

DOING A THESIS WITH THE  
ENVIRONMENTAL SYSTEMS ANALYSIS GROUP

## INFORMATION BROCHURE FOR STUDENTS STARTING A THESIS

January 2020



Environmental Systems Analysis Group (ESA)  
Environmental Sciences Group (ESG)  
Wageningen University and Research  
Droevendaalsesteeg 3a; Lumen building 100, 2nd floor  
P.O Box 47, 6700 AA Wageningen  
Tel: +31 (0)317 - 484812  
Website: <http://www.esa.wur.nl>  
Thesis coordinators: Dr. Lenny van Bussel and Dr. Jana Verboom  
E-mail: [lenny.vanbussel@wur.nl](mailto:lenny.vanbussel@wur.nl); [jana.verboom@wur.nl](mailto:jana.verboom@wur.nl)

DOING A THESIS WITH THE ENVIRONMENTAL SYSTEMS ANALYSIS GROUP

**INFORMATION BROCHURE FOR STUDENTS  
STARTING A THESIS**

January 2020

## Table of Contents

1	INTRODUCTION .....	4
1.1	Prerequisites .....	4
1.2	Examiners and daily supervisors .....	4
2	LEARNING OUTCOMES OF DOING A THESIS IN THE ESA GROUP .....	6
2.1	Performing research .....	6
2.2	Scientific writing .....	6
2.3	Presenting results orally .....	6
3	THE PROCESS OF WRITING AN MSc THESIS .....	8
3.1	Before starting your thesis.....	9
3.2	Phase 1: Proposal writing (See Appendix B) .....	11
3.3	Phase 2: Performing the research .....	12
3.4	Phase 3: Reporting phase (See also Appendix C and D) .....	12
3.5	After you complete your thesis .....	15
4	GRADING .....	17
4.1	Grading procedure.....	17
4.2	Meaning of grades .....	17
5	WHO MAY BE OF HELP DURING YOUR THESIS WORK.....	19
5.1	Your supervisor .....	19
5.2	Your examiner, the educational co-ordinator or the head of the group .....	19
5.3	Study advisor.....	19
5.4	Student Counsellor .....	19
	APPENDICES .....	21
	Appendix A. Facilities and house rules .....	22
	Appendix B. Guidelines for writing a research proposal.....	23
	Appendix C1. Guidelines for writing a thesis report .....	25
	Appendix C2. Guidelines for writing a scientific text .....	29
	Appendix C3. Title page of thesis report .....	34
	Appendix D. Guidelines for preparing an oral presentation .....	35
	Appendix E. Thesis evaluation form Wageningen University .....	36
	Appendix F. Rubric for assessment of MSc-thesis .....	37

# 1 INTRODUCTION

Welcome at the Environmental Systems Analysis Group. Before you start doing your thesis work, you should read this booklet carefully. It will inform you on what is expected of you. Registration, supervision, facilities at the ESA group, and house rules are described. In addition to the information about the group, you will find guidelines for thesis writing and information on the grading procedure. You will also find a chapter about whom to contact when you face problems with supervision.

## 1.1 Prerequisites

The ESA group offers opportunities for obtaining thesis credit points within MES, MUE, MCL and MBI. The prerequisites for a thesis depend on your master program (please check the study handbook). For most master programs the prerequisites are:

- For a thesis of 30 EC or more, two courses are required:
  - ESA-22806 (ESA: Methods & Applications) **or** ESA-23306 (Introduction to Global Change)
- **and**
  - ESA-31306 (Integrated Ecosystem Assessment in Regional Management) **or** ESA-31806 (Environmental Assessment for Pollution Management).
- For a thesis of less than 30 ECTS, please discuss the prerequisites with your supervisor

### Other preparatory courses

It would be good to consider your thesis topic early in your study programme. If still possible, please discuss recommended courses with your supervisor. If you would like to learn programming or understand the underlying program-codes of models, for example, you are recommended to follow the course INF-22306 (Programming in Python). Other modelling courses that may be of use, depending on your situation and your plans, are MAQ-35806 (Earth Systems Modelling), ENR-21306 (Environmental Economics for Environmental Sciences), INF-31806 (Models for Ecological Systems). GRS-10306 (Introduction to Geo-Information Science) may also be relevant, but can only serve as an **additional** course to your MES study programme.

## 1.2 Examiners and daily supervisors

Theses are examined by the staff members:

- Prof. dr. Rik Leemans (Head of the Group) - [rik.leemans@wur.nl](mailto:rik.leemans@wur.nl) / 484812
- Prof. dr. Lars Hein - [lars.hein@wur.nl](mailto:lars.hein@wur.nl) / 482993
- Prof. dr. Wim de Vries – [wim.devries@wur.nl](mailto:wim.devries@wur.nl) / 486514
- Dr. Bas Amelung - [bas.amelung@wur.nl](mailto:bas.amelung@wur.nl) / 485285
- Dr. Ir. Lenny van Bussel – [lenny.vanbussel@wur.nl](mailto:lenny.vanbussel@wur.nl) / 487763
- Dr. Solen Le Clec'h - [solen.leclech@wur.nl](mailto:solen.leclech@wur.nl)
- Dr. Ir. Karen Fortuin - [karen.fortuin@wur.nl](mailto:karen.fortuin@wur.nl) / 484033
- Dr. Dolf de Groot - [dolf.degroot@wur.nl](mailto:dolf.degroot@wur.nl) / 482247

- Prof. Dr. Niklas Höhne – [niklas.hoehne@wur.nl](mailto:niklas.hoehne@wur.nl)
- Dr. Sophie Rickebusch – [sophie.rickebusch@wur.nl](mailto:sophie.rickebusch@wur.nl) / 484123
- Dr. Zoran Steinmann - [zoran.steinmann@wur.nl](mailto:zoran.steinmann@wur.nl)
- Dr. Jana Verboom - [jana.verboom@wur.nl](mailto:jana.verboom@wur.nl) / 477963
- Dr. ir. Arnold van Vliet - [arnold.vanvliet@wur.nl](mailto:arnold.vanvliet@wur.nl) / 485091
- Dr. ir. Marjolein Lof – [marjolein.lof@wur.nl](mailto:marjolein.lof@wur.nl)
- Dr. Sarahi Nuñez Ramos - [sarahi.nunezramos@wur.nl](mailto:sarahi.nunezramos@wur.nl)
- Dr. Kasper Kok – [kasper.kok@wur.nl](mailto:kasper.kok@wur.nl)

(For the personal profiles of each staff member see <https://www.wur.nl/en/Research-Results/Chair-groups/Environmental-Sciences/Environmental-Systems-Analysis-Group/People.htm>; for a list of possible thesis subjects see <https://www.wur.nl/en/Research-Results/Chair-groups/Environmental-Sciences/Environmental-Systems-Analysis-Group/Education/Possible-thesis-subjects.htm>).

First examiner is often your supervisor. Your daily supervisor may be one of the staff members mentioned above, but can also be one of the PhD students. It is obligatory to have a second examiner. This will be one of the ESA examiners. Often Prof. dr. Rik Leemans, unless he is already your daily supervisor (and first examiner) or not available, in which case the second examiner will be one of the other examiners. Your supervisor will be involved in:

- the approval of your research plan,
- the approval of the oral start presentation of your research plan, and
- the approval and grading of your final thesis and presentation (see also Section 4).

## 2 LEARNING OUTCOMES OF DOING A THESIS IN THE ESA GROUP

We distinguish between several educational aims of doing a thesis in Environmental Systems Analysis. After having completed the thesis, students will be able to (1) prepare, perform and report on scientific research in the field of environmental sciences; and (2) contribute to scientific research in the field of environmental systems analysis. More specifically, we distinguish between educational aims with respect to conducting research, data analysis, scientific writing and presenting research results.

### 2.1 Performing research

Our aim is that after having completed the thesis, students will have learned:

- to explore the background of a given research problem and to critically review scientific literature;
- to define causes and effects of the problem at hand;
- to define the boundaries and the aggregation level of the system to be studied;
- to formulate a project proposal, including research aims, research questions, a research plan, and planning;
- to perform the research following the project proposal;
- to gather, efficiently analyze, interpret and evaluate relevant information;
- to structure the collection and use of relevant data;
- to keep to the research plan (project proposal), and change it if needed;
- to answer the research questions, critically discuss the results and draw conclusions;
- to discuss mid-term and other results with peers and supervisors;
- to solicit advice from others and incorporate it into the research;
- to use the Thesis Ring as a platform for discussion of intermediate results.

### 2.2 Scientific writing<sup>1</sup>

Our aim is that after having completed the thesis, students will be able:

- to write a scientific report or article;
- to structure a scientific text;
- to use correct wording while writing;
- to present the results in a clear way in journal quality tables and figures;
- to formulate a clear discussion and sound conclusions; and
- to formulate and use a data management plan for the correct and structured use of data in preparation of the research.

### 2.3 Presenting results orally

Our aim is that after having completed the thesis, students will be able:

- to prepare a structured, clear and concise presentation;

---

<sup>1</sup> If you are not proficient enough in scientific writing in English, we urgently advise you to take a dedicated course (e.g. ECS-65600 Scientific Writing Skills).

- to effectively communicate the results of their thesis with a scientific audience; and
- to answer questions from the audience in a clear and direct manner.

### ***Thesis Ring***

During the process of designing and writing the Master thesis, students participate in a Thesis Ring of maximum 12 students. The Thesis Ring aims to provide a supportive and encouraging peer learning environment in which work-in-progress is presented, reviewed and discussed. The Thesis Ring is facilitated by Dr. Bas Amelung, who moderates the process and assesses the students' participation and written reviews.

Each student has to enlist for the Thesis Ring in the Thesis Contract. Thesis Rings start in September and February each year. Students present his/her own work-in-progress and review the work of others. Each review round ends with a general discussion. In preparing and presenting their reviews, students learn to understand and analyze the elements of their own research Proposal and Master thesis and acquire critical reading and writing skills. Drafts are uploaded in the Blackboard Thesis Ring web environment. More information can be acquired through your supervisor.

### 3 THE PROCESS OF WRITING AN MSc THESIS

Before starting the MSc thesis the student should select a topic and supervisor and register for the thesis. The MSc thesis itself is usually produced in three phases: proposal writing, performing the research, and reporting. Afterwards, you may in consultation with your supervisor decide to rewrite your thesis for publication in a scientific journal. The Timeline in Figure 1 summarizes the process of writing an MSc thesis (including deadlines and requirements). Exact timing of submissions and meetings can vary student by student. The proposal and final thesis should be uploaded in Turnitin.

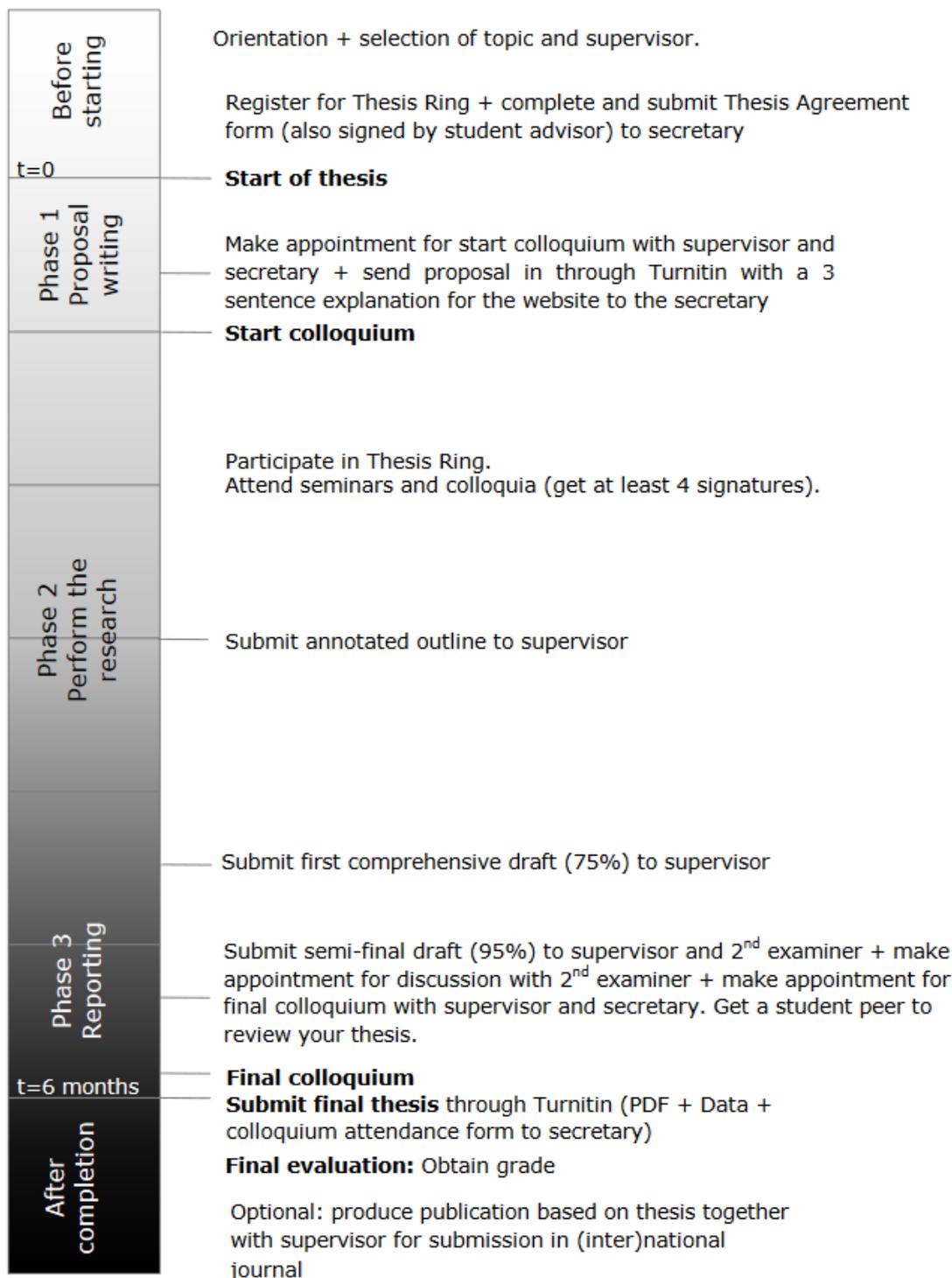


Figure 1. Timeline of thesis project

## **3.1 Before starting your thesis**

### **3.1.1 Orientation meeting to select a topic**

To select a topic, please discuss the possible options with one of the possible examiners (see 1.2) or one of the thesis coordinators Dr. Lenny van Bussel or Jana Verboom. To prepare for this orientation meeting you send in an official written overview of the courses you followed. You can have a look at the overview of the ESA research topics and possible thesis subjects available from our website <http://www.wageningenur.nl/esa>. Depending on the outcome of this meeting, you may have a second meeting with a potential supervisor of the ESA group before deciding on the final topic of your thesis.

### **3.1.2 Registration**

Before starting your thesis work, you should complete the registration form for doing a thesis and joining a thesis ring and return it to the secretary together with your thesis agreement form (see below). Register for Thesis Ring through the coordinator Dr. Bas Amelung.

### **3.1.3 Working place**

Your supervisor and/or the secretary of the ESA group will assign you a working place and introduce you to all members of the ESA group. Please also read the house rules of the Environmental Systems Analysis Group (see Appendix A).

### **3.1.4 Thesis Agreement**

Together with your supervisor you complete a Thesis Agreement to register commitments regarding MSc-thesis work, including commitments on frequency of supervision meetings, working hours and working plan (see also Section 5). Your study advisor will receive a copy and will be asked to check whether you have enough EC credits to start a thesis.

Please note that the contract is not an ‘official’ document that is unchangeable after signing, but just a way to register the appointments you make with your supervisor. The Thesis Agreement can be renewed and adapted to new situations whenever you want. It is a way of registering your student rights and responsibilities during the thesis work.

You can download a word version the thesis contract from this website: <http://www.wageningenur.nl/en/show/Forms-Student-Service-Centre.htm> (Contracts -> Master Thesis Agreement). A copy of the signed Thesis Agreement should be handed in to the secretary before starting the actual thesis work.

### **3.1.5 Data Management Policy**

To ensure adequate and transparent data management and data storage, you are required to set up a Research Data Management Plan (RDMP) for your MSc thesis and to archive all your files at the end of the process. The RDMP should be included in the MSc thesis contract under Point 7: “Arrangements on reporting”. Your data

(including a readme file in the main folder that explains the files' contents) should be provided to the secretary and she will archive it. Your final mark will only be officially registered after the secretary obtained the data.

Please use the template for the RDMP. It is available on the ESA website, under Education → Brochures and forms. Good data documentation ensures that:

- The data are organized appropriately to facilitate efficient data analysis and minimizes errors.
- Data are self-explanatory and understandable to supervisors/project partners in order to facilitate communication and teaching.
- Data can be retrieved, understood and properly interpreted, now and in the future, as their relevant context is available.

### ***Detailed guidelines on data files and folders***

Since the projects within the ESA group generate data of a very diverse nature, we do not provide specific advice on file types to be used. However, please make sure your data are accessible from standard programs, such as .Microsoft Excel (xlsx, .xls or .csv) or Notepad (ASCII files).

Ensure that you include a readme file that explains exactly what files are available in the project folder, so that people not involved in the project are also able to understand what is available and how the results evolved from the original data.

Consider using folders named 'Original data', 'Calculations/scripts/interpretation', 'Final data' and 'Documentation' within your project folder. Folders could be set up according to the following guidelines. Your project folder should contain your name.

#### ***Original data***

- The 'original data' folder should contain original data only and no calculations.
- Missing values are indicated with a dot (e.g. in SPSS) or NA (in R). Any zero should be a true zero.
- Any changes to the data file (e.g. removal of an extreme outlier) should be recorded and the reason should be indicated, together with the originally obtained value (e.g. by insert comment). Note that extreme outliers can only be removed when there are strong indications that something went wrong (for example a value that is physically impossible, or in hindsight the sample appears not to belong to the target population. Just the fact that the value deviates from your other data is not a good reason to omit it!)
- The original data are sacred, so do not mess with it. There is only 1 original data set and any changes made to that should automatically translate into changes in calculated values. *Calculations/scripts/interpretation*

Depending on the nature of your work, you can have a "calculations" (e.g. calculations in excel), "scripts" (e.g. model scripts) and/or "interpretation" (e.g. an overview of how qualitative data are summarised) folder.

- The 'calculations' folder includes all calculations. It should be clear how they are calculated from the raw data so do not "copy -paste to-values"! Instead make direct links to the original values or information.

- All the scripts used to obtain the final data are stored in the ‘scripts’ folder.
- All manipulations used to summarise qualitative data are stored in the ‘interpretation’ folder.
- Make sure that your calculations and scripts are understandable for others to allow for a complete reconstruction of the data analysis. Do add comment lines to explain what is calculated.
- Include the units of expression.
- As there is only one unique sheet containing the raw data, derived parameters will automatically be recalculated when there is a change in the raw data file.

#### *Final data*

- The ‘final data’ folder contains the data used as results from the previous calculations. The data can be used for statistical analysis, to make figures etc.
- Ensure that the data contain the correct number of decimals, so that they correspond with the precision of the observation.

#### *Documentation*

This worksheet presents basic information about the project (title, persons involved) and a list of related files with metadata, original lab files, publications etc. The exact information required will depend on the project.

### **3.2 Phase 1: Proposal writing (See Appendix B)**

When you start your thesis work, you have chosen a subject and perhaps discussed a possible research focus with your supervisor. A detailed project plan, however, still needs to be written. It will take usually several weeks to complete a good proposal. This phase is a preparation for the actual research that is carried out in phase 2.

The most important activities within this phase are:

- to explore the background of the chosen research problem and to critically review scientific literature using several search engines. These are available through the library: <http://library.wur.nl>;
- to define causes and effects of the problem at hand;
- to define the boundaries and the aggregation level of the problem (or system) to be studied;
- to formulate a project proposal, including research aims, research questions, a research plan, data management plan, and the time planning in a GANTT chart
- to present the research proposal to the ESA research group in an oral presentation to inform the group about the research plan and to solicit comments to improve the proposal.

During phase 1, you have regular meetings with your supervisor(s) to discuss progress. Your supervisor(s) will judge the quality of the proposal. It has to comply with basic scientific quality criteria (i.e. clear problem statement, objective and research questions and well-motivated research approach and planning). Developing an adequate research proposal is your responsibility. If, after about a one-month writing period, the quality of the proposal remains insufficient, despite proper advice from you supervisor(s), the proposal may be rejected. A consequence of rejection may be that another subject or even another chair group may have to be chosen.

The final draft of your research proposal is presented in a so-called “Start Colloquium” to staff and students of the Environmental Systems Analysis group. Please send your proposal together with three lines explaining your research (for the website) to the secretary after you made the appointment for the colloquium.

Your supervisor(s) will provide you with written comments on your final draft, and with suggestions to improve or further clarify the problem statement, objective and research questions, and enhance the methodology. They will also give feedback on your English language skills, in terms of both grammar and style. You should take these comments seriously while elaborating your research and writing your final thesis. After all, completing the proposal does not end its role. The proposal constitutes the thesis’ foundations and often forms an essential part of the introduction chapter.

### 3.3 Phase 2: Performing the research

During Phase 2 the research is carried out. Important activities are:

- to perform the research as outlined in the project proposal;
- to gather, analyse, interpret and evaluate relevant information;
- to keep to the research plan (project proposal), and change it if needed;
- to answer the research questions, critically discuss the results and draw conclusions; and
- to write draft chapters for the report on results and conclusions.

During Phase 2, your supervisor will closely guide your research, in particular in the early phase. When the research proceeds, you will learn to work more individually, and take your own initiatives. A fieldwork period of several months may be part of Phase 2, sometimes abroad. During Phase 2 you will start writing chapters for the final report. Meetings with the supervisor will take place on a regular basis, preferably once every two weeks (in case of fieldwork abroad, regular email or Skype contact is advised). During these meetings the progress is discussed, as well as possible problems. Be aware, however, that most supervisors have other research and teaching responsibilities and can be busy. You are responsible to regularly report on progress, ask advice and request for appointments. You can always make a formal appointment through the ESA secretariat.

### 3.4 Phase 3: Reporting phase (See also Appendix C and D)

After you have accomplished your research (field work, analysis and preparation of the results) you will have to document this in your thesis. The thesis report should be written in English and should be as concise as possible: the core-text should not be longer than approximately 75 pages (single spaced, 12pt font Times New Roman).

**Write concise and comprehensively and structure your thesis in a logical way!**

Additional material (e.g. questionnaires, model code and basic data) can be added in appendices.

During phase 3, students will meet with their supervisors on a regular basis (preferably once per one or two weeks). Planning the meetings with examiners, providing them with the drafts of the thesis and organizing the final seminar by selecting a time

through the Environmental Systems Analysis secretariat should be done in close cooperation with your supervisor but is all your responsibility.

It is strongly advised to finalise all these activities before starting a new thesis or internship. Writing a thesis is usually a time-consuming activity. Both students and supervisors need to be aware from the beginning that planning a project is not an easy task. It is important that all the work for the thesis (including report writing and presenting the results) is finalised within the period agreed upon at the start of the project. Learning how to plan is an important part of the project.

Below a more detailed overview is given of the main activities in this phase.

### 3.4.1 Phase 3.1. Finalisation of the report

You are to some extent free to choose the format of the report but it should, in any case, be based on the following structure (see also Appendix C):

- preface;
- summary;
- introduction;
- method;
- results (usually several chapters);
- discussion;
- conclusions (and recommendations);
- references; and
- appendices.

During the reporting phase you will produce different (intermediate) products:

#### (1) Annotated outline

At the beginning of phase 3 (usually 2-3 months before the end of your thesis project) you should hand in an *annotated outline* of your thesis report. This is a document of a few pages with the complete table of contents and a brief description of the content of each chapter.

#### (2) Intermediate drafts

Depending on the topic and arrangements with your supervisor, several drafts will be written and discussed. At least 6 weeks before the end of your project you should have a *first comprehensive draft* of your thesis report, approximately 75% ready and containing all the basic information (but some elements may still be missing or need further analysis). **This version will be discussed in detail with your supervisor**, who may suggest major changes in the structure and content but usually no new data should be collected after this date.

This will also be a moment for reflection and evaluation of your work to discuss if all is going according to plan and if the final result will (at least) be satisfactory.

#### (3) Semi-final draft

The *semi-final draft* of the report needs to be handed in as an MS-Word document to the supervisor and the second examiner at least 2 weeks before the end of the thesis project (and before your final presentation). This version is almost finished

(at 95% of the text ready) and, from your point of view, only needs minor editorial work (e.g. on some figures, tables, references and/or overall layout). Also the summary is included. **This draft will be discussed during a one-hour appointment with the second examiner**

(usually the head of the group, in case (s)he is not your direct supervisor). The examiner can suggest changes to improve the final thesis. You should make an appointment with him/her through the ESA-secretariat. **Note:** examiners need at least a week to read and comment on your thesis, so submit the 95%-ready thesis in time. Making an appointment on short notice is often difficult. Make sure to arrange your appointment well in advance and consider that during some periods (e.g. the summer vacation in July and August) examiners may not be available.

After the final presentation (see further) you still have some time (1-2 weeks) to make the final changes before submitting the final thesis report.

#### **(4) Final report**

The *final report* needs to be available at the end of the project. Upload the final word version in Turnitin. Please hand in a PDF file of the final report and the data file to each of your supervisor(s), and to the secretariat of the Environmental Systems Analysis Group. If you did fieldwork, please consider sending electronic copies of the report to your local supervisors. If you have a lot of material, you can choose to provide a USB stick to your supervisors with the PDF of your thesis and data, the main literature used, pictures from the fieldwork, etc. Please discuss with your supervisor(s).

### **3.4.2 Authorship**

A thesis can consist of chapters that are written in collaboration with other authors. Also for these chapters, the common guidelines for authorship should be followed and hence co-authors should also be mentioned in the relevant chapters. The guidelines can be found here: <http://www.wageningenur.nl/en/article/Recommendations-forauthorship-in-scientific-publications.htm>

The introduction and the general discussion should be written by you as single author. In these chapters you can show your ability to place your own work in a broader perspective.

### **3.4.3 Phase 3.2. Oral presentation**

At least 1 week before the end of the project, you will present the results to other students, staff of the Environmental Systems Analysis Group and other people who are interested.

Please make an appointment for the final presentation with the secretary of the ESA Group (after consultation with your supervisor). She will forward an announcement for the presentation to all ESA students and staff and ensure the announcement is posted on the intranet for all MES, MCL and MUE students.

Preparation of the oral presentation will be done with the help of the supervisor. You will discuss and, if necessary, practice the presentation with your supervisor, at least a week

before the actual presentation. The supervisor will comment on the content and structure of the presentation, and on your presentation skills. Your supervisor will evaluate the actual presentation with you.

The oral presentation takes 20 minutes maximum (plus 10 minutes for discussion). It should at least include (see also Appendix D):

- the title of your thesis;
- outline of the presentation;
- introduction;
- aim of the study / research questions;
- method;
- results;
- discussion points; and
- conclusions (and recommendations).

To stimulate discussion with fellow-students, and to practice reviewing other people's work, the student who is presenting his/her thesis should ask one fellow student to act as "reviewer". These reviewers will read the thesis and start the discussion after the presentation is finished. Reviewers should write a review including answers to the following questions:

- Is the presentation well structured?
- Is the content of the thesis well-presented overall?
- Were the results and conclusions clear?
- After reading the thesis and listening to the presentation, what questions do you still have?

Please ensure that you give constructive feedback. Give feedback in the same way you would like to receive feedback.

We expect all students to attend start and final presentations of their peers. During your thesis you have to attend at least four final thesis presentations, of which you have to be reviewer on one. Please download this form from [www.wageningenur.nl/esa](http://www.wageningenur.nl/esa) and make sure you get signatures of the supervisors of the presenters. Without a completed form you will not be able to graduate. In the case you are unable to attend four presentations, due to fieldwork abroad or a lack of presentations in the period of your thesis, please discuss this with your supervisor.

### **3.5 After you complete your thesis**

Your examiners will determine your final grade based on series of different criteria (see Section 4) and submit the grade to the student administration. Be aware of the required time for supervisor and examiner to read and mark your thesis, when you want to finalize your studies before a specific date, and plan accordingly. This is especially important for the summer period, July and August, when your examiners may have holidays.

The digital (pdf) version of your thesis and the DATA file, which are submitted to the ESA secretariat, will be archived. We do not intend to publish your thesis or provide electronic access on the internet, because the thesis is the result of a research project with clear learning goals and not just research.

If the research findings are innovative and interesting, and your thesis has sufficient scientific quality, your supervisors and examiners will stimulate you to use your thesis as a basis for a scientific publication. Depending on the available resources (e.g. time), you or your supervisor should take a lead in writing such a paper and submitting it to a peer-reviewed scientific journal. Generally, you and your supervisor will be co-authors. A publication can be used for additional outreach, such as an official press release, and will be an asset to your CV

Sometimes, a publisher, who has browsed the titles of different theses on internet, will approach you to publish your thesis as a book. Wageningen University and the ESA group **discourage** students to publish their thesis in such a way. If you are approached by a publisher, we would appreciate if you decline such an invitation.

**Note:** If you want to pursue a broader publication and outreach of your thesis results, you should discuss this first with your supervisor!

## 4 GRADING

### 4.1 Grading procedure

The grading of your thesis will be done after the research has been completed, the final report and data are handed in and after the oral presentation. Both examiners (see Section 1.2) will always be involved in the final grading.

During the final meeting (“examination”) with your supervisor, and preferably with the 2<sup>nd</sup> examiner present, he or she discusses the thesis work with you, explains the strong and weak points of your work and together you will fill in the official “Thesis Assessment Form of Wageningen University” (see Appendix E). The “Rubric for the Assessment of an MSc thesis” (Appendix F) is used to determine the grade for each point of the assessment form. The rubric will also help you to understand the grades better.

Since the supervisors and examiners are very much aware of the importance of the grading, these decisions are not taken lightly. However, in case you have good grounds to disagree on the proposed grade, you can of course express this during the final meeting with your supervisor.

The grading will follow the educational aims, as described above. The final grade will be based on four individual grades for:

- Research competence (40%);
- Thesis report (50%);
- Colloquium (5%); and
- Examination (5%).

Please note that each of these grades must be 6 or higher in order to pass

### 4.2 Meaning of grades

The final grade is based on grades for a) your research skills, b) your research report, c) your oral presentation, and d) your thesis defence (see 4.1). Integrating these aspects is not an easy task. The following guidelines to distinguish between the various grades have proven to be useful. They should, however, be considered indicative and not taken as strict rule. Note that this document only presents the meaning of grades <6, 6, 7, 8, 9 and 10. Intermediate points (e.g. 6.5 or 7.5) can also be given. These reflect performance in between the full grades. Note also that 10 is very rarely given in the Dutch grading system.

Grade lower than 6: This means that the student failed. The quality of his or her thesis work is overall insufficient.

Grade 6: The outcome of the study is acceptable, but below requirements in some respect; the student needed substantial and repeated help in designing the research questions, performing the research and/or writing the results. The final results are acceptable but the thesis has some major shortcomings (for instance in structure and/or clarity in style and/or grammar).

- Grade 7: The outcome of the study (both thesis report and oral presentation) is sufficient; it meets the requirements. The student adequately developed the research proposal and elaborated the research questions according to expectations. The student needed some help but made efficient use of the supervision and showed sufficient progress in research and/or writing skills.
- Grade 8: The outcome of the study is good. The thesis report is clearly structured, comprehensive and well-written. The student was creative in problem solving and worked quite independently. Supervision was more a scientific discussion than methodological guidance. The oral presentation was at least a 7.5.
- Grade 9: The thesis results include several new ideas or findings; the thesis report has minimal flaws and provides a good basis for a scientific publication. The student shows high potential for being an independent researcher. The oral presentation was at least good (8)
- Grade 10: The thesis is truly outstanding and a genuine advance in the scientific field addressed by the student. The results are suitable to submit for publication practically without further modification. The oral presentation was very good to excellent.

If the marks had to be explained in one word, the order would be: (6):acceptable; (7): sufficient, (8): good (9): very good and (10): excellent.

## **5 WHO MAY BE OF HELP DURING YOUR THESIS WORK**

If you face any serious problems or complaints having to do with supervision or evaluation during your thesis work, there are several people of help at Wageningen University. Of course the first one to contact is your supervisor, but if you feel you cannot solve the problem with him/her, don't hesitate to contact others.

### **5.1 Your supervisor**

If students and supervisors face serious problems during the thesis work, they are often concerned with a discrepancy between what was actually happening during the thesis work and what was agreed upon beforehand.

Be sure you make clear agreements on the supervision: how many hours are reserved for supervision, what are the supervisor office hours, what are the periods the supervisor will be absent and who will replace him/her etc. Before you start your thesis work, these agreements you and your supervisor record in the Thesis Agreement. In this contract you also write down agreements regarding reporting, facilities, evaluation etc. The contract will not prevent problems, but it will serve to support a solution to any problems that may occur despite the best intentions of both you and your supervisor.

Try to contact your supervisor regularly and don't hesitate to discuss problems in an early stage!

### **5.2 Your examiner, the educational coordinator or the head of the group**

If you cannot solve the problem with your supervisor, you could contact your examiner, the educational coordinator or the head of the ESA group (see Section 1.2). They will surely be willing to help you solve the problem. You can also choose to contact another staff member.

### **5.3 Study advisor**

Your Study Advisor is always available for questions, advice or comments concerning your study.

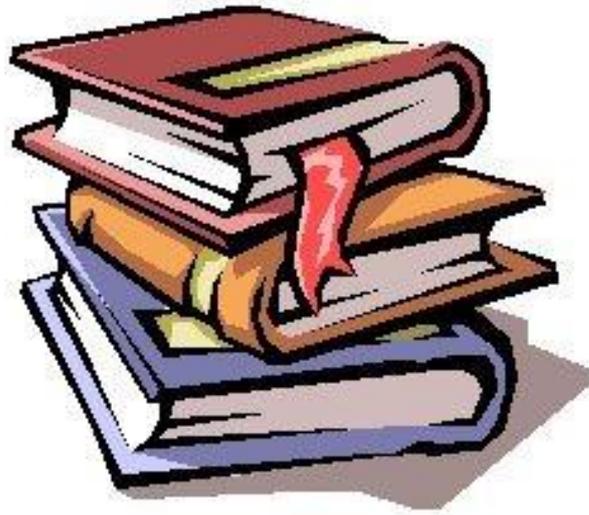
### **5.4 Student Counsellor**

Through the secretariat of the Dean's Office, an appointment can be made with one of the Deans for Students of Wageningen University. The Dean of Students confidentially supports students in practical and personal matters. He or she can be considered as a counsellor who can be contacted in case of personal problems, study problems and other questions.

## 5.5. Writing Lab

The Writing Lab is for all BSc and MSc students at Wageningen University who need coaching and support for their written academic assignments, including MSc theses. Discuss with your supervisor the possible assistance of the Writing Lab for writing your thesis. The sessions are free, visit <https://www.wur.nl/en/article/Wageningen-Writing-Lab-2.htm> for more information.

## APPENDICES



## Appendix A. Facilities and house rules

1. The Environmental Systems Analysis Group is located Droevendaalsesteeg 3, LUMEN Building no. 100, 2nd floor. The secretary is Mrs Mathilde Witteveen (phone 484812; email: [mathilde.witteveen@wur.nl](mailto:mathilde.witteveen@wur.nl)).
2. Several PC's are available for students who work on their theses. Mathilde Witteveen is in charge of allocating these PC's to students.
3. Students must attend at least four colloquia of other students.
4. Students should register for and attend the Thesis Ring meetings. If students are not able to participate in the thesis ring, this should be mentioned and motivated in the thesis contract.
5. Any copies of literature are at your own expense.
6. Students can print letters on WU paper, but only after approval by the supervisor; mailing can be done through the university mail; official letters need a CORSA reference number, which you can only obtain at the secretariat.
7. Any contacts with people outside the university are to be made after consulting the supervisor.
8. For traveling within the Netherlands a small travel budget is available. However, before these trips are made, the student needs to make an estimate of the costs and discuss this with their supervisor. Students are allowed to use the ESA group's NS Business Card for their trips. They should inform the secretary about their travel dates and destinations before they start using the card. Overnight stays in connection with the fieldwork should be paid for by the students themselves.
9. International phone calls are at students own expense.
10. At the end of the thesis project, students receive an e-mail with an evaluation form to evaluate the supervision received. Please complete this form.



## Appendix B. Guidelines for writing a research proposal

Usually it takes a few weeks to write a project proposal of about 5 pages (max 10, including possible appendices).

This proposal needs to include at least the following:

### 1. Title of the project

The title should be concise. It is usually a summary of the problem statement and may include a geographic reference to a specific case study area. **1. Introduction**

The introduction includes the background of the problem, a ‘problem statement’, and provides an overview of the scientific literature<sup>2</sup>, summarising what is known about the subject. It gives a brief reflection on the wider context of the research topic, the scientific and social relevance (why is it important) and how the research idea developed. It shows what is not yet known and still needs to be studied. The introduction is written in such a way that the study's purpose follows logically from the problem statement. It may serve as the basis for chapter 1 of the thesis report.

### 2. Purpose of the study

From the introduction and background, the purpose of the study can be formulated. This is the scientific formulation of what will be achieved in the research. It is followed by a number of research questions that will be answered in order to meet the purpose of the analysis. This formulation of the purpose and research questions will also be used in chapter 1 of the thesis. The analysis of the study should focus on answering the research questions.

### 3. Method

A description is given of how the research questions will be answered. The research method(s) and tools used are described and you should explain why these are the most appropriate for your study. In systems analysis, the research method is often a combination of for example literature study, interviews, modelling, fieldwork, etc. This description of the method may serve as the basis for Chapter 2 of the thesis.

### 4. Planning

This section should give a description of the planning. It shows for each research question when it is to be answered and when draft chapters of the report are due. It also includes time for comments and re-writing, and indicates when presentations are held. The planning may also include a strategic research plan, discussing for example, where the research will be carried out (e.g. fieldwork-site), which organisations will collaborate (if applicable), who will do what (in case of a group-project) etc.

### 5. Supervision

The names of the WUR supervisor(s) are mentioned here as well as possible supervisors or contact people in the fieldwork-site.

### 6. Draft table of contents

The proposal includes a draft table of contents of the thesis. The thesis chapters are referred to in the planning (e.g. a GANTT chart).

---

<sup>2</sup> Use WUR library search options (<http://library.wur.nl/>) and other search programs

## **7. References and contacts**

Make a list of background literature used and the contacts (organisations/persons) that will be used during field work for example to visit for interviews

## **8. Data management plan**

Use the data management template to add a data management plan

## **Appendix C1. Guidelines for writing a thesis report**

Writing a scientific text is not easy and there are several books that can be of help (see Appendix C2). To some extent, you are free to choose the format of the report but it should, in any case, be based on the following structure, and should be as concise as possible. The main text should preferably be less than 50 pages, if necessary followed by a flexible number of pages for Appendices. For writing your thesis it might be helpful to go through a thesis of a former student of ESA, you can borrow such a thesis at the secretary or ask your supervisor.

### **Title Page**

See **Appendix C3** for layout-instructions for the title page and first true page.

### **Preface (usually less than 1 page, max. 2 pages)**

This section provides the institutional context of the study and may describe why you did this research (e.g. how you became interested in the subject). It may include some personal notes on your project, and should include acknowledgements of people who supported you. According to the university's guidelines, you have the opportunity to also acknowledge religious or political/ideological inspirations that you experienced. Statements about religion or politics other than related to the support you experienced are not allowed. Please have the acknowledgements approved by your supervisor before submitting the final version of your thesis. **Table of Contents (preferably 1, max. 2 pages)**

The table of contents should be clear and preferably only include headings of maximum 3 digits. It can be generated automatically using MS Word styles. Lists of Figure, Tables and Appendices can also be added.

### **Summary (1 page max (or 750 words))**

This section summarises your research. It includes some background information, the aim of the study, a short description of the methods used, the most important results of the project and the major discussion points, and conclusions. In the summary you normally use past tense.

### **Introduction (max. 7 pages)**

The introduction (or Chapter 1 of your report) can be largely based on the research proposal. It includes background information (scientific and societal context) and an overview of the most important scientific literature, defines the main terms and concepts used, and describes the current state of the knowledge on the topic of your thesis. It also shows what is unknown or poorly known at present. Then the actual problem statement is specified. From this, the purpose of your study should follow logically, as well as the research questions that will be addressed. The introduction ends with a short outline of the rest of the thesis report. This outline specifies how the different chapters are structured and linked.

Present tense should be used to write the problem statement. The review of literature to describe the current state of knowledge on the topic should be written in past tense (as in “Studies showed that ...”), or in the present perfect tense if it is common knowledge (e.g. Studies have shown that...”).

**Method(s) and literature review (suggested maximum, 8 pages; discuss with supervisor if you think more are needed)**

This section describes how you addressed the research questions and what methods you used. The selection of specific methods must be clearly motivated and you should discuss examples of alternative methods/approaches. It may include a description of your research area, or a description of the models that you used or the scenarios that you formulated. All (main) statements must be clearly supported by literature references. To describe the methods you used, use the past tense.

**Results (as many pages as needed preferably less than 25)**

The results are usually presented in several chapters. These chapters present your results in a clear and concise way. It does not yet draw conclusions. The results are presented as much as possible in tables and figures. It should be very clear to the reader what results are part of your study, and what parts are from other, existing studies or literature. The results are presented in such a way that they logically refer to the research questions formulated in

Chapter 1. Use the past tense to describe your results. **Discussion (max. 5 pages)**

After having described the results, they need to be discussed. This means that you critically address them. First of all, you need to tell the reader about any weaknesses in your approach/methods and the consequent uncertainties in the results and relate these weaknesses to your conclusions. Discuss the weaknesses in such a way that they cannot be used to criticise your research and its conclusions. Secondly, you need to convince the reader that, despite the weaknesses, your approach was appropriate and your results reliable (under the given restrictions). Finally, you need to compare your results to those of other research papers and reports and discuss the differences and similarities. What do they imply for your conclusions?

A smart way to draft your discussion is to first summarise the answers to your research questions and draft your final conclusions. Then criticise your own conclusions (e.g. too little data; not the most appropriate methods; major uncertainties remain; or the conclusions differ from those in other studies) and discuss how these criticisms influence your findings or why they (i.e. the criticisms) are less relevant. You can also indicate in the discussion section how additional research could improve on your results (e.g.: "*Although my limited dataset specified a clear trend, collecting more data would enhance precision*"). This way, your discussion chapter comprehensively links the result chapters and the conclusion chapter, and convinces your audience of the robustness and trustworthiness of your results, findings and conclusions. Use the present tense to discuss your results, the uncertainties of your research and to compare your results to results of other research papers and reports. **Conclusions (max. 5 pages)**

This chapter draws conclusions from the results. Brief answers are given to each research question. The final paragraph of the conclusions provides the synthesised conclusion(s) that address the aim of the study. Use the present tense in the conclusion section.

In addition, recommendations may be formulated for (a) further research, (b) policy makers and/or (c) management implications. If you provide recommendations, your objectives must state that you will give recommendations and clearly identify to whom.

## References

*Cite only references that are relevant and necessary.* Make sure all references listed at the end of the thesis are actually cited in the thesis, and check for accuracy of dates, authors and sources. Avoid citing references that no one else will be able to find (from unpublished sources, for example). The purpose of a good reference list is to allow other scientists to check the reliability of your sources. This means that only retrievable sources should be cited (i.e. no websites).

- The reference list should be consistent and complete and include the main scientific papers, books, book chapters and reports that have been published on the topic of your thesis. Only include references in your list that you used in your text.
- Use a consistent style throughout the report (see below) and preferably use EndNote (or similar reference management software) to manage and generate the reference list.
- Do not use footnotes for your references.
- Please do not use general websites in your reference list because information of websites cannot be checked. Usually there is a report or paper behind a website that you should cite. In case you cannot find the original source, you could add the website and the date accessed to the main text of your thesis. Please add a footnote and do not add the website to your reference list. The only exceptions are reliable websites that provide official data (e.g. Agrostat and CBS).

In the text, you usually refer to another study as follows:

- In the case of one author: (Leemans, 2012);
- In the case of two authors: (Leemans and Amann, 2012); and
- In the case of more than two authors: (Leemans *et al.*, 2012).

The format of the reference list is up to you, but should follow a generally accepted format and in any case include:

- Name of author;
- Year of publication;
- Title of publication;
- Journal name and volume number, or report name and number;
- Pages; and
- In case of books and reports: name and place of publisher.

Please consult some scientific articles to choose a format that you like.

## Figures and tables

*Include only figures and tables that are necessary.* Do not present the same data in both a table and a figure.

- Make sure figures and tables are clear, legible and relevant. Each should be self-explanatory from its caption and legend. Because all figures are explained in a caption, titles are not needed.
- Avoid including extraneous details (lines or data). One well-designed figure or table may save a thousand words, so try to let it speak for itself and avoid unnecessary words to describe what it shows (in the caption as well as in the text).

- All the data is explained in the figure and the precision of the data is indicated by the numbers on the axes. Do not add the actual values in a table below the figures (an MS-Excel option). Each axis in a figure must be clearly labeled and its units must be specified. (note that the current default of Excel is to remove the y-axis. Always add this axis and define its scale accordingly.)
- Clearly refer to the source: in case you copied the entire table or figure from another publication you should cite the original source and require permission to copy it. Most texts, figures and tables from scientific papers and books fall under copyright. Often you will adapt a figure or table from another source, or several sources. In that case you write “adapted from ....”, or “based on”.
- The easiest way to insert figures is to cut/paste them as bitmaps. Then you can always easily scale them and control the text flow around the figures. Complex figures including maps, boxes, arrows and other elements, you can always first create in PowerPoint and then copy and paste them into word as a single bitmap (edit → paste special → bitmap). If you would like to also use the figures in your presentation and/or in a scientific publication, you better save them one by one. For printing and conversion to .pdf it is best to use .eps files. This format is generally also required by publishers. If you keep your thesis file in word format, and in your presentation it is better to use .jpg format. When you save these formats, keep in mind what size you would like these figures to be. You can easily make figures and switch between formats using the open source programme Gimp, or, if you have a licence, Photoshop.

### **Equations**

- Equations should be formatted with the equation editor. Like figures and tables, all equations should also be numbered (e.g. Eq. 1) sequentially.
- Be aware the using an 'x' or '\*' as a multiplication sign is confusing as these symbols are often also used for other purposes. Use the proper multiplication sign (•).
- When you have defined an equation, you specify all the different variables and their unit. Please check that the units on the left side of the equations match the units on the right side.

### **Appendices**

Provide additional material and tables that adds to the findings, that provides source codes etc. Major results should never occur in an appendix.

## Appendix C2. Guidelines for writing a scientific text

There are several books that help you in writing a scientific text, such as a proposal, thesis or paper. We recommend that you make use of:

- Parija, S. C. and Kate, V. (eds) (2017) *Writing and publishing a scientific research paper*. Singapore: Springer. doi: 10.1007/978-981-10-4720-6.  
<https://wur.on.worldcat.org/oclc/997433122> (online available)
- Heard, S. B. (2016) *The scientist's guide to writing : how to write more easily and effectively throughout your scientific career*. Princeton, N.J.: Princeton University Press. doi: 10.1515/9781400881147.  
<https://wur.on.worldcat.org/oclc/1013948940> (online available)
- Mack, C. A. and Society of Photo-optical Instrumentation Engineers (2018) *How to write a good scientific paper*. Bellingham, Washington (1000 20th St. Bellingham WA 98225-6705 USA): SPIE (SPIE Press monograph, PM286). doi: 10.1117/3.2317707.  
<https://wur.on.worldcat.org/oclc/1020276973> (online available)
- Tantra, R. (2019) *A survival guide for research scientists*. Cham: Springer. doi: 10.1007/978-3-030-05435-9.  
<https://wur.on.worldcat.org/oclc/1117630107> (online available)
- <https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing>

Below, some general messages from these books are summarized:

- The purpose of scientific writing is to communicate new scientific findings.
- A scientific report should be as clear and simple as possible: use as much as possible the simplest words available and short sentences.
- The first publication of new scientific results must contain sufficient information to (1) assess observations, (2) repeat experiments, and (3) evaluate the intellectual processes.
- Tables and figures should be self-explanatory. The title of table should be above the table, and the title of the illustration below the graph.
- Make sure your text is original; extensive copying from internet is not allowed. Moreover, where you use text from other authors, ALWAYS provide the correct citation, preferably to the original (primary) source of information. If you are unsure about correct practice to prevent plagiarism, please have a look at the library website: [http://library.wur.nl/infoboard/7\\_citing/](http://library.wur.nl/infoboard/7_citing/).
- Where necessary, obtain permission to copy work (e.g. graphs) from other publications.

As mentioned above, both the proposal and thesis must be based on, and linked to the scientific literature. Statements in the text should be backed up by scientific citations. The proposal and thesis should include a complete list of the references of these citations, all formatted in a similar and consistent way. Access to the scientific literature can be obtained, for example, through Web of Science, Scholar Google and Current Contents. All these scientific literature databases are available through the library desktop services. The Endnote personal scientific library software is also available. This software helps you to store and retrieve the papers, reports and books that you use and helps to properly cite and automate the generation of reference lists in consistent formats. We strongly advise you to use this software: it will save you time by automatically performing some boring tasks. You can also try and use the Mendeley plugin

Prof. Rik Leemans has read many thesis reports and has observed many common weaknesses and mistakes. On the basis of these observations, he has compiled a list of tricks and tips in writing, on grammar, style, use of MS Word and figures:

### English writing and grammar

A few comments on using subordinate clauses (sub-sentences):

- Do not use subordinate clauses (sub-sentences) to convey key messages. Essential information should be presented in a main clause. Sub-sentences are useful to provide additional information.
- Be careful with sub-sentences starting with ‘which’ and ‘that’. In general, ‘which’ and ‘that’ refer to the noun in front of those words and not to the whole sentence. To refer to a whole sentence use a full-stop (‘.’) and start the next sentence with ‘This’.
- Be aware of punctuation (.; ,). Always put a comma after a sub-sentence.
- Always check if it is clear to what words like ‘these’, ‘this’, ‘their’ etc. refer to. When in doubt, use the original word again.
- To ensure clarity and comprehensibility, do not nest subordinate clauses: use only one level of sub-sentences.

### Writing style

Always write a thesis or scientific paper for a specific audience. The expertise of this audience determines what concepts you have to explain and what concepts you can assume are known. When in doubt, provide a definition or explanation of a concept, the first time when you use it. (If it does not fit in the actual text, you can always add a footnote.) If you have to define many different concepts, it could be useful to add a glossary (i.e. a list of words with their definitions).

You can use acronyms in the text. The first time you use an acronym, you should write it in full and add the acronym in brackets. In the remaining text you then **always** use the acronym. Generally, you should not use acronyms in headers or captions, and in the summary. Only use acronyms when they are functional (i.e. used several times). You can add a list of acronyms, explaining all the acronyms that you use in your thesis. But, even when you have added such a list, the first time you use an acronym in the main text, explain it by writing it in full.

When using sub-sentences, the logical information flow with next sentences is often lost. Keep a line of argumentation clear. For example, one student drafted: “**Cryptosporidium is a parasitic protozoan that can cause cryptosporidiosis. A symptom of Cryptosporidiosis is diarrhoea.**”

The main first sentence states that *Cryptosporidium* is a protozoan (i.e. additional information). The second sentence focusses on the disease that *Cryptosporidium* causes. The link between the two sentences is in the sub-sentence, which grammatically links to ‘*protozoan*’. This is confusing and illogical. Correct: “**Cryptosporidium, which is a parasitic protozoan, can cause cryptosporidiosis. Cryptosporidiosis is characterized by diarrhoea.**” Now the subject of the second sentence immediately and logically links to the object of the first sentence, and the added information on being a parasitic protozoan is in the sub sentence. This is also obtained by simplifying the sentences (i.e. replacing symptoms by a synonymous verb).

Be careful with the word ‘of’. Using ‘of’ too frequently leads to wordy sentences. ‘Of’ can often be preplaced using a genitive/’s construction (e.g. the possessions of Rik → Rik’s possessions; or the measurement of temperature → temperature measurement).

English is a language in which many nouns can be replaced by verbs. Doing so often makes the text easier to comprehend. For example:

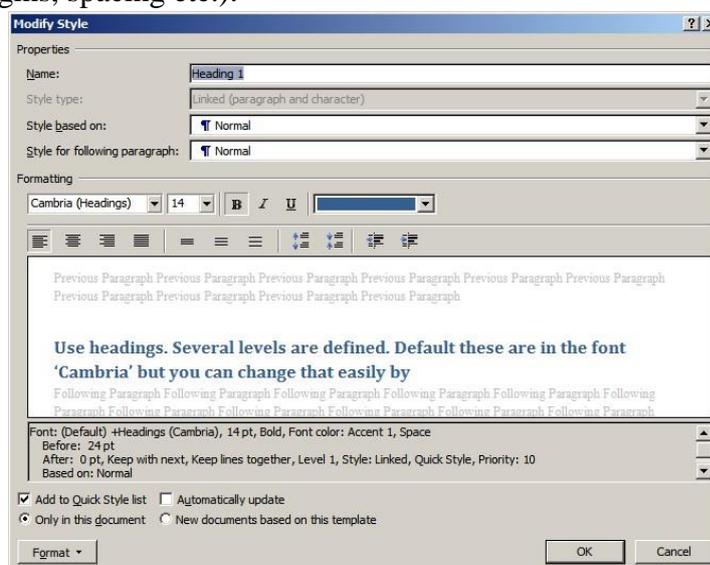
- ‘The aim of this study is ...’ Better → ‘This study aims ...’.
- ‘The development of an approach, which solves the problem, is innovative’ Better → An innovative approach is developed to solve the problem (no ‘of’ and no sub-sentence, resulting in a clearer sentence).

Do not make large jumps between sentences and paragraphs. A reader should be guided through the text in a logical way. This means that sentences within a paragraph should be linked and also the flow between paragraph and sections should be fluid. The logic can often easily be improved by swapping the sequence of words in a sentence or by swapping object and subject. An interesting paper on how to structure your text is given in a Gopen & Swan’s paper “If the reader is to grasp what the writer means, the writer must understand what the reader needs” in the Scientific American <https://www.americanscientist.org/blog/the-long-view/the-science-ofscientific-writing>

### Using MS-WORD styles

Some students still use MS-word as an old-fashioned typewriter. They format the text with the font and paragraph buttons of the MS-Word Home menu. This is fine when you are writing a one-page letter but not with a complex document like a thesis with different chapters. For these documents you should consistently use the styles possibilities and options of the same ‘Home menu’. For more information on using MSA-Word effectively, see ‘Help MS-word’ or <http://office.microsoft.com/en-gb/word-help/style-basics-in-word-HA010230882.aspx?CTT=1>.

Use headings; several levels are defined. Their default font is ‘Cambria’ but you can easily change that by using ‘modify style’ (click right mouse button pointing to the style that you want to change). You get the following menu, where you can change many different aspects (e.g. font, size, colour, margins, spacing etc.):



When ready, click OK and the adjusted style will be used throughout the document. A tip: if you always want to start a new chapter on a new page, just click the option ‘page break before’ in the format-paragraph menu.

Using styles consistently helps you to format the whole document easily and quickly. Having headings defined as styles allows you to automatically include a Table of Content with page

numbers. The same holds for tables and figures: creating separate styles for their captions allows you to automatically generate a Table of Figures or a Table of Tables with page numbers.

## Appendix C3. Title page of thesis report

**Title**  
**Name of student**  
**MSc Thesis in .....[add study  
 program]**  
 Year and month

*PICTURE or DRAWING* to illustrate the thesis-topic  
 (to be selected by student).

Supervised by: \_\_\_\_\_ [name of daily supervisor]

Course code: .....

**Environmental Systems Analysis**



First true page of thesis report

*Title of the thesis*

*Name of Student*  
*MSc Thesis in .....[add study program]*  
*Year and month*

**Supervisor(s):**

1) .....(ESA)

+ contact details

2) .....other WUR group

(or other Univ)

+ contact details

+ .....name of other dept./org. & supervisor (if applicable)

**Examiners:**

1st: .....

(is usually your Supervisor)

2<sup>nd</sup>: .....

(is usually the head of the group

unless he was your supervisor)

Disclaimer: This report is produced by a student of Wageningen University as part of his/her MSc-programme. It is not an official publication of Wageningen University and Research and the content herein does not represent any formal position or representation by Wageningen University and Research.

Copyright © 2020 All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, without the prior consent of the Environmental Systems Analysis group of Wageningen University and Research.

## Appendix D. Guidelines for preparing an oral presentation

The oral presentation (colloquium) is based on a power point presentation and should be 20 minutes maximum, followed by 10 minutes discussion. It should at least include the following subjects:

- The title of your thesis: One slide showing the title, your name and any other information you wish to add;
- Outline of the presentation: One slide telling the audience what they can expect in the coming minutes;
- Introduction: One – two slides giving some background on the thesis subject;
- Aim of the study / research questions: One slide, presenting the questions that will be answered later;
- Method: A few slides giving details on the method you used;
- Results: Several slides, presenting your results;
- Discussion: One or two slides with the main discussion points (e.g. problems encountered or uncertainty in results); and
- Conclusions (and recommendations): One or two slides, addressing your research questions and drawing conclusions and, optionally, the main recommendations.

It is important to prepare your slides carefully. Some general recommendations with respect to slides include:

- Use a large font size (at least 24 points) <sup>3</sup>;
- Do not use too many lines;
- Make sure your slides only contain information that you really talk about; and
- Graphs usually are easier to read by the audience than tables.

It is important to practice your presentation several times before you actually give it. When presenting, please take into account the following:

- Do not stand with your back turned to the audience (look at the audience);
- Talk slowly, give the audience time to think;
- When presenting graphs and tables, take your time to tell the audience what it presents before you start to talk about their content (e.g. when presenting graphs, first explain the x and y axis, before you start to talk about the results);
- When presenting tables, be aware that the audience will not have time and energy to remember all the numbers that are in there. Decide in advance which numbers you think are important in the table, and focus your discussion on them; and
- Use a pointer if you present tables and graphs, to make sure that the audience knows what you are talking about, or highlight (e.g. circle) the elements on which you want to focus in the power point.

---

<sup>3</sup> There is a standard WUR Template for presentations (available from the secretariat) which you can use, but you are free to make your own design (following the above guidelines)

## Appendix E. Thesis evaluation form Wageningen University

Assessment Form MSc Thesis Wageningen University			
Complete the green fields boxed with a single line. Use a point as decimal sign; the default language is English (UK)			
Name chair group			Fee Percentage pe
Name student			Chair Group <input type="text"/>
Registration number			Not applicable <input type="text"/>
Study programme			Not applicable <input type="text"/>
Specialisation			
Code thesis			
Short title thesis			
Country (of fieldwork)	1 CountryName <input type="text"/>		
	2 Not applicable <input type="text"/>		
Date examination			Signature
Supervisor chair group			
Supervisor outside chair group (if any)			
Second reviewer/examiner			
		Grading Mark 1-10	Relative weight *
<b>Research competence (30-60%) *</b>			40%
1 Commitment and perseverance			0.00
2 Initiative and creativity			
3 Independence			
4 Efficiency in working with data			
5 Handling supervisor's comments and development of research skills			
6 Keeping to the time schedule			
<b>Thesis report (30-60%) *</b>			50%
1 Relevance research, clearness goals, delineation research			0.00
2 Theoretical underpinning, use of literature			
3 Use of methods and data			
4 Critical reflection on the research performed (discussion)			
5 Clarity of conclusions and recommendations			
6 Writing skills			
<b>Colloquium (5-10%) *</b>			5%
1 Graphical presentation			0.00
2 Verbal presentation and defence			
<b>Oral Defence (5-10%) *</b>			5%
1 Defence of the thesis			0.00
2 Knowledge of study domain			
* please choose weights such that their sum is 100.			
<b>TOTAL</b>			0.00



## Appendix F. Rubric for assessment of MSc-thesis

Author: Arnold F. Moene, Meteorology and Air Quality Group, Wageningen University, Adjusted for ESA: Lars Hein, 24 May 2011

This document is released under the Creative Commons Attribution-Non-commercial-Share Alike 3.0 Netherlands License

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
1 Research competence (40%) *.						
<b>1.1. Commitment and perseverance</b>	Student is not motivated. Student escapes work and gives up regularly.	Student has little motivation. Tends to be distracted easily. Has given up once or twice.	Student is motivated at times, but often sees the work as a compulsory task. Is distracted from thesis work now and then.	The student is motivated. Overcomes an occasional setback with help of the supervisor.	The student is motivated and/or overcomes an occasional setback on his own and considers the work as his "own" project.	The student is very motivated, goes at length to get the most out of the project. Takes complete control of his own project. Considers setbacks as an extra motivation.
<b>1.2. Initiative and creativity</b>	Student shows no initiative or new ideas at all.	Student picks up some initiatives and/or new ideas suggested by others (e.g. supervisor), but the selection is not motivated.	Student shows some initiative and/or together with the supervisor develops one or two new ideas on minor parts of the research.	Student initiates discussions on new ideas with supervisor and develops one or two own ideas on minor parts of the research.	Student has his own creative ideas on hypothesis formulation, design or data processing.	Innovative research methods and/or data-analysis methods developed. The scientific problem has been formulated by the student with limited or no support from supervisor.
<b>1.3. Independence</b>	The student can only perform the project properly after repeated detailed instructions and with direct help from the supervisor.	The student needs frequent instructions and well-defined tasks from the supervisor and the supervisor needs careful checks to see if all tasks have been performed.	The supervisor is the main responsible for setting out the tasks, but the student is able to perform them mostly independently.	Student selects and plans the tasks together with the supervisor and performs these tasks on his own.	Student plans and performs tasks mostly independently, asks for help from the supervisor when needed.	Student plans and performs tasks independently and organizes his sources of help independently.

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
	No critical self-reflection at all.	No critical self-reflection at all.	Student is able to reflect on his functioning with the help of the supervisor only.	The student occasionally shows critical self-reflection.	Student actively performs critical self-reflection on some aspects of his functioning.	Student actively performs critical self-reflection on various aspects of his own functioning and performance.
<b>1.4. Efficiency in working with data</b> Note: depending on the characteristics of the thesis work, not all three aspects (experimental work, data analysis and model development) may be relevant and some may be omitted	<b>Experimental work</b> Student is not able to set up and/or execute an experiment.	Student is able to execute detailed instructions to some extent, but errors are made often, invalidating (part of) the experiment.	Student is able to execute a methodology that has been designed by someone else (without critical assessment of sources of error and uncertainty).	Student is able to execute a methodology that has been designed by someone else. Takes sources of error and uncertainty into account in a qualitative sense.	Student is able to judge the setup of a scientific methodology and to develop modifications if needed. Takes into account sources of error and uncertainty quantitatively.	Student is able to setup or modify a methodology exactly tailored to answering the research questions. Quantitative consideration of sources of error and uncertainty. Execution of the methodology is flawless.
	<b>Data analysis</b> Student is lost when using data. Is not able to use a spreadsheet program or any other appropriate dataprocessing program.	Student is able to organize the data, but is not able to perform checks and/or simple analyses.	Student is able to organize data and perform some simple checks; but the way the data are used does not clearly contribute to answering of the research questions and/or he is unable to analyse the data independently.	Student is able to organize the data, perform some basic checks and perform basic analyses that contribute to the research question.	Student is able to organize the data, perform commonly used checks and perform some advanced analyses on the data.	Student is able to organize the data, perform thorough checks and perform advanced and original analyses on the data.

	<p><b>Model development</b></p> <p>Student is not able to make any modification/addition to an existing model.</p>	<p>Student modifies an existing model, but errors occur and persist. No validation.</p>	<p>Student is able to make minor modifications (say a single formula) to an existing model. Superficial validation or no validation at all.</p>	<p>Student is able to make major modifications to an existing model, based on literature. Validation using some basic measures of quality.</p>	<p>Student is able to make major modifications to an existing model, based on literature or own analyses. Validation using appropriate statistical measures.</p>	<p>Student is able to develop a model from scratch, or add an important new part to an existing model. Excellent theoretical basis for modelling as well as use of advanced validation methods.</p>
--	--	---	---	--	--	---

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
<p><b>1.5. Handling supervisor's comments and development of research skills</b></p>	<p>Student does not pick up suggestions and ideas of the supervisor.</p>	<p>The supervisor needs to act as an instructor and/or supervisor needs to suggest solutions for problems.</p>	<p>Student incorporates some of the comments of the supervisor, but ignores other without arguments.</p>	<p>Student incorporates most or all of the supervisor's comments.</p>	<p>Supervisor's comments are weighed by the student and asked for when needed.</p>	<p>Supervisor's comments are critically weighed by the student and asked for when needed, also from other staff members or students.</p>
	<p>Knowledge and insight of the student (in relation to the prerequisites) is insufficient and the student is not able to take appropriate action to remedy this.</p>	<p>There is some progress in the research skills of the student, but suggestions of the supervisor are also ignored occasionally.</p>	<p>The student is able to adopt some skills as they are presented during supervision.</p>	<p>The student is able to adopt skills as they are presented during supervision and develops some skills independently as well.</p>	<p>The student is able to adopt new skills mostly independently, and asks for assistance from the supervisor if needed.</p>	<p>The student has knowledge and insight on a scientific level, i.e. he explores solutions on his own, increases skills and knowledge where necessary.</p>
<p><b>1.6. Keeping to the time schedule</b></p>	<p>Final version of thesis or colloquium more than 50% of the nominal period overdue without a valid reason (force majeure).</p>	<p>Final version of thesis or colloquium at most 50% of the nominal period overdue (without a valid reason).</p>	<p>Final version of thesis or colloquium at most 25% of nominal period overdue (without valid reason).</p>	<p>Final version of thesis or colloquium at most 10% of nominal period overdue (without valid reasons).</p>	<p>Final version of thesis or colloquium at most 5% of nominal period overdue (without good reasons).</p>	<p>Final version of thesis and colloquium finished within planned period (or overdue but with good reason).</p>

	No time schedule made.	No realistic time schedule.	Mostly realistic time schedule, but no timely adjustment of time schedule.	Realistic time schedule, with some adjustments (but not enough or not all in time) in times only.	Realistic time schedule, with timely adjustments.	Realistic time schedule, with timely adjustments of both time and tasks.
--	------------------------	-----------------------------	--	---	---	--

2. Thesis report (50%) \*

<b>2.1. Relevance research, clearness goals, delineation</b>	No link is made to existing research on the topic. No research context is described.	The context of the topic at hand is described in broad terms but there is no link between what is known and what will be researched.	The link between the thesis research and existing research does not go beyond the information provided by the supervisor.	Context of the research is defined well, with input from the student. There is a link between the context and research questions.	Context of the research is defined sharply and to-the-point. Research questions emerge directly from the described context.	Thesis research is positioned sharply in the relevant scientific field. Student is able to indicate the novelty and innovation of the research.
--	--	--	---	---	---	---

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
<b>research</b>	There is no researchable research question and the delineation of the research is absent.	Most research questions are unclear, or not researchable and the delineation of the research is weak	At least either the research questions or the delineation of the research are clear.	The research questions and the delineation are mostly clear but could have been defined sharper at some points.	The research questions are clear and researchable and the delineation is clear.	The research questions are clear and formulated to-the-point and limits of the research are well-defined.
<b>2.2. Theoretical underpinning, use of literature</b>	No discussion of underlying theory.	There is some discussion of underlying theory, but the description shows serious errors.	Student has found the relevant theory, but the description has not been tailored to the research at hand or shows occasional errors.	Student has found the relevant theory, and has been partially successful in tailoring the description to the research at hand. Few errors occur.	Student has found the relevant theory, made a synthesis of it, and has been successful in tailoring the description to the research at hand.	Clear, complete and coherent overview of relevant theory on the level of an up-to-date review paper. Exactly tailored to the research at hand.

	No peer-reviewed/primary scientific papers in reference list except for those already suggested by the supervisor.	Only a couple of peerreviewed papers in reference list.	Some peer-reviewed papers in reference list but also a significant body of grey literature.	Relevant peer-reviewed papers in reference list but also some grey literature or text books. Some included references less relevant.	Mostly peer-reviewed papers or specialized monographs in reference list. An occasional reference may be less relevant.	Almost exclusively peerreviewed papers in reference list or specialized monographs (not text books). All papers included are relevant.
<b>2.3. Use of methods and data</b>	No description of methods and/or data.	Research is not reproducible due to insufficient information on data (collection and/or treatment) and analysis methods.	Some aspects of the research regarding data-collection, data-treatment, models or the analysis methods are described insufficiently so that that particular aspect of the research is not reproducible.	Description of the data (collection, treatment) or models as well as the analysis methods used is lacking in a number of places so that at most a more or less similar research could be performed.	Description of the data (collection, treatment) or models as well as the analysis methods used is mostly complete, but exact reproduction of the research is not possible due to lack of some details.	Description of the data (collection, treatment) or models as well as the analysis methods is complete and clear so that exact reproduction of the research is possible.

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
<b>2.4. Critical reflection on the research performed (discussion)</b>	No discussion and/or reflection on the research.  Discussion only touches trivial or very general points of criticism.	Student identifies only some possible weaknesses and/or points at weaknesses which are in reality irrelevant or non-existent.	Student indicates most weaknesses in the research, but does not weigh their impact on the main results relative to each other.	Student indicates most weaknesses in the research and is able to weigh their impact on the main results relative to each other.	Student indicates all weaknesses in the research and weighs them relative to each other. Furthermore, (better) alternatives for the methods used are indicated.	Student is not only able to identify all possible weaknesses in the research, but is also able to indicate which weaknesses affect the conclusions most.

	No confrontation with existing literature.	Confrontation with irrelevant existing literature.	Only trivial reflection vis-à-vis existing literature.	Student identifies only most obvious conflicts and correspondences with existing literature. Student tries to describe the added value of his study but does not relate this to existing research.	Student shows minor and major conflicts and correspondences with literature and can identify the added value of his research relative to existing literature.	Student critically confronts results to existing literature and in case of conflicts is able to weigh own results relative to existing literature.  Student is able to identify the contribution of his work to the development of scientific concepts.
<b>2.5. Clarity of conclusions and recommendations</b>	No link between research questions, results and conclusions.	Conclusions are drawn, but in many cases these are only partial answers to the research question. Conclusions merely repeat results.	Conclusions are linked to the research questions, but not all questions are addressed. Some conclusions are not substantiated by results or merely repeat results.	Most conclusions well-linked to research questions and substantiated by results. Conclusions mostly formulated clearly but some vagueness in wording.	Clear link between research questions and conclusions. All conclusions substantiated by results. Conclusions are formulated exact.	Clear link between research questions and conclusions. Conclusions substantiated by results. Conclusions are formulated exact and concise. Conclusions are grouped/ordered in a logical way.

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
<b>(recommendations are optional)</b>	No recommendations given.	Recommendations are absent or trivial.	Some recommendations are given, but the link of those to the conclusions is not always clear.	Recommendations are welllinked to the conclusions.	Recommendations are to-the point, well-linked to the conclusions and original.	Recommendations are to-the point, well-linked to the conclusions, original and are extensive enough to serve as project description for a new thesis project.

<b>2.6. Writing skills</b>	Thesis is badly structured. In many cases information appears in wrong locations. Level of detail is inappropriate throughout.	Main structure incorrect in some places, and placement of material in different chapters illogical in many places. Level of detail varies widely (information missing, or irrelevant information given).	Main structure is correct, but lower level hierarchy of sections is not logical in places. Some sections have overlapping functions leading to ambiguity in placement of information. Level of detail varies widely (information missing, or irrelevant information given).	Main structure correct, but placement of material in different chapters illogical in places. Level of detail inappropriate in a number of places (irrelevant information given).	Most sections have a clear and unique function. Hierarchy of sections is mostly correct. Ordering of sections is mostly logical. All information occurs at the correct place, with few exceptions. In most places level of detail is appropriate.	Well-structured: each section has a clear and unique function. Hierarchy of sections is correct. Ordering of sections is logical. All information occurs at the correct place. Level of detail is appropriate throughout.
	Formulations in the text are often incorrect/inexact inhibiting a correct interpretation of the text.	Vagueness and/or inexactness in wording occur regularly and affect the interpretation of the text.	The text is ambiguous in some places but this does not always inhibit a correct interpretation of the text.	Formulations in text are predominantly clear and exact. Thesis could have been written more concisely.	Formulations in text are clear and exact, as well as concise.	<i>Textual</i> quality of thesis (or manuscript in the form of a journal paper) is such that it could be acceptable for a peer-reviewed journal.

<b>3. Colloquium (5%) *</b>						
<b>3.1. Graphical presentation</b>	Presentation has no structure.	Presentation has unclear structure.	Presentation is structured, though the audience gets lost in some places.	Presentation has a clear structure with only few exceptions.	Presentation has a clear structure. Mostly a good separation between the main message and side-steps.	Presentation clearly structured, concise and to-the-point. Good separation between the main message and side-steps.
	Unclear lay-out. Unbalanced use of text, graphs, tables or graphics throughout. Too small font size, too many slides.	Lay-out in many places insufficient: too much text and too few graphics (or graphs, tables) or vice versa.	Quality of the layout of the slides is mixed. Inappropriate use of text, tables, graphs and graphics in some places.	Lay-out is mostly clear, with unbalanced use of text, tables, graphs and graphics in few places only.	Lay-out is clear. Appropriate use of text, tables, graphs and graphics.	Lay-out is functional and clear. Clever use of graphs and graphics.

<b>3.2. Verbal presentation and defence</b>	Spoken in such a way that majority of audience could not follow the presentation.	Presentation is uninspired and/or monotonous and/or student reads from slides: attention of audience not captured.	Quality of presentation is mixed: sometimes clear, sometimes hard to follow.	Mostly clearly spoken. Perhaps monotonous in some places.	Clearly spoken.	Relaxed and lively though concentrated presentation. Clearly spoken.
	Level of audience not taken into consideration at all.	Level of audience hardly taken into consideration.	Presentation not at appropriate level of audience.	Level of presentation mostly targeted at audience.	Level of presentation welltargeted at audience. Student is able to adjust to some extent to signals from audience that certain parts are not understood.	Clear take-home message. Level well-targeted at audience. Student is able to adjust to signals from audience that certain parts are not understood.
	Bad timing (way too short or too long).	Timing not well kept (at most 30% deviation from planned time).	Timing not well kept (at most 20% deviation from planned time).	Timing is OK (at most 10% deviation from planned time).	Timing is OK.	Presentation finished well in time.
	Student is not able to answer questions.	Student is able to answer only the simplest questions.	Student answers at least half of the questions appropriately.	Student is able to answer nearly all questions in an appropriate way.	Student is able to answer all questions in an appropriate way, although not to-the-point in some cases.	Student is able to give appropriate, clear and to-the-point answers to all questions.

<b>4. Examination (5%) *</b>						
<b>4.1. Defence of the thesis</b>	Student is not able to defend/discuss his thesis. He does not master the contents.	The student has difficulty to explain the subject matter of the thesis.	Student is able to defend his thesis. He mostly masters the contents of what he wrote, but for a limited number of items he is not able to explain what he did, or why.	Student is able to defend his thesis. He masters the contents of what he wrote, but not beyond that. Is not able to place thesis in scientific or practical context.	Student is able to defend his thesis, including indications where the work could have been done better. Student is able to place thesis in either scientific or practical context.	Student is able to freely discuss the contents of the thesis and to place the thesis in the context of current scientific literature and practical contexts.

<b>4.2. Knowledge of ESA's study domain</b>	Student does not master the most basic knowledge (even below the starting level for the thesis).	The student does not understand all of the subject matter in ESA's study domain.	The student understands the subject matter of the ESA's study domain on a textbook level.	The student understands the subject matter of ESA's study domain, including the literature used in the thesis and in textbooks	Student is well on top of ESA's study domain and subjects discussed in thesis. Not only does he understands but he is also aware of current discussions in the thesis' literature.	Student is well on top of ESA's study domain and subjects discussed in thesis. Not only does she understands but she is also aware of discussions in the literature beyond the thesis' topic.
---	--	--	---	--	--	---