of contents, must be listed in the table of contents. Additional subheadings may also be included. The table of contents must be formatted so that each level of heading is clearly distinguished and page numbers are easily found. Page numbers must be aligned flush right and must be preceded by a leader of periods. One way to identify section headings is to increase the indention of successively lower levels of subheadings.

(j) **List of tables (required if there are several tables included in the Dissertations, Theses, Research Reports and Research Papers)**

If there are several tables (more than one) presented in the main body of the document, then a list of tables must be included that lists the table number, the table caption, and the page number on which the table occurs. The formatting of the list of tables is similar to that of a table of contents, except that there are no subheadings.

(k) **List of figures (required if there are several figures included in the Dissertations, Theses and Research Reports and Research Papers)**

If there are several figures (more than one) presented in the main body of the document, then a list of figures must be included. The list of figures page should consist of a table that lists the figure number, the figure caption, and the page number on which the figure occurs. The formatting of the list of figures is similar to that of a list of tables.

(l) **List of appendices (required if there are appendices included in the Dissertations, Theses and Research Reports and Research Papers)**

If there are several appendices (more than one) cited in the main body of the document, then a list of appendices must be included. The list of appendices page should consist of a table that lists the appendix number, and the page number on which the appendix occurs. The formatting of the list of appendices is similar to that of a list of figures.

(m) **List of abbreviations, acronyms and symbols (*required if there are abbreviations or acronyms included in the Dissertations, Theses and Research Reports and Research Papers*)**

If there is any abbreviation, acronym or symbol used in the document, a list of abbreviations, acronyms and symbols as well as associated meanings must be included in alphabetical order.

2.2 LAYOUT IN THE MAIN BODY OF DISSERTATION, THESIS, RESEARCH PAPER AND RESEARCH REPORT

- (a) Dissertations, theses, research reports and research papers are the four publication types that may be produced by postgraduate students at SUA.
- i. Students registered for a postgraduate diploma shall be required to carry out research that will lead to the production of an examinable Research Project Report.
 - ii. Students registered for the Master's by Coursework and Internship shall be required to produce a Research Paper.
 - iii. Students registered for a master's degree by coursework and research or a PhD degree by coursework and dissertation shall be required to produce a dissertation
 - iv. Students registered for master's or PhD degree by research and thesis shall be required to produce a thesis
- (b) Dissertation or thesis at SUA may be written either as published or publishable paper formats

2.2.1 LAYOUT OF RESEARCH REPORT/ RESEARCH PAPER

The sequence of sections/chapters in the main body of the research report or research paper shall be in the following order; Introduction, Literature review, Materials and Methods/Methodology, Results and Discussion, Conclusions, Recommendations, References and Appendices.

(a) **Introduction**

The introduction section of the report should lay the foundation for the current research and place the work in context within the disciplinary field. It should be an analysis of the existing body of research that has a bearing on the current research. It should both review the literature and provide a critical analysis of it. It should outline some of the limitations of prior research and describe areas that require further exploration. This section provides context for the goals of the current research project. This section should also state the overall problem which has prompted the research undertaking, the justification for undertaking the research, the general and specific objectives and the questions and/or hypotheses guiding

the research.

(b) **Literature review**

A literature review section of the report should provide a critical summary, analysis and evaluation of the research that has been carried out in the student's field of research. It should identify themes and trends in research questions, methodology and findings. Likewise, the review section should provide a discussion on the theoretical, empirical and methodological frameworks employed by a student undertaking research.

(c) **Methodology/Materials and Methods**

This section should describe all of the materials and methods used in the study. It may include activities such as modelling, conducting simulations, performing fieldwork or experiments, implementing surveys, data management and analysis, among many other techniques. If the description of one or more of the methods is lengthy, it is appropriate to include an overview in this section of the document and to include more details in an appendix.

(d) **Results and Discussion,**

This section presents all of the data obtained using the methods described in the methodology/materials and methods section. If the data are extensive, a summary may be included in the main body of the document with additional information located in an appendix. In discussing the results, interpret in context with the current state of research in the discipline. The discussion should also clearly explain the meaning of the results and their implications, in particular as they relate to the research questions and the hypothesis(es) tested. It is common to use citations to refer to the primary disciplinary literature in order to compare and contrast the results of the current research with results obtained and reported by other researchers. Sources of discrepancies, limitations or errors in the current work and their implications should also be presented when discussing the result.

(e) **Conclusions**

Conclusions should summarize and reflect on the main findings in the report. The conclusions may also highlight the applicability of the findings as well as the limitations and future direction of the areas for future work.

(f) **Recommendations**

Recommendations should emanate from report findings and conclusions and be made succinct and start with an action verb (create, establish, fund, facilitate, coordinate, etc.). Recommendations should also use a "SMART" format (Specific, Measurable, Attainable, Realistic, Timely) and be well-targeted.

(g) **References**

Include a reference list for all and only sources cited in the report. The style used in this list of references section should be consistent with the referencing style used in SUA.

(h) **Appendices**

Appendices may be used to place lengthy and detailed material that supports the main body of the report. If used, appendices should be formatted in the same way as the body of the report.

2.2.2 LAYOUT OF DISSERTATION/THESIS DEVELOPED IN A PUBLISHED PAPER FORMAT

- (a) In this Guideline, published materials include those which are already “published”, “in press” or “accepted” in a peer-reviewed scientific journal(s).
- (b) PhD candidate must have at least three full-length papers emanating solely from his/her PhD studies. Two of the said papers must be either “published”, “in press” or “accepted” in SUA recognized journals. The third paper may have the status “submitted” as evidenced by an acknowledgement from the editor of the journal.
- (c) The masters’ candidate must have at least two full-length papers emanating solely from his/her master’s study. He/she must appear as the first author (except when a different type of order of authors is customary in the student’s field of research). One of the said papers must be in “published” or “accepted” status in SUA recognized journals. The second paper may have the status “submitted” as evidenced by an acknowledgement from the editor of the journal.
- (d) Formatting of published papers included in a thesis or dissertation must either:
 - i. Conform to the guidelines to authors of the publishing organization, or
 - ii. Be consistent with the rest of the thesis or dissertation.
- (e) A footnote must be placed on the first page of a chapter containing published paper with the following information:

“The material contained in this chapter has been published in ... *OR* has been accepted for publication in ... *OR* has been submitted to the ... *OR* is in preparation for submission to ... *Title of Source of Publication.*”

Candidates should provide a link to forthcoming or published papers so that it may be easily accessed by the examiners. If a source of publication has not yet been determined, edit the footnote as needed to reflect where it might be submitted. For example, the material contained in this chapter is in preparation for submission to a journal.

- (f) For multiple authorship, the candidate must appear as the first author of the paper
- (g) The main body of the dissertation/thesis developed by published papers shall have common sections consisting of General introduction, Paper-based chapters, General discussion, General conclusions and recommendations, References and Appendices.

i. **General Introduction**

When the document consists of a collection of articles or papers, an introductory chapter must be included that describes the connection between all other chapters. The general introduction chapter should lay the foundation for the current research and place the work in context within the disciplinary field. This chapter should also state the overall problem which has prompted the research undertaking, the justification for undertaking the research, the general and specific objectives, the research questions and/or hypotheses, an overview of theoretical empirical, methodological and conceptual frameworks, study limitations and a brief description on the organization of the thesis.

ii. **Paper-based chapters**

Papers should be independent documents, in journal article format, following the norms for the relevant discipline. However, the paper should be organized in a format that has insights on the introduction, methodology/material and methods, findings, discussion, conclusion and recommendation. Paper-based chapters must be thematically related such that the contribution to knowledge emerges across the papers as a body of work. A reference list for all sources cited in the paper must be included at the end of each paper-based chapter. Paper-based chapters may be co-authored or represent collaborative work. However, the student should be the first author of all the papers and hold primary responsibility for the conceptualization of the study, analyses, interpretation and writing.

iii. **General/Integrated discussion**

The general purpose of the general discussion chapter is to provide an overall synthesis and demonstrate high-level abstraction, analysis, and interpretation of the thesis findings. The general discussion chapter of the paper-based thesis and dissertation provides students with a space in which to weave the results and discussion points from the individual articles comprising the thesis, elaborate on the logic and linkages between them, and convincingly argue for the unified, coherent, and original nature of their findings and contributions to the field-at-large. The general discussion (or elements of it) chapter may be publishable in its own right. When written well, the general discussion often results in an important academic contribution to the body of knowledge.

iv. **General conclusions and recommendations**

The general conclusions and recommendations chapter should contain a reaffirmation of the thesis statement, a brief description of the results presented in the papers and their applicability as well as the limitations and future direction. While it is natural that some parts of this chapter might be repeated from the previous chapters, the candidate should consciously avoid repeating the same words as in the discussion of the previous chapters.

v. **Reference List**

Include a reference list for all and only sources cited in the General

Introduction, General Discussion and General Conclusions and Recommendations Chapters only. The style used in this list of references section should be consistent with the referencing style used in SUA. As indicated earlier, a separate reference list associated with each paper-based chapter must be included at the end of each respective chapter.

vi. **Appendices**

Appendices may be used to place lengthy and detailed material that supports the main body of work. If used, appendices should be formatted in the same way as the body of the dissertation or thesis.

2.2.3 LAYOUT OF DISSERTATION/THESIS DEVELOPED IN A PUBLISHABLE MANUSCRIPTS FORMAT

- (a) In this *Guideline*, publishable manuscripts include those already in print, accepted for publication, in review or planned for submission.
- (b) Candidates registered for PhD by research and thesis must have at least three full-length manuscripts emanating solely from his/her PhD studies in the form of publishable papers. Two of the said manuscripts must be in “accepted” status in SUA recognized journals. The third manuscript may have the status “submitted” as evidenced by an acknowledgement from the editor of the journal.
- (c) Candidates registered for PhD by coursework and dissertation must have at least three full-length manuscripts emanating solely from his/her PhD studies in the form of publishable papers. One of the said manuscripts must be in “accepted” status in SUA recognized journals. The two remaining manuscripts may have the status “submitted” as evidenced by an acknowledgement from the editor of the journal.
- (d) The masters’ candidate must have at least two full-length publishable manuscripts emanating solely from his/her study. One of the said manuscripts must have the status “submitted” as evidenced by an acknowledgement from the editor of the journal.
- (e) Publishable manuscript(s) should adopt a format of a specified journal that is recognized by SUA or be consistent with the rest of the thesis or dissertation.
- (f) A footnote must be placed on the first page of a chapter containing publishable manuscript with the following information:

“The material contained in this chapter has been accepted for publication in ... *OR* has been submitted to the ... *OR* is in preparation for submission to ... *Title of Source of Publication.*”

- (g) The main body of the dissertation/thesis developed by published manuscripts shall have common sections consisting of extended abstract, General introduction, Manuscript-based chapter, General discussion, General conclusions and recommendations, References and Appendices. The layout for this section is similar to that of the dissertation and thesis developed by the published manuscript.

3.0 OTHER FORMATTING CONSIDERATIONS

3.1 GENERAL TYPESCRIPTS AND LAYOUT (*required for all types of publications*)

- (a) Type text in 1.15 spacing on two sides of 80 g/m² paper
- (b) Paginate the preliminaries (portions preceding the introduction) in lower case

Roman numerals (i.e. i, ii, iii, etc.) beginning with the title page. Number pages of the main body of the thesis in Arabic numbers (1, 2, 3, etc.) consecutively throughout. The page numbers should appear at the centre of the top margin.

- (c) Blank pages: The title page, declaration page, copyright page and dedication page (if present) should always be printed as one-sided sheets. When a document is prepared for double-sided printing, the back of each of these sheets is required to be blank. One way to accomplish this is to insert blank “pages” that will correspond to the reverse side of each of these one-sided sheets. These blank pages should not have numbers printed on them, but they are included in the page count. Blank “pages” must also be inserted to ensure that major sections (such as the start of a chapter) begin on odd-numbered pages. Blank “pages” are only allowed to occur on even-numbered sides of sheets of paper. Two or more blank “pages” in a row are not allowed
- (d) Page Margins: the binding edge margin is required to be 1.3 (approximately 3cm) inches on all pages. For portrait pages in a double-sided document, the binding edge will be on the left-hand side for odd pages, and on the right-hand side for even pages. For landscape pages, the binding edge will be on the top for odd pages, and at the bottom for even pages. The non-binding, top and bottom margins are required to be at least 0.8 inches (approximately 2cm).
- (e) Ensure that typescripts are legible and that the fonts, as well as the format, are consistent throughout. The font should be Arial size 11.
- (f) To itemize within a paragraph, use the forms (a), (b), (c). Consecutive short sentences can also be itemized by starting them with a dash aligned to the left and ending them with a semi-colon.
- (g) Spelling should follow that of the U. K. English Dictionary.

3.2 FOOTNOTES

- (a) Include footnotes in the text-only if their use is unavoidable.
- (b) Number them consecutively with a superscript number at the relevant author’s name or point in the text.

3.3 TABLES

- (a) Type each table on a separate sheet in case it covers more than half a page.
- (b) Number them consecutively using Arabic numbers (e.g. 1, 2, 3, etc) in the same order they are referred to in the text.
- (c) Type adequate and self-explanatory captions above tables. For tables that are presented in a landscape format (horizontal), the caption and page number should be typed at the centre, in this case, it will appear on the left margin and not on the top margin as for portrait format.
- (d) Capitalise only the first letter of the first word of captions and of column headings in the table except where otherwise necessary.
- (e) Use the fewest possible lines and avoid the use of vertical lines to separate columns.
- (f) Place acknowledgements of the source cited below tables, using the format; Source: Gakale and Manthe (2020), etc.
- (g) Give references for tables in full only in the references list at the end of the dissertation/thesis and not as footnotes to the text.
- (h) The words - table, figure, appendix or map which refer to a specific table, figure, map in the text should start with a capital letter
- (i) Authors should take notice of limitations set by the size and layout of the document.

Large tables should be avoided. A table should not exceed the printed area of the page. Fold-outs are not accepted in the main text. If any data are to be presented, an attempt should be made to divide these over two or more tables or reduce the size using smaller fonts and/or photocopying machines to a readable extent.

3.4 ILLUSTRATIONS

- (a) Provide these on separate pages in case they cover more than half a page.
- (b) Number figures sequentially in Arabic numbers (e.g. Figure 1, 2, 3, etc.) and refer to them in the text in order of their appearance.
- (c) Type captions below figures.
- (d) Capitalise only the first letter of captions, except where otherwise necessary.
- (e) When referring to figures in the text, use the form Fig. 3, (Fig.8), etc.
- (f) Photographs are only acceptable if they are relevant and should help the reader to understand the subject matter. Photographs should have good contrast and intensity.
- (g) Figures should not have borders/grids

3.5 UNITS OF MEASURE

- (a) Use SI (System International) units (see Appendix C).
- (b) Spell out units unless they are preceded by numbers.
- (c) Note that abbreviations for units are the same in singular and plural, e.g. write kg, not kgs.
- (d) Express rates or amount per unit in the form 50 kg/ha or 50 kg N/ha or 50 kg ha⁻¹. Do not write 50 kg/ha N. Leave space between the value and the unit of measure (eg. 50 kg/ha).

3.6 NUMBERS

- (a) In numbers with four digits on either side of the decimal point, run digits together, e.g. 1000; 8285; 0.3284
- (b) In numbers with more than four digits, leave a space (not a comma) between each group of three digits on either side of the decimal point e.g. 1 262 843; 256 421; 10 000; 0.032.
- (c) In columns of numbers (e.g. in tables) containing four or more than four digits, group the digits into three as follows:

28 032
1 422
862

- (d) For the decimal point, use a stop, not a comma, e.g. write 0.2, not 0,2.
- (e) For numbers below the unit, precede the decimal point with a zero, e.g. 0.62 not .62.
- (f) Spell out numbers from zero to nine, but use figures for higher numbers, e.g. six plots; but 10, 15 plots.
- (g) In a series of three or more numbers, use figures irrespective of magnitude, e.g. "In trials with 6 cultivars in Zambia, 4 in Malawi and 8 in Mozambique
- (h) Use figures whenever a number is followed by a unit of measure and for days, years, dates, page numbers, classes, etc., e.g. 5 kg, 2 g, 3 days, 1 year, 6 January, page 13, type 7, etc.

- (i) Spell out numbers that occur at the beginning of sentences. Twenty students attempted.....
- (j) Express fractions as decimals, though percentages and simple fractions can still be used.
- (k) For simple fractions use the form one-quarter, two-thirds, not $\frac{1}{2}$, $\frac{2}{3}$, etc.
- (l) Where possible, avoid large figures ending in several zeros. Either spell them out or use an exponential for part of the number; e.g. for 1 600 000 write 1.6 million or 1.6×10^6 .

3.7 PERCENTAGE

Use the % symbol only with a figure, e.g. 62%, but spell out the words percent or percentage when they occur without figures.

3.8 FORMULAE AND EQUATIONS

- (a) For formulae, use the internationally accepted format (see Appendix D) – for a format from Elsevier Scientific Publishers).
- (b) Equations should be numbered using roman numbers in the order of their appearance

3.9 TIME

Use the 24-hour clock, e.g. 0730 h, 2345 h, etc.

3.10 DATE

Use the form 22 January, 2014; not 22nd January, 2014; January 22, 2014 or January 22nd, 2014.

3.11 YEAR

- (a) Write in the 1990s, not in the 1990's
- (b) For two calendar years write 2001-02, not 2001 02, 2001-2 or 2001-2002
- (c) For single non-calendar years, i.e. parts of two years or seasons that extend over two years, write 2001/02 not 2001 2, 2001-02 or 2001-2002.
- (d) For two non-calendar years, write 2000/01 – 2001/02.

3.12 LOCAL TERMS

If local or unfamiliar terms are used, e.g. for plant or animal species, food products, etc. give the scientific names in italics or underlined or a description when the terms are first used.

3.13 ABBREVIATIONS AND ACRONYMS

- (a) A selected list of symbols and prefixes which, in addition to those for SI units, can ordinarily be used is given in Appendix E. However, spell them out in full if they are used in an unfamiliar context.

- (b) Where it is wished to use abbreviations of organisations, technical terms etc., spell them out in full the first time they occur, followed by the abbreviation in brackets, e.g. Sokoine University of Agriculture (SUA); sugarcane mosaic virus (SCMV), etc. Thereafter use the abbreviation only.
- (c) In acronyms, degree designations, etc. it is usual to omit full stops, e.g. USA, not U.S.A., PhD not Ph.D.; FAO not F.A.O.

3.14 REFERENCES OR LITERATURE CITED

Use American Psychological Association (APA) reference style. For detailed information, please see the most recent *Publication Manual of the American Psychological Association* at www.apa.org.

3.15 CITATIONS IN THE TEXT

The following examples for citing and formatting reference entries **are** in accordance with principles established in the *Publication Manual of the American Psychological Association*. Students are advised to always consult the most recent *Publication Manual of the American Psychological Association* at www.apa.org.

(a) One author

Include the author's surname and the publication year. For example, (Mugula, 2016) or Mugula (2016)

(b) Two authors

Citations of a reference with two credited authors include the surnames of both authors and the publication year. The surnames are separated by "and" in narrative citations and by an ampersand ("&") in parenthetical citations. For example, Kanuya and Greye (2016) or (Kanuya & Greye, 2016).

(c) Citations of a reference with three authors

Include the surname of the first author, followed by "*et al.*" and the publication year. For example, Maerere *et al.* (2001) or (Maerere *et al.*, 2001).

(d) Organisation

Write the organization's name and introduce an abbreviation that is used instead of the name in subsequent citations. For example Food and Agriculture Organization (FAO) (2021)....

(e) Multiple citations

Multiple citations in the same parenthetical unit are arranged alphabetically by author surname(s) first. Semicolons separate citations with different author lists. When citations with the same author lists exist, the author surname or surnames appear once, followed by the references' publication years, separated by commas and ordered among themselves in chronological order. For example (Ishengoma & Ngaga, 2018; Mwamakimbula, 1997, 2015a, 2015b; Monela *et al.*, 1997)

(f) Citations of work by different first authors with a similar surname

Citations of works of different first authors with similar surnames are distinguished by inserting the first authors' given-name initials into the citations. The initials are inserted even when subsequent authors and publication years in citations differ.

Narrative: G. R. Nyinondi *et al.* (2001) and T. J. Nyinondi and Gladwell (2012)

Parenthetical: (G. R. Nyinondi *et al.*, 2001; T. J. Nyinondi & Gladwell, 2012)

(g) Citing the same first authors and same publication years

If multiple references with (a) three or more authors, (b) the same first authors, and (c) the same publication years exist, The surname lists in citations are extended to feature the surnames of enough authors, beyond the first author, to show the differences among these references.

Narrative: Mlozi, Mvena, *et al.* (2018) and Mlozi, Mvena, *et al.* (2018)

Parenthetical: (Mlozi, Mvena, *et al.*, 2018; Mlozi, Mvena, *et al.*, 2018)

(h) Personal communications

To refer to personal communications relating to unpublished material, personal communication etc, use the form ... M. Mwatawala (personal communication, September 3, 2020) or (M. Mwatawala, personal communication, September 3, 2014).

(i) Secondary citations

Secondary citations can take the form Madalla (2012), as cited in Mbilinyi *et al.* (2014) or (Madalla, 2012, as cited in Mbilinyi *et al.* (2014)). The secondary citation should be kept minimum possible or where possible avoided altogether. Citations presented as "personal communications" shall not be allowed.

- (j)** For a Thesis/dissertation to be recommended for examination at least 40% of all references cited must be journaled articles and published not older than 5 years. Journal articles may include ones accessed through electronic databases.

3.16 CITATIONS IN LIST OF REFERENCES

- (a)** Cite references in alphabetical order of author(s) and order of year of publication.
- (b)** For references with the same author(s) and year of publication, start with papers by the same author being arranged in the order (1) single author, (2) two authors alphabetically according to the name of the second author, and (3) several authors chronologically with 1981a, 1981b, etc for papers published in the same year.
- (c)** References by one author take precedence over references by the same plus additional authors irrespective of the year of publication.
- (d)** Avoid using Anon. or Anonymous where possible. Where no name of an author is given, use the name of the sponsoring or issuing organization, ministry, department, etc. if it can be identified.

- (e) Separate authors by semi-colons.

3.17 EXAMPLES OF CITATION LAYOUTS

The following examples show how to set out the details needed for the main types of literature cited in the text using APA style.

(a) **Journal paper**

i. **One author**

Tarimo, A. J. P. (1997). Physiological response of groundnut to plant population density. *African Crop Science Journal* 5: 267 – 272.

ii. **Two author**

Temu, A. E. & Due, J. M. (2000). The business environment in Tanzania after Socialism: Challenges of performing banks, parastatals, taxation and the civil service. *Journal of Modern African Studies* 38(4): 683 – 712.

iii. **Three to 20 authors (write all the authors)**

Churi, A. J., Mlozi, M. R., Mahoo, H., Tumbo, S. D. & Casmir, R. (2013). A Decision Support System for Enhancing Crop Productivity of Smallholder Farmers in Semi-Arid Agriculture. *International Journal of Information* 3(8): 238-248.

iv. **Twenty-one or more authors (mention up to 20 then add.... Write the name of the last-mentioned author)**

Nichols, H. B., Schoemaker, M. J., Cai, J., Xu, J., Wright, L. B., Brook, M. N., Jones, M. E., Adami, H., Baglietto, L., Bertrand, K. A., Blot, W. J., Boutron-Ruault, M.-C., Dorransoro, M., Dossus, L., Eliassen, A. H., Giles, G. G., Gram, I. T., Hankinson, S. E., Hoffman- Bolton, J., . . . Sandler, D. P. (2019). Breast cancer risk after recent childbirth: A pooled analysis of 15 prospective studies. *Annals of Internal Medicine*, 170(1), 22–30.

(b) **Journal paper not in English**

Nunes, E. (1985). Investigacao recente sobra as principais factor queimitam a producao do milho em mozambique. (A recent investigation of the main factors limiting sorghum production in Mozambique). *Agricultura Boletim Tecnica* 8: 4 – 10.

(c) **Journal paper accepted for publication but still in press**

Sones, K.R. **(In Press)**. Yield targeting in rabi sorghum. *Journal of Agronomy*

(d) **Books**

i. **No edition is included**

Stocker, L. (2000). *Practical Wildlife Care for Veterinary Nurses, Animal Care Students and Rehabilitators*. Blackwell Science Ltd.

ii. If the edition is included

Stocker, L. (2000). *Practical Wildlife Care for Veterinary Nurses* (2nd. ed.), *Animal Care Students and Rehabilitators*. Blackwell Science Ltd.

(e) Edited Books

i. One editor

Sibuga, P. (Ed.). (2005). *Genetics*. Mkuki.

ii. Multiple editors

Hulme, D. & Murphree, M. (Eds.)(2001). *African Wildlife and Livelihoods: The promise and performance of Community Conservation*. James Currey Ltd.

(f) A chapter in the multi-authored book

i. One editor

Barrow, E., Gichohi, H. & Infield, M. (2004). The evolution of community conservation policy and practice in East Africa. In: D. Hulme. (Ed.), *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation* (pp. 11-25.) James Currey Ltd.

ii. Two editors

Schwab, B., & Finocchiaro, S. (2018). "Don't fix it!": The role of player empowerment in the prevention of match-fixing. In S. Steele & H. Opie (Eds.), *Match-fixing in sport: Comparative studies from Australia, Japan, Korea, and beyond* (pp. 135–150).Routledge.

iii. Three to 20 editors

Adams, Z., Füss, R., & Kaiser, D. G. (2008). Macroeconomic determinants of commodity futures returns. In F. J. Fabozzi, R. Füss, & D. G. Kaiser (Eds.), *The handbook of commodity investing* (pp. 87–112). Wiley.

(g) Conference

i. Serial conference proceedings

Albright, M. (1991). The role of the United States in Central Europe. *Proceedings of the Academy of Political Science*, 38(1), 71–84.

ii. Nonserial conference proceedings

Ishengoma, R. C. & Ngaga, A.G. (2005). Trends and accomplishments of research in forestry and nature *conservation* at SUA 1996 - 2000. In: J.A Mtovelo (Ed). *Proceedings of The First University-wide Scientific Conference*.

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(h) **Paper presentation**

Mwalukasa, N. (2018, April 5–9). *Role of Library in fostering education* [Paper presentation]. Tanzania Library Association Annual Meeting, Singida, Tanzania.

(i) **Report**

Mahoo, H., Tumbo, S., & Mbungu, M. (2003). Climate change adaptation in Tanzania (Report No. MR-1682-OSTP). FAO.

(j) **Dissertations**

i. **Unpublished doctoral dissertation**

Maskini, M. S. (2000). *Spatial and temporal grazing patterns of livestock and wild herbivores at Ngorongoro Conservation Area*. [Unpublished doctoral dissertation]. Sokoine University of Agriculture.

ii. **Unpublished master's thesis**

Nyamba, S. (2011). *Assessment of factors influencing the use of mobile phones in communicating agricultural information: a case of Kilolo district*. [Unpublished master's thesis]. Sokoine University of Agriculture.

4.0 USING OF HUMAN AND ANIMAL SUBJECTS AND RECOMBINANT DNA

All research that involve human subjects, animal subjects or recombinant DNA must be reviewed by the University Research and Publication Committee. A letter from such committee should be appended in a dissertation, thesis or report as evidence that approval was sought and granted.

5.0 USING COPYRIGHTED MATERIALS

- (a) All material reused or obtained from another source must be properly cited. This includes previously published material that was created by the author of the dissertation, thesis, report or paper being submitted to Sokoine University of Agriculture.
- (b) Permission is needed to republish any material, including that created by the author of the dissertation, thesis or report being submitted to Sokoine University of Agriculture, with the following exceptions:
 - i. The material is in the public domain. This includes material created by employees of the government. This may also include some materials produced in other countries or by other governments.
 - ii. Material for which the copyright has expired.
 - iii. Material that is covered under the “fair use” clause of copyright law, which allows for the reuse of some materials without permission.
 - iv. Text or figures substantially altered from their source.

- (c) If permission is required to use previously published materials, it must be given in writing by the holder of the copyright (typically a publisher). If permission is not granted, the previously published material must not be used in its published form. In many cases text, figures or tables can be substantially modified so that they can be used as long as they are properly cited.
- (d) In cases where copyrighted material is used in a dissertation, thesis, report or paper, it is expected that permission to use the material will be documented. Many publishers explicitly describe the way that their permission to allow re-use of copyrighted material should be documented. In case the instruction is not provided, include an acknowledgement of the permission granted by the holder of the copyright in the acknowledgement section of the dissertation, thesis, report or paper.
- (e) In addition, students must submit documentation to the DPRTC that they have permission to use copyrighted materials in a dissertation, thesis or report or documentation that materials are exempt from copyright restrictions. Evidence of permission to use material created by others or previously published can be documented in two ways:
 - i. It can be included in an appendix to the dissertation, thesis, report or paper.
 - ii. Submit digitally to the DPRTC with the final electronic version of the dissertation, thesis, report or paper as supplemental files.
- (f) With either method, label each piece of evidence with the corresponding figure number, table number or chapter so that the reader can easily match the evidence to the corresponding material in the dissertation, thesis, report or paper.

6.0 PRINTING AND BINDING

6.1 PRINTING

- (g) Dissertations, theses, reports or papers should be double-sided printed
- (h) Except for the cover, images, figures, maps, graphs and other materials which may require some coloured graphics, the rest of the document contents must be printed in black and white colours. If the document has a lot of graphics with intense colours, consider using 100g/m² paper instead of 80g/m².

6.2 HARD BINDING

- (a) Department/School/College/Institute Postgraduate Studies Committee should check the unbound dissertation/thesis/report/paper before sending it for hard-binding.
- (b) After certification by the supervisor that the candidate has satisfactorily incorporated all the recommended corrections, the candidate shall submit two hardbound copies of the dissertation/thesis/report/paper to the DPRTC.
- (c) "Trim size" or "book size" for dissertations, thesis, research report and research paper should be 6inches x 9inches.

6.3 ELECTRONIC COPIES

- (a) Dissertations, theses, reports and papers are also required to be submitted to the DPRTC both as a single pdf and single word file with the identical format to the hardbound copy. Compression, password protection, or digital signatures are not

allowed. Supplemental files that do not lend themselves to inclusion in a written document (such as music or video) may also be included but must be linked to text or described within the .pdf or word document.

- (b) The single .pdf and word file can be bookmarked and hyperlinked to aid navigation. It is recommended that, at a minimum, the table of contents contains hyperlinks to each section, and each item in the table of contents and the table of contents itself are listed as a bookmark. Figures and tables may be linked to the table of contents or the text within the main body of the document.
- (c) Candidates will also be required to submit in a separate cover, one electronic copy of an extract giving a short account of the dissertation/thesis/report/paper. The extract shall include a running title, an introduction, a summary of innovative findings, their perceived usefulness in outreach/industrial/commercial applications and an indication of areas where the results may find immediate application opportunities. The extract shall not exceed 1000 words and must be written in both English and Swahili Languages. Any submission without the extract shall be deemed to be incomplete and therefore not ready for an error-free certificate.
- (d) All files, including supplemental files, must be named starting with the year of submission followed by the First and Surname of the student.

7.0 FORMAT FOR POSTGRADUATE DIPLOMA/MASTER'S/PhD RESEARCH PROPOSALS

All postgraduate students are required to use this format in preparing their research proposals

- (a) The cover of the research proposals must contain the following information in the order listed:
 - i. The institution name (i.e. Sokoine University of Agriculture) and logo
 - ii. The College/School/Centre/Directorate and Department in which the student is registered for the study.
 - iii. The degree program (eg. Postgraduate Diploma, Master of Arts, Master of Science, Doctor of Philosophy)
 - iv. The type of document (i.e. Research Proposal)
 - v. The full title of the proposal. The title should not be more than 20 words and should describe the content of the proposal accurately and concisely
 - vi. The full name of the student (starting with the first name).
 - vii. Name(s) of the Principal Supervisor and Co-supervisor(s) if relevant, of the proposed study.
 - viii. The month and year of submission of the research proposal.
- (b) The main body of the research proposal must have the sections assigned with a number in the following order:
 - 1. Introduction - Background information, statement of the problem, study justification, objectives, research questions/hypothesis
 - 2. Literature review - Review only the most pertinent literature; selective and critically paying attention to the state of knowledge on the subject, what remains to be done, methodologies/techniques and expected contribution of your study. Depending on the field of specialisation, students may also present the theoretical, empirical literature reviews as may be related to the topic as well as the conceptual framework guiding the study.

3. Methodology/Material and Methods - Be very concise with special attention to the selection of study area, research /experimental design, study population, sampling procedures, data and data sources, techniques for data collection and analysis procedures.
 4. Schedule of activities and durations
 5. Source(s) of funds and budget
 6. References
 7. A page with signatures of the student and supervisor(s) as well as the date
- (c) The maximum number of pages (including references) should not exceed 10 for a Postgraduate Diploma/MSc/MA proposal and 15 for a PhD proposal, all 1.15 spaced and the font size fixed at 11 points Arial. The number of pages above does not include appendices.
- (d) The proposal must be double-sided printed in A4 paper size (80g/m²).
- (e) The proposal should be spiral bounded.

Appendix A: Sample Cover and specifications



Sokoine University of Agriculture



PhD Thesis

Farming Systems and Household Food Security: the
Case of Kishapu and Mvomero Districts in Tanzania

Goodluck Dastan Massawe

May 2022



Kuhusu Tasnifu Hii

Utafiti huu ulifanyika katika kanda mbili tofauti za ikolojia ya kilimo nchini Tanzania, ambazo ni Wilaya ya Kishapu na Mvomero, ili kubaini mambo makuu yanayopelekea uchaguzi wa mifumo ya kilimo miongoni mwa kaya za wakulima wadogo wadogo na jinsi mifumo hiyo ya kilimo inavyohusiana na usalama wa chakula katika ngazi ya kaya. Taarifa muhimu za utafiti zilikusanywa wakati wa misimu ya kabla na baada ya mavuno kwa mwaka 2014 kutoka kaya 506. Aidha taarifa za ziada zilitokana na tafiti za soko, mahojiano na watoa habari wakuu na mijadala ya vikundi vya wakulima. Mifumo minne kuu ya kilimo ilitambuliwa kwa kuzingatia: mazao yanayolimwa; kiwango cha mwelekeo wa soko kwa mazao muhimu; na idadi ya mifugo vinavyomilikiwa na kaya. Hali ya usalama wa chakula katika kaya ilipimwa kwa kutumia vipimo vya HDDS and HFIAS. Utafiti uligundua kuwa kaya ambazo zilibadilisha vyanzo vyao vya mapato kupitia shughuli zisizo za shamba zilikuwa na uwezekano mkubwa wa kupata chakula bora katika vipindi vya konda (kabla ya kuvuna). Mambo yanayoathiri maamuzi ya kaya kutumia mfumo fulani wa kilimo ulihusiana na ukubwa wa kaya, muktadha wa kilimo na sifa za shamba. Katika maeneo yenye ukame na pembezoni mwa Kishapu, kaya zenye watu wengi zilikuwa na uwezekano mkubwa wa kuchagua mfumo wa kilimo cha mchanganyiko (Mazao na Mifugo), jambo linaloonyesha kwamba ukubwa wa familia ulihakikisha upatikanaji wa nguvukazi zinazohitajika kwa shughuli za ufugaji na upandaji mazao. Katika wilaya ya Mvomero yenye mvua nyingi na inayoweza kufikiwa na watu wengi zaidi, kaya zilikuwa na uwezekano mkubwa wa kutumia mfumo wa kilimo cha zao la Chakula Moja na zililazimika kutafuta kazi nje ya shamba. Utafiti unapendekeza kwamba mikakati ya kuboresha usalama wa chakula katika maeneo ya vijijini inapaswa kujaribu: kuongeza mapato kutokana na kilimo, kukuza shughuli za kuzalisha mapato nje ya shamba, na kukuza mawasiliano ya mabadiliko ya tabia juu ya kile kinachochukuliwa kitamaduni kama chakula katika eneo la utafiti.



Kuhusu Tasnifu Hii

Utafiti huu ulifanyika katika kanda mbili tofauti za kololaji ya kilimo nchini Tanzania, ambazo ni Wilaya ya Kishapu na Mvomero, ili kubaini mambo makuu yanayopelekea uchaguzi wa mfumo wa kilimo mtergoni mwa kaya za wakulima wadogo wadogo na jinsi mfumo huo ya kilimo inavyohusiana na usalama wa chakula katika ngazi ya kaya. Taarifa muhimu za utafiti zilikusanywa wakati wa misimu ya kabla na baada ya mavuno kwa mwaka 2014 kutoka kaya 506. Aicha taarifa za ziada zilitokana na tafiti za soko, mahojiano na watao habari wakuu na mjadala ya vikundi vya wakulima. Mfumo mwanne huu ya kilimo ilitambuliwa kwa kuzingatia mazao yanayolimwa, kwanza cha mwelekeo wa soko kwa mazao muhimu, na idadi ya mifugo vitavyomilikiwa na kaya. Hali ya usalama wa chakula katika kaya lipimwa kwa kutumia vipimo vya HDOS and HFIAS. Utafiti uligandua kuwa kaya ambazo zililidisha vyanzo vya mapato kupitia shughuli zilizozia shamba zilikuwa na uwezekano mkubwa wa kupata chakula lora katika vipindi vya konda (kabila ya kuvuna). Mambo yanayotihini maamuzi ya kaya kutumia mfumo fulani wa kilimo zilikuwiana na utubwa wa kaya, mkadha wa kilimo na sifa za shamba. Katika mienzo yenye ukambi na pembezozi mwa Kishapu, kaya zote wata wengi zilikuwa na uwezekano mkubwa wa kuchagua mfumo wa kilimo cha mchanganyiko (Mazao na Mifugo), jambo linaloonyesha kwamba ukubwa wa familia ulipakilisha upatikanaji wa nguvu/dazi zinazohitajika kwa shughuli za ulugaji na upandaji mazao. Katika wilaya ya Mvomero yenye mvua nyingi na inayoweza kufikiwa na watu wengi zaidi, kaya zilikuwa na uwezekano mkubwa wa kutumia mfumo wa kilimo cha zao la Chakula Moja na zililazimika kutafuta kazi nye ya shamba. Utafiti unapendeleza kwanza mikakazi ya kutorecha usalama wa chakula katika mawazo ya vigaji inapaswa kujaribu: kuongeza mapato kutokana na kilimo, kukuza shughuli za kuzalisha mapato nye ya shamba, na kukuza mawasiliano ya mabadiliko ya tabia juu ya kile kinachochukuliwa kiamaduni kama chakula katika eneo la utafiti.

2022

PhD

Massawe, G.D

Sokoine University of Agriculture



PhD Thesis

Farming Systems and Household Food Security: the Case of Kishapu and Mvomero Districts in Tanzania

Goodluck Dastan Massawe

May 2022

Appendix B: Sample Title Page

**FARMING SYSTEMS AND HOUSEHOLD FOOD SECURITY IN KISHAPU AND
MVOMERO DISTRICTS, TANZANIA**

*Thesis submitted to Sokoine University of Agriculture in Fulfilment of the
Requirements for the Degree of Doctor of Philosophy*

By

Goodluck Dastan Massawe

Supervisors

**Prof Esron D. Karimuribo
Dr Akwilina W. Mwanri**

**Department of Policy, Planning and Management
College of Social Sciences and Humanities
Sokoine University of Agriculture, Morogoro, Tanzania**

November 2021

APPENDIX C: SELECTED SYMBOLS FOR UNITS AND PREFIXES

A	ampere	K	Kelvin
Å	Angstrom	lm	lumen
atm	atmosphere	lx	lux
Bar	Bar	m	metre
c	centi ($\times 10^2$)	m-	milli- ($\times 10^{-3}$)
°C	degree Celsius	mbar	millibar
cal	calorie	M	mega- ($\times 10^3$)
d	day	μ	micro- $\times 10^{-6}$
d-	Deci- ($\times 10^{-1}$)	min	minute (angle)
F	Farad	ml	milliliter
°F	degree Fahrenheit	n-	nano- ($\times 10^{-9}$)
ft	foot (feet)	N	Newton
g	gram	O	Ohm
h	hour	Pa	Pascal
ha	hectare	S	second (time)
hp	horsepower	t	tonne
Hz	hertz	V	volt
J	joule	W	Watt
k	Kilo ($\times 10^3$)		

APPENDIX D: FORMULAE

1. Formulae should be typewritten, if possible leave ample space around the formulae.
2. Subscripts and superscripts should be clear.
3. Greek letters and other non-Latin symbols should be explained in the footnote where they are first used. Take special care to show clearly the difference between zero (0) and the letter O, and between one (1) and the letter l.
4. Give an interpretation of all symbols immediately after the equation in which they are first used.
5. For simple fractions use the solidus (/) instead of a horizontal line, e.g. $1p$ 2m
rather than $\frac{1p}{2m}$
6. Equations should be numbered serially at the right-hand side in parentheses. In general only equations explicitly referred to in the text need be numbered.
7. The use of fractional powers instead of root signs is recommended. Also powers of log e are often more conveniently denoted by exponent.
8. Levels of statistical significance which can be mentioned without further explanation are: *P<0.05, **P<0.01, ***P<0.001.
9. Level of significance for comparable means should be written in superscript in a table and be defined as footnote below the table
10. In chemical formulae, valence of ions should be given as, e.g. Ca²⁺ and CO₃²⁻. Not as Ca⁺⁺ or CO₃⁻.
11. Isotope numbers should precede the symbols, e.g., ¹³O.
12. The repeated writing of chemical formulae in the text is to be avoided where reasonably possible; instead, the name of the compound should be given in full. Exceptions may be made in the case of a very long name occurring very frequently or in the case of a compound being described as the end product of a gravimetric determination (e.g. phosphate as P₂O₅).

APPENDIX E: ABBREVIATIONS

a.e.	acid equivalent	NFE	nitrogen-free extract
a.i.	active ingredient	n.s	no significant difference
AI	artificial insemination	NW	northwest
approx.	Approximately	OM	organic matter
CEC	cation exchange capacity	pH	Hydrogen ion concentration
CF	crude fibre	post-em	post-emergence
cm	centimeter	p.p.m.	parts per million
CP	crude protein	pre-em.	pre-emergence
CV	coefficient of variation	r	correlation coefficient
cv	cultivar	RH	relative humidity
DE	digestible energy	r.p.m.	revolutions per minute
DM	dry matter	s.d.	standard deviation
e.g.	for example	s.e	standard error
F1	first filial generation	SNF	solids not fat
i.e.	for example	sp.	species (singular)
IU	international unit	spp.	species (plural)
LAI	leaf area index	TDN	total digestible nutrients
M	molar	UV	ultraviolet
Max.	maximum	var. vars	variety(ies)
Min.	minimum	wt.	weight
NAR	net assimilation rate	vol.	volume