

Guidelines for preparing an MSc-thesis

at the Chair groups:

FEM: Forest Ecology and Forest Management Group

PEN: Plant Ecology and Nature Conservation Group

REG: Resource Ecology Group

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Preface

In these guidelines you will find all information regarding the requirements and procedures for doing an MSc thesis at the chair groups Forest Ecology and Forest Management (FEM), Plant Ecology and Nature Conservation (PEN) and Resource Ecology Group (REG). These chair groups are part of the Department of Environmental Sciences at Wageningen University and Research.

For additional information, please contact the thesis-coordinator of the appropriate chair group.

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1. Introduction

The MSc-thesis offers the challenge to demonstrate your ability to set up and to carry out a scientific research project in a self-responsible and independent manner. This challenge includes to:

- provide an adequate delineation and definition of your research topic,
- build a sound theoretical framework for orientation of the research,
- generate proper research questions and/or testable hypotheses,
- develop methodology fit for hypothesis testing,
- collect data in a systematic and verifiable manner,
- analyse the data critically and correctly,
- present the results in a comprehensible manner,
- draw sound conclusions based on a comprehensive discussion of the results,
- show the contribution of your results to the development of the research topic.

These guidelines inform you about the steps to be taken and procedures to be followed for preparing an MSc- thesis with the chair groups Forest Ecology and Forest Management (FEM), Plant Ecology and Nature Conservation (PEN) and Resource Ecology Group (REG). These guidelines are an elaboration on the general terms of reference for preparing an MSc thesis at Wageningen University (see study handbook). In some cases, e.g. when the fieldwork of the thesis project is carried out abroad or when it is a part of a larger project, it may be necessary to come to specific arrangements that depart from these guidelines. In that case you should contact your super-visor early enough to make the necessary arrangements. Each chair group has a Thesis coordinator, who you can contact for queries not answered in these guidelines:

FEM:	Prof. Dr. Lourens Poorter,	tel:0317-486216, lourens.poorter@wur.nl
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1.1 Basic requirements and necessary skills

- You can only start a MSc-thesis project when
 - you have been admitted to the MSc programme,
 - you have successfully followed the prerequisite courses (see below), and
 - your study plan has been approved by your (e.g., MFN, MAS, MBI, etc.) study adviser.
- The chair groups have different **prerequisite courses** for their thesis:
 - FEM:** Depending on the topic, but generally: *Ecological Methods 1* (REG-31806) and *Forest Ecology and Management* (FEM-30306)
 - REG:** Depending on the topic, but generally: *Ecological Methods 1* (REG-31806) and *Animal Ecology* (REG-30306)
 - PEN:** Depending on the topic, but generally: *Plant Vegetation & Systems Ecology* (PEN 30306) or *Restoration Ecology* (PEN 30806)
- *Ecological Methods 1* (REG-31806) is highly recommended for PEN as well. Depending on the contents of your MSc-thesis projects other requirements may apply, such as *Models for Forest and Nature Conservation* (INF-21806) or a course on GIS applications. Discuss this with your supervisor.
- Students from other universities have to register at Wageningen University for their thesis project and associated courses.
- It is expected that you have sufficient skills in applying up-to-date software packages for text processing, database and spreadsheet management, presentations and drawings. Special attention should be given to statistical data analysis packages, such as SPSS or R.

2. Elements of the MSc-thesis project

2.1 Selection of a topic

The first step in working on an MSc-thesis is the selection of a topic. There are two different ways to define a topic:

- Topics offered by the chair groups can be found on their Internet pages (see front page), via e-mail, via the university database on thesis and internship subjects (tip.wur.nl) or directly by contacting the supervisors. Some of these topics are offered in co-operation with organisations in the field of forest and nature conservation, such as Staatsbosbeheer, Natuurmonumenten, Tropenbos, WWF, or CIFOR.
- You can suggest your own topic. In this case you first have to discuss the feasibility and relevance of the topic with the thesis coordinator or a potential supervisor from one of the chair groups. It is advised however, to choose a topic that is close to the research being carried out by the chair group, in order to ensure proper supervision and guidance. When you want to do multi- or interdisciplinary work, or when you simultaneously do two studies, then you can do your thesis with two WUR chairgroups, and have two supervisors.
- If you need support in finding a suitable thesis topic you can always contact one of the thesis coordinators.

In case the MSc research is carried out abroad, or co-supervised by another organisation than Wageningen University, adequate scientific supervision must be guaranteed (see 2.2). In this case specific agreements have to be made with the WUR supervisor and thesis coordinator. Possibilities to carry out an MSc-thesis in different European countries also exist through the [EU-Erasmus/Socrates programme](#). You must make all arrangements in time before the start of your thesis work, and your supervisor must agree with this.

2.2 Supervision

During an MSc thesis project, you need the approval of your topic and research proposal by your supervisor. She/he is also responsible for your supervision and for the evaluation of your thesis report. The 1st (main) supervisor is always a lecturer or a (assistant/associate/full) professor of the chair group (=WUR-supervisor).

When you do your thesis project outside the chair group (for instance at a research institute such as Wageningen Environmental Research, or at another university), you also need to have a daily supervisor at the other institute. This should be an academic who is actively involved in scientific research or a PhD-student.

In the thesis contract you have to describe the agreements regarding supervision. You should have contact with your WUR-supervisor at least once a month. When you are abroad, contact your supervisor by email or Skype at least once a month. Of course it is possible to have more frequent contact. Both parties (you and your WUR-supervisor) are responsible for maintaining contact. The right on supervision expires, once you have exceeded your MSc project time with more than 2 months without valid reason, after which an insufficient mark may be given.

2.3 Registration

Once you have decided on a thesis topic and supervisor you should register yourself at the responsible chair group by filling out a registration form.

Registration is done via your supervisor or the chair group's contact person for this.

After registration your name will be added to the list of thesis-students working at the chair group and you will receive all messages of presentations and other relevant meetings at the chair group.

2.4 Preparation for fieldwork in the tropics

When you go abroad to conduct your field work, you **have** to consult the student physician well in advance. The physician provides vaccinations and advice for students leaving for the tropics, **and** conduct examinations before departure and on return from the tropics. You may also contact the GGD (Community Health Service) for this. A prerequisite for students who will carry out their fieldwork in the tropics is that they have passed the course ENT-50303 "*Analysis and Prevention of Health Risks in the Tropics*" or equivalent training.

You should arrange for the necessary visa, and repatriation, health, and travel insurances yourself. Make sure that your insurance covers the entire period of your stay abroad.

Students of Wageningen University & Research who, in the context of their studies, want to travel to a region/area that the [Ministry of Foreign Affairs](#) considers a risk area, need explicit permission for this from the university. The procedure is meant to prepare the student for the trip and forces you to take a closer look into aspects of health and safety in a broad perspective. Follow the [WUR-guidelines and procedure](#) for obtaining such an approval well in advance.

2.5 Preparation of a research proposal

The preparation of a consistent and comprehensive research proposal is an integral part of the thesis work, carried out under supervision of your supervisor at the chair group. You must give proper attention to the research proposal. If done correctly, the proposal can be integrated into the final thesis report (the Introduction and Methods sections). You cannot start your research before your research proposal including the budget and work plan is approved by your supervisor(s). You will receive a grade for the research proposal and research proposal presentation, which contributes to the final grade for the thesis. FEM organizes bi-weekly thesis rings that you are expected to join to improve the writing style and clarity of the proposal and final thesis. Contact your supervisor for information on the thesis ring.

You can find more information on the preparation of a proposal in Annex 1.

2.6 Presentation of the research proposal

After you have drawn up your research proposal, it is a prerequisite to present your research proposal in a **start colloquium** to other MSc students and staff members in order to improve your presentation skills, and to get comments and suggestions for improvement of your research proposal. Discuss the date for your start colloquium with your supervisor. The length of the presentation is usually about 12-15 minutes, followed by 5-10 minutes for discussion and feedback. The presentation should be given in English (even when the MSc-thesis itself will be written in Dutch), so that international students will be able to participate in the discussion. The main goal of an end colloquium is to present research results as clearly as possible (and in an engaging way) to the audience. The goal of a start colloquium is different, you present your research plans in such a way as to get the best possible feedback in order to improve the research setup. Therefore, the focus should much more be on the link between theory, questions and

methodology, and the methodology itself. Where can it be improved? Start colloquia can be tremendously improved if the speakers ask themselves in advance what kind of feedback they want from the audience. What do you consider the main weaknesses? What questions do you want to ask your peers (students) and “experts” (lecturers) ? What knowledge/expertise do you miss?

Spell these questions out on separate slides. A start colloquia can benefit from a longer discussion, because it is about improving the study with help from the audience and not about giving a “trailer” about your upcoming final thesis results. For technical and organizational details on presentations, see 2.10. At FEM you will present your start colloquium to your supervisor only or, in case you go abroad, at the host institution.

2.7 Thesis contract

It is important that you make a planning of your work. Also, you have to make sure that all arrangements are made in order for you to do your research. Is there a workplace that you can use? Is all necessary equipment available? Do you need special software? Have the necessary licences or permits been obtained (e.g., access to conservation areas, or a licence from the Animal Experiment Committee)? What expenses are allowed to make for transport, communication, experimental facilities, chemical analyses, printing, etc.? Which expenses will be paid by the chair group and which by the student? How are data ownership arranged, and data storage, publication rights and (co-)authorship? How is this arranged when your thesis is carried out within the framework of the PhD thesis of a PhD student?

All these matters are dealt with in the thesis contract. The thesis contract indicates the rights and obligations of all parties involved (the student, supervisor, and host institution). The format of the thesis contract can be downloaded from the websites of the chair groups. The thesis contract will only be signed if the proposal and presentation has been approved, and is therefore a go/no-go moment in the thesis progress.

You fill in the thesis contract in consultation with your supervisor(s). The contract contains a summary of the work plan, the facilities that can be used and the expenses involved. It should contain a specified financial plan of the costs, and by whom these costs will be covered: the chair group, an external donor or yourself.

The research proposal should be added as an appendix to the contract. When the research proposal and the budget have been approved, the thesis contract will be signed. A copy of the thesis contract should be presented to your study adviser. The original remains with the administration of the responsible chair group.

2.8 Carrying out the research

You should document your research activities, findings and sources carefully, including also seemingly small details. It is recommended you keep in close contact with the supervisor to discuss the ongoing project. When unforeseeable circumstances occur during your research you will have to adapt your research plan. Changes in your planning must be discussed with, and approved by, your supervisor(s). In case you are working at a different institution than WUR, your local supervisor should also approve the changes.

Keep in mind that you are an ambassador of Wageningen University. Always respect the social, cultural and interpersonal norms and standards. When you have planned to work in forests or conservation areas, you have to obtain permission by the owner and you must at all times follow local guidelines (including rules for collecting samples). You are responsible for the equipment and other material that you use.

During the period that you carry out your research, we expect that you participate in chair group activities such as presentations of research by your fellow-students, and scientific seminars of the chair group. It broadens your view on your study and working field, and an active involvement in scientific discussions within the chair group is part of your scientific training.

2.9 Thesis report

Your research should finally result in a **comprehensive, consistent** and **concise** thesis report. There is no fixed limit to the size of the thesis, but - as a general rule - the size should not exceed 40 pages, excluding annexes. It is also possible to write your thesis in the format of a scientific article, which is usually much shorter than a regular thesis report. Discuss this possibility with your supervisor.

Any publication resulting from your thesis work will be done under the responsibility of the chair group, and needs approval of the chair group and the host institution (in case you carried out your research somewhere else) before being submitted for publication. The supervisor of the chair group is, as a rule, co-author of publications originating from the thesis work. The composition of the author list and the order of authors need to be approved by your supervisor.

Consult Annex 2 for more information on writing the thesis report. We require that you add a copyright statement and that you adhere to the [Conduct for Scientific Practice](#).

2.10 Presentation of your thesis

When you and your supervisor have agreed on the final version of the thesis you will have to give a final thesis presentation. This is an oral presentation of the major findings of your research to other MSc students and staff members of the chair group.

The chair groups have a fixed schedule for these presentations. Appointments for a date and the publication of the announcements should be made through the supervisor at least three weeks in advance.

The length of the final presentation is about 15-20 minutes with c. 10 additional minutes for discussion and feedback. The presentation should be given in English (even when the MSc-thesis itself will be written in Dutch), so that international students can participate in the discussion. We strongly advise you to hold a trial presentation with your supervisor or with your fellow students as part of your preparation.

Check in advance if the technical equipment for your presentation is available and works properly. When you have prepared a PowerPoint presentation, make sure it runs properly on other computers.

FEM: All presentations are scheduled on the first Tuesday of each month. Make an appointment with the secretary of the Forest Ecology and Forest Management group; Mrs. Joke Jansen (room 1.207). The student is obliged to attend all monthly Tuesday presentations during the course of her/his 6 months thesis, while being in the Netherlands.

PEN: Presentations are scheduled on Tuesday mornings. Ask your supervisor who arranges the schedule and make an appointment in consultation with your supervisor. The student is obliged to attend at least 8 presentations of other students or staff.

REG: Presentations are scheduled on the Monday afternoon. Make an appointment via your supervisor who will check the open slots. The student is obliged to attend at least 8 presentations.

2.11 Final examination and grading

The final examination is one of the last steps in the MSc thesis project. You should make an appointment for the exam at least 3 weeks in advance and hand in a hardcopy of your final thesis at least one week prior to the examination date.

The content of the examination will depend on how much the examiners have been involved in the supervision of the project and in the preparation of the thesis. Depending on the chair group the examiners may be your first supervisor and/or one of the

professors of the chair group. Every thesis is evaluated by at least 2 examiners. The examination will last approximately 45 minutes, including questions, discussions, feedback and motivation of the final grade.

The aim of the final examination is to reflect on the entire 'scientific training' process that you have undergone while preparing the MSc-thesis. You can prepare for this with the help of the thesis evaluation sheet (see below). You are expected to be able to place your results and conclusions in the context of the field of science and to indicate the possibilities for application in practice.

All elements of the thesis project are discussed during the final evaluation. The **Thesis Evaluation Sheet** serves as a guideline for the discussions; see the website of the chair groups for more the criteria and weighing factors. Directly after the exam, the overall grade will be determined and discussed with you. Grading will be based on the standard grading scale at Wageningen University ranging from 1 to 10 (extraordinary good), a grade lower than 6 means failure. High grades are generally not given when you exceed your thesis period without a valid reason. As a general reference for grading, the Rubric for thesis-evaluation is used. A grade of a 9 or higher implies that the supervisor is of the opinion that you could qualify to be awarded the degree 'with distinction' (= cum laude) by the Examining Board of the University. This is not an automatic outcome of an algorithm but is based on measured opinions of supervisors and examiners. At the end of the examination, after having received the grade, the student can also give feedback to the supervisor.

The supervisor will pass the grade on to the Central Student Administration. It should be noted, however, that your MSc-thesis work will successfully pass only after all administrative issues (see section 3.5) have been completed.

3. Administrative issues

3.1 MSc-thesis contract, research proposal and financial plan

The practical work for your MSc-thesis project can only start after your supervisor has approved the research proposal with a specified budget and after the MSc-thesis contract has been signed (see 2.4). A copy of the contract and the budget must be presented to the administrative office. A second copy of the contract must be sent to your study adviser.

3.2 Costs associated with the MSc-research

Your MSc-research project should be planned in such a manner that no extra project finances or external funds are required. You should try to rely on existing administrative and logistic support as much as possible. When you expect to make additional costs, consult your supervisor about possibilities to cover these costs.

If you need to make costs beyond the normal expenses for printing and copying the report (e.g., for materials and chemical analysis), you have to provide a specified **financial plan** in advance. In principle only research costs can be included in this financial plan. Travelling and accommodation costs are generally assumed to be paid for by the student. The financial plan has to be agreed upon by the supervisor.

Costs made without the explicit prior agreement of the supervisor will have to be paid by the student. Depending on your thesis contents and the costs involved, you could consider submitting a request for financial support at a funding organisation (e.g., for travel costs, research costs, etc.). Some of the funds are listed in the [Nuffic beursopener](#), or see the Wageningen Universiteits Fonds. You will also find an extensive list of funds at the [WUR website](#). Most of these funding agencies meet only one to two times a year to decide about applications, so apply for funds well in advance (ca 4 months before you are going abroad). For travel funding regulations, consult appendix VIII of the WU Student Charter.

3.3 Participation in MSc-colloquia

In the period that you are working on your project you are expected to attend the MSc-presentation meetings of the chair group. It is mandatory to attend at least 8 colloquia (PEN, REG) or all monthly Tuesday session during your thesis period (FEM) if you carry out an MSc thesis project. Make sure you sign the attendance list, which is circulating during the colloquia, in order to document your attendance.

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3.4 Printing costs

Discuss with your supervisor whether digital copies of your final thesis are sufficient, or if hard copies are required. Hard copies that are to be sent to co-operating organizations can be paid by the chair group, but only if they were mentioned in the financial plan in the thesis contract.

3.5 Completing the administrative requirements

Your final mark will be sent to the Central Student Administration of Wageningen University after you have passed your exam, presented digital copy(s) of your final thesis to your supervisor(s) and a digital copy of the data sets that you collected with clear metadata with descriptions of the variables and their units, the statistical code/syntax, the statistical analyses, and the presentation(s) you prepared (see 3.6) in e.g., a ZIP-file.

3.6 Data storage

Your thesis work represents a significant time investment of you and all parties involved. Your data might be valuable for follow up research, or your work may be part of a greater project, and the data that you have gathered may be included in larger data sets and used in publications. Society increasingly asks that data collected with public money (e.g., through universities) also become publicly available, so that data can be (re)used. It also meets the standards of scientific rigor and transparency, that data and analysis can be checked. Therefore you have to deliver your thesis report and all your data to both your supervisor and partner organisation. Parts of your thesis, like illustrations or graphs, may be used for scientific presentations and educational or promotional purposes (of course with proper references).

Prepare this according to the following specifications:

- Label the Zip-files with your name
- Use different directories for the text of the thesis, raw datasets, analyses etc. and name them accordingly.
- Save both a Word copy and a PDF version of your final thesis document.
- Only the datasets that have been checked for errors should be saved.
- Only save files that contain the raw (but corrected) data or first order calculations based on these data.
- Make a file called "CONTENTS" which describes the contents of the directories and files.
- In data files, all variables must be clearly identified and specified (i.e. abbreviations are explained, units used are declared, etc.). Here you may refer to the appendices in your report.

3.7 Checklist for successful completion of MSc thesis work

<i>Action</i>	<i>Date</i>
1. Determine whether student may start thesis	
2. Determine thesis topic	
3. Registration of MSc-project: fill in the registration form, include student in administrative system and mailing list	
4. For students with fieldwork abroad: ask for permission if your field work site has a safety risk.	
5. Prepare research proposal	
6. Dependent on the chair group, participate in thesis ring.	
7. Approval of research proposal, and approval of the budget	
8. Draw up an MSc-thesis contract, signed by student, supervisor and examiner and give copies to: a.) student, b.) supervisor, c.) secretary, d.) study adviser.	
9. For students with fieldwork abroad: visit the doctor	
10. Arrange date for start colloquium presentation	
11. If requested, send a short summary of the project proposal to editor website	
12. Thesis work	
13. Arrange date for final colloquium	
14. Provide copies of final draft version of the thesis to supervisor and examiner	
15. Check fulfilment of requirements: start presentation, participation in colloquia sessions, final colloquium of own thesis work	
16. Final exam and grading	
17. Examiner/supervisor delivers grade to secretariat	
18. Student delivers copies of MSc thesis to secretarial office or supervisor (more copies dependent on arrangements) and a digital copy with thesis and data	
19. Administrative finalization: <ul data-bbox="331 1718 1067 1807" style="list-style-type: none"><li data-bbox="331 1718 1067 1751">• Send grade to central administration,<li data-bbox="331 1769 1067 1807">• deregister student from mailing list and website	

Annex 1: The Research Proposal

A proposal consists of the following parts:

- **Introduction consisting of Background and Problem statement:** This gives the background and motivation for the selection of the topic and a clear description of the problem field, finally resulting in a concise problem statement. This part includes a review of the theoretical and empirical literature, which is most relevant to the topic and ensures that your work advanced the current stage of knowledge. The theory acts as a base for further investigation and comparison with the (future) results. You must indicate *which* concepts are important to be looked at in answering the research questions.
- **Research objective(s), questions, and hypotheses:** This clearly states the scientific objectives of the research. It is important that the objectives of the research are strictly related to the research topic. Subsequently, the research objective(s) should be translated into 1-3 research questions that need to be answered in order to fulfil the objective(s). Provide for each question clear and testable hypotheses, in which you also explain *why* you expect a certain relationship. If possible, include a conceptual model, in which the relations of the relevant concepts of the applied theories are presented in a graphical way.
- **Research methods:** In this part of the proposal you explain *how* the research questions will be answered. You need to consider the following points:
 - Identify the **character of the thesis work**. Will it be an explorative, a comparative, experimental or design study? What should be the final product: the description of a research object, a theory, the test of a hypothesis, a simulation model, a comparison of scenarios for future developments, a management plan, a design for a nature restoration plan?
 - Develop a **suitable design** for your experiments and observations and choose the methods for applying treatments and data collection. This step requires arguing about, and providing an answer to, questions like:
 - (1) What is your *object* and what kind of *data* do you want from it?
 - (2) What *methods* do you employ to derive the data? What kind of observations and measurements and how many replicates do you need? In case of experimental work: of which factors do you want to test the effect on which response variables? How do you vary these factors? What is the experimental design?
 - (3) Which *instruments* and *facilities* do you need? It is important to think about this far in advance, because not all equipment is available, or it can be in use elsewhere. Sometimes equipment needs to be borrowed from other groups. The following people take care of all fieldwork equipment and materials:
FEM: Mr. Leo Goudzwaard; PEN: Mr. Jan van Walsem, REG: Yorick Liefiting.
 - You should explicitly consider the reliability, validity and replicability of the results of your research.
- **Design the data analysis:** It should be pointed out that the description of the methods is necessary for *data collection* as well as for *data analysis*. How can the data be processed? Which statistical tests can be applied given the employed data collection methods or experimental design? Note that it is important to think about data analysis before you start to collect data. Certain analyses require certain data formats and experimental set-up.
- **Working plan and time schedule:** The research proposal finally should be completed by a comprehensive working plan, indicating the necessary steps in carrying out the research, as well as their logical order in time.

- You need to present a **financial plan**. The necessity of financial means to carry out the thesis work needs to be discussed and agreed between student and supervisor(s) before the actual thesis work starts.
- You need a data storage and sharing plan, an example can be found [here](#).
- Discuss with your supervisor and arrange a place to work, a computer, lab place, sample storage, etc. Also make arrangements (reservations) for the transport facilities, or other logistical prerequisites (licences, etc.). Make prior arrangements with the laboratory staff if you need to use the laboratory facilities. These subjects should be part of your thesis contract. The same applies when working in a different institute than WUR.
- After you have completed your research proposal, you must provide a **short abstract** of your proposal to the web manager. This will be published on the web pages of the chair group.

Annex 2: The thesis

The thesis consists of the following elements:

- **Front page:** This is the cover of your thesis. It should mention the title of the research and the name of the author, names of the supervisors and their chair group or institute. The front page also needs to carry the logo of Wageningen University (and hosting institute if work is carried out elsewhere). You are free in designing the cover page. See Annex 3 for examples.
- **Title page:** This must be in the strict format as shown in Annex 3, containing:
 - Your full name (including all initials)
 - Title of the thesis research
 - Official code and name of the thesis-course
 - Name of the supervisor(s) and chair group or hosting institute
 - Date of publication (month, year)
 - The proper logo of the university
- **Table of contents:** An overview of the chapter structure of the thesis with their respective page numbers. It should also include the summary and annexes.
- **List of tables and figures (optional):** The outline is followed by a list of tables and figures in the text, including their (short) titles and respective page numbers.
- **Summary:** Provides a short (one page) comprehensive summary of the thesis. It contains justification, main research questions (and hypotheses), research design, the most salient results, interpretation, and the wider take home message that answers your question. This is the first thing that people will read, and it is very important that it is strong, crisp and clear.
- **Introduction:** This part includes the problem statement, theoretical background, as well as the research questions, hypotheses, or objectives. In the introduction, you provide a review of the relevant literature and theoretical concepts, including a conceptual model, in which the relations of the relevant concepts of the applied theories are presented in a graphical way. Also indicate what your novel contribution is to the existing literature. You may finish this section with an outline of the structure of the subsequent chapters.
- **Material and methods:** This part reports on the used information sources, the 'material' of your study (research area, plants or animals that you have used), as well as the applied methods and instruments for data collection and data analysis. (Note that 'material' is not the tools that you have used). Briefly explain and justify the design of your research: the experimental variables and the kind of data you have collected in order to answer the research questions. In contrast to the research proposal -where this section is presenting the ambitions/ plan- you must present the situation as it has actually worked (incl. problems that occurred) in the final thesis report. When you have done experimental work, you should give all relevant details of the followed procedure (protocol). This enables others to evaluate your work, and to reproduce it if needed. In the case of fieldwork, you should describe the area and sites where the research was carried out. This may also be done in the next section. This section and the results are normally written in the past tense.
- **Results:** In this section the results should be presented in the most objective and comprehensive manner. Mixing results with subjective interpretation and discussion should be avoided. Avoid description in purely statistical terms, but use ecologically meaningful terms. The challenge is to structure the results in such a way that the research questions are addressed as best. Where appropriate, the findings should be illustrated or summarised with tables and figures. In any case tables and figures must be drawn in such a way that they can be read on their own, independent from

the surrounding text. So make sure that you include legends to all tables and figures that can be read and understood stand alone. Do not forget to include measurement units and an explanation of abbreviations. Colour figures should be avoided. Use grey scales or textures instead. References to tables and figures should be made in the text (e.g., see table 1; cf. figure 2). Note that table captions are given above the table, whereas figure captions are placed below the figure.

- **Discussion:** The discussion section links your own findings, as presented in the result section, with those of others. What do your results mean and imply? You must discuss your findings in the background of the scientific objective(s) and research question(s), as well as in the light of the chosen theoretical framework. The challenge here is to argue for and against the findings and the related theoretical concepts. Literature references are therefore again a requisite in this section. You should also discuss to what extent the findings might have been influenced by the chosen methods, and possible flaws in your data. Structure the discussion in such a way that the research questions are answered and discussed. Do not forget to cite your results (by citing tables and figures). A common format of the discussion is that you start with a brief recap of your main questions and results. You can discuss the results in the same order of your research questions. Give each section a clear header that covers the content, so that the structure is clear. These headers should ideally reflect your research questions, so that for the reader it is clear where the answer to the question will be given. You can start each section with your hypothesis, then explain whether your results are in line with the hypothesis, and if not, why. Also include suggestions for future research on this topic (theoretical framework and methods), and the practical application of the results (consequences for management and policy).
- **Conclusions:** This section brings together the most important findings and consequences of your research. These conclusions normally touch on the scientific objective and the research questions. Note that these aspects should already have been discussed in the discussion, and that the conclusions summarize your “take-home message”. Do not bring in new components into the conclusions.
- **Bibliography:** It is very important that you give proper references when making statements from the literature. References acknowledge the work of others, and provide the reader with information on the sources that you used. In this section a list of all referred literature should be given, sorted in alphabetical order. Make your life easy by using a bibliographic programme like Endnote to make your reference list. The style for the different types of publications (articles in journals, books, chapters in books etc.) should be consistent. When you refer to information on the Internet you should give the complete web-address, as well as the date on which the information has last been accessed (e.g., Ministry of LNV, 2002: Forestry on paper. Public brochure downloadable at <http://www.minlnv.nl/morepaper.pdf>. Information derived on June 15th 2002). Sources from the internet are not always authoritative and should be used sparingly. We strongly suggest you to use appropriate search engines for searching double refereed literature sources, such as Web of Science, Scopus, Biological Abstracts or Google Scholar.

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- **Annex/Appendix:** The annex should include information, which can be missed in the direct text body but is relevant for the understanding of the research or of

important steps of it. This could mean for example: the inclusion of the original data, further detailed statistical analysis, etc. Note that also the annex pages should be numbered consistently with the general text.

Different types of research (e.g., historical research, a literature review) might require a different chapter structure.

Annex 3: Examples Front page and Title page

COVER PAGE:

Wind and storms, trees and forests

PICTURE (optional)

Paul Beaufort
May 2017

AV 2017_18



Thesis title

Author's name

Date

Thesis Registration number

Logo(s)

TITLE PAGE:

Wind and storms, trees and forests

Paul M. Beaufort
May 2017

FEM 80322

Supervisors:
Dr. Ir. L. Breeze
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Forest Ecology and Forest Management group

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