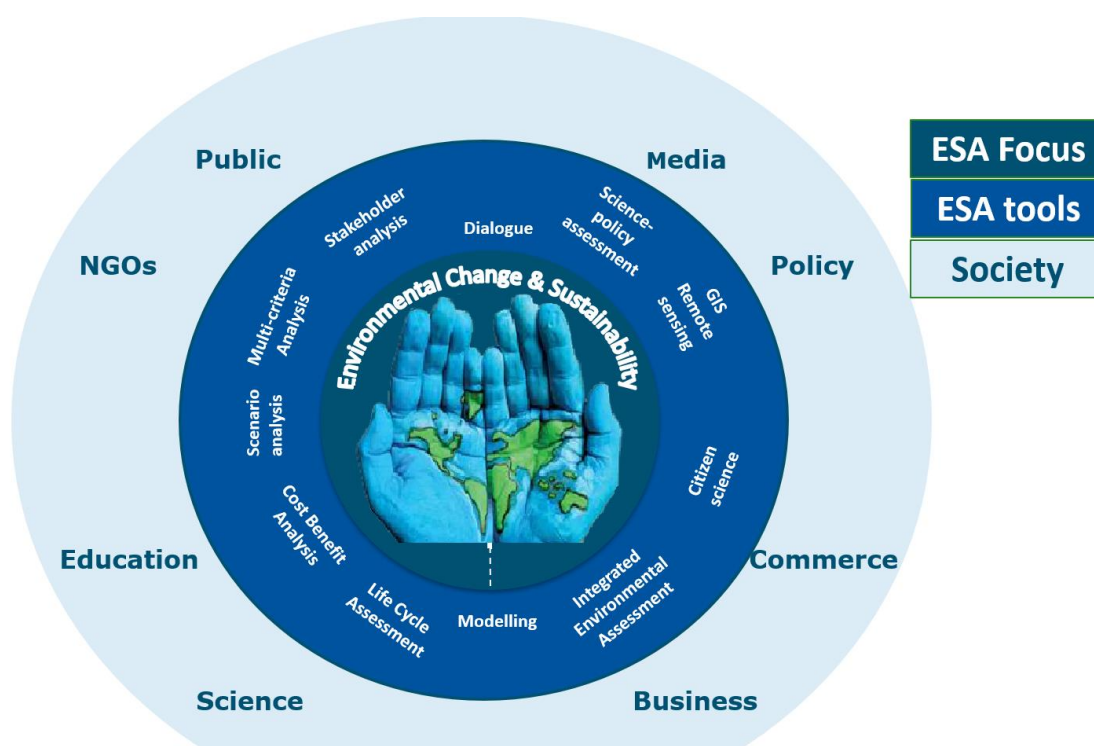


ENVIRONMENTAL SYSTEMS ANALYSIS GROUP

GUIDE FOR ESA THESIS STUDENTS

February 2022



Environmental Systems Analysis Group (ESA)

Environmental Sciences Group (ESG)

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1 INTRODUCTION

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

1.1 Prerequisites

The ESA Group offers opportunities to obtain thesis credit points within MES, MUE, MCL, MTO and MBI. The prerequisites (in total 12 credits) for a thesis depend on MSc program (please check the study handbook). In principle and for most master programmes, the prerequisites for a thesis of 30 EC or more are:

- Compulsory course for all MES, MUE and MCL students is ESA-22806 Environmental Systems Analysis: Methods and Applications.
- MES students must also have passed one of the following three courses: ESA-31806 Nutrient and Pollution Management, ESA-31306 Regional Environmental Management, or ESA-32306 Engaging & Modelling with Stakeholders.
- MUE students must also have passed one of the following two courses: ESA-32306 Engaging & Modelling with Stakeholders or ESA-31306 Regional Environmental Management.
- MCL students must also have passed one of the following two courses: ESA-31806 Nutrient and Pollution Management or ESA-31306 Regional Environmental Management.
- MTO students following the thematic trajectories Tourism & Natural Resources and Tourism & Global Change must have passed the course ENP-31006 Governance of Tourism & Natural Resources.
- MBI students with specialisation C – Health and Disease must have passed the course REG-33306 Disease Ecology and MBI students with specialisation D – Ecology must have passed ENT-30306 Ecological Aspects of Bio-interactions.
- Other MSc students should contact the ESA thesis coordinator.

For a thesis of less than 30 ECTS, please discuss the prerequisites with the supervisor.

Other preparatory courses

It would be good to consider the thesis topic early in the study programme. If still possible, the student is advised to discuss recommended courses with the supervisor. If the student would like to learn programming or understand the underlying program-codes of models, for example, s/he is recommended to follow the course INF-22306 (Programming in Python). Other modelling courses that may be of use, depending on the student's situation and 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 the student's MES study programme.

1.2 Examiners and daily supervisors

Theses are supervised by the following staff members:

- Prof. dr. Carolien Kroeze – carolien.kroeze@wur.nl
- Prof. dr. Rik Leemans – rik.leemans@wur.nl
- Dr. Bas Amelung – bas.amelung@wur.nl
- Prof. dr Rob Alkemade – rob.alkemade@wur.nl
- Dr. Solen Le Clec'h - solen.leclech@wur.nl
- Dr. ir. Karen Fortuin – karen.fortuin@wur.nl
- Prof. dr. Lars Hein – lars.hein@wur.nl
- Prof. dr. Niklas Höhne – niklas.hoehne@wur.nl
- Dr. ir. Marjolein Lof – marjolein.lof@wur.nl
- Dr. Kasper Kok – kasper.kok@wur.nl
- Dr. ir. Koen de Koning – koen.dekoning@wur.nl
- Dr. ir. Gerard Ros – gerard.ros@wur.nl
- Dr. Sophie Rickebusch – sophie.rickebusch@wur.nl
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- Prof. dr. Wim de Vries – wim.devries@wur.nl
- Dr. Mengru Wang – mengru.wang@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>.

The daily supervisor may be one of the staff members mentioned above, but can also be one of the PhD students. The supervisor will be involved in:

- the approval of the research proposal,
- the approval of the oral start presentation of the research proposal,
- a progress evaluation and
- the approval and grading of the final thesis and presentation (see also Section 4).

It is obligatory to have an examiner. The examiner (i.e. ESA examiner) will be identified by the supervisor. The ESA examiner will assess the final version of the thesis. In some cases, an examiner is not needed (e.g. there are two experienced supervisors, one ESA supervisor can then be examiner).

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 identify the knowledge gap in the 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, describing methods, tools and planning;
- to perform the research following the project proposal;
- to gather, efficiently analyse, 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 relate the research outcomes with the wider scientific context;
- 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 writing¹

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.

¹ If the student is not proficient enough in scientific writing in English, we urgently advise to take a dedicated course (e.g. ECS-65600 Scientific Writing Skills).

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;
- 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.

2.4 Additional learning goals

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

- work in compliance with academic codes of conduct, and with proper management of time and resources; and
- make use of input and feedback for executing the research project as well as provide feedback to others.

Thesis Ring

During the process of designing and writing the Master thesis, students participate in a Thesis Ring. 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 should enlist for the Thesis Ring by sending an email to Dr. Bas Amelung (bas.amelung@wur.nl). The student will 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, the student will learn to understand and analyse the elements of their own research proposal and Master thesis and acquire critical reading and writing skills. Drafts are uploaded in the Teams Thesis Ring web page. More information can be acquired through the supervisor.

3 THE PROCESS OF WRITING AN MSc THESIS

Before starting the MSc thesis project, the student should select a topic and supervisor and register for the thesis by starting the case in OSIRIS. See the procedure for doing an MSc thesis with ESA on the ESA website ([ESA website](#)) and the procedure to initiate the administrative processes for the MSc thesis in the [WUR website](#). Note that the administrative process can only be initiated after the student received confirmation from the supervisor.

The MSc thesis itself is usually produced in three phases: proposal writing, performing the research, and reporting. Afterwards, the student may in consultation with the supervisor decide to rewrite the thesis for publication in a scientific journal. The timeline in Figure 1 summarizes the process of writing an MSc thesis (including deadlines and requirements). The exact timing of submissions and meetings can vary student by student. The proposal and final thesis should be uploaded in Turnitin via the ESA Brightspace web page called MSc Thesis & Internship Environmental Systems Analysis - ESA82000_2019_0_+.

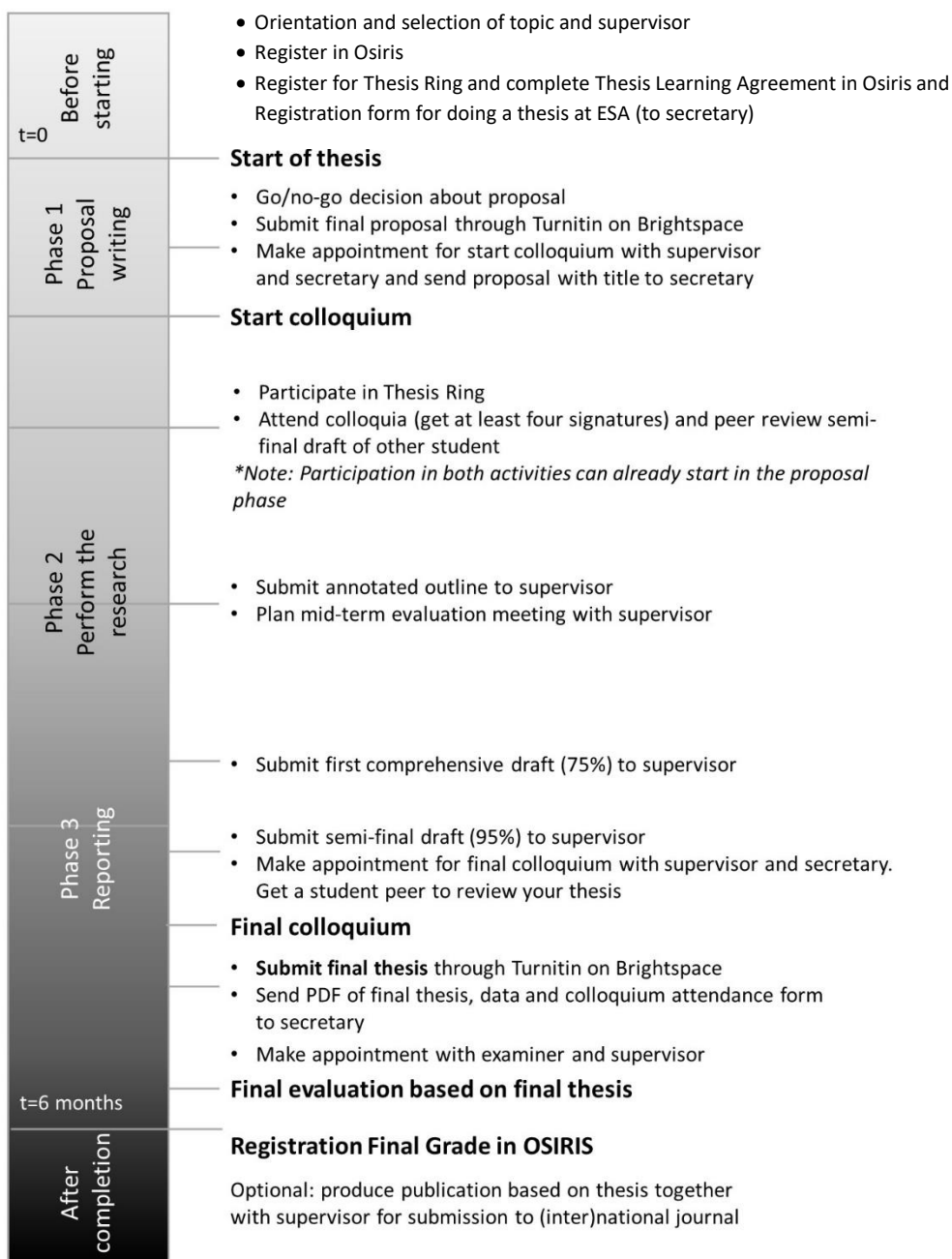


Figure 1. Timeline of thesis project

3.1 Before starting the thesis work

3.1.1 Orientation meeting to select a topic

To select a topic, the student should arrange orientation meeting with one the thesis coordinators Dr. Aritta Suwarno or Dr. Jana Verboom to discuss the possible options for the Thesis. To prepare for this orientation meeting, the student should send in an official written overview of the followed courses. Regarding the research topic, the student should have a look at the overview of the ESA research topics and possible thesis subjects available from our website (ESA Research topics and thesis subjects). Depending on the outcome of this meeting, the student may have a second meeting with a potential supervisor of the ESA group before deciding on the final topic of the thesis. In some cases, the student will have two supervisors from our chair group, or a main supervisor from ESA and a co-supervisor from another chair group. The co-supervisor could also be a colleague from one of the Wageningen Research institutes, such as WENR.

3.1.2 Registration

Before starting the thesis work, the student should **start the case in Osiris** and prepare the **Master Thesis Learning Agreement** to be approved by the supervisor. The student should also register for the Thesis Ring through the coordinator Dr. Bas Amelung (bas.amelung@wur.nl). Attending the thesis ring is voluntary but highly recommended. More information can be found on Brightspace under “MSc Thesis & Internship Environmental Systems Analysis - ESA82000_2019_0_+” (under Thesis ring in the file **Readme** **ESA** **thesis** **ring**: <https://brightspace.wur.nl/d21/le/content/17166/viewContent/817536/View>).

The student also requested to complete the **registration form** for doing a thesis at ESA, the form can be found on the ESA education website under Brochures and Form,s and return it to the ESA secretary.

3.1.3 Working place

The supervisor and/or the secretary of the ESA group will assign the student a working place and introduce him/her 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 Learning Agreement

The student should develop and complete a Master Thesis Learning Agreement, with input from the supervisor, in OSIRIS. Once the student submitted the Master Thesis Learning Agreement in OSIRIS, the supervisor will receive a notification to check this Thesis Learning Agreement and approve, reject or suggest modifications, while the study advisor will also receive a notification to review whether the student has enough ECTS credit to start a thesis and passed all the compulsory course.

In the process of developing and submitting the Master Thesis Learning Agreement, the student could use the Word version from the ESA website (ESA Master Thesis Learning Agreement, see below) and discuss it with the supervisor before copy/pasting it into Osiris. The student can download a partly filled in Word version of the Master Thesis Learning

Agreement from the ESA website ([thesis contract](#)). Please note that the agreement is not an ‘official’ document that is unchangeable after submitting, but just a way to register the appointments the student’s make with the supervisor. The Master Thesis Learning Agreement can be renewed and adapted to new situations. It is a way of registering the student rights and responsibilities during the thesis work. Hence, it is important to also fill the name of study advisor and thesis coordinator in the Master Thesis Learning Agreement.

3.1.5. Data Management Policy

To ensure adequate and transparent data management and data storage, the student is required to set up a Research Data Management Plan (RDMP) for the MSc thesis and to archive all of the files at the end of the process. The RDMP should be included in the MSc thesis contract under Point 7: “Arrangements on reporting”. The data (including a readme file in the main folder that explains the files’ contents) should be provided to the secretary, Mathilde Witteveen, and she will archive it. The 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 ([RDMP template](#)). 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, the student should make sure that the data are accessible from standard programs, such as Microsoft Excel (xlsx, .xls or .csv) or Notepad (ASCII files).

The student should ensure to 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.

The student should consider using folders named ‘Original data’, ‘Calculations/scripts/interpretation’, ‘Final data’ and ‘Documentation’ within the project folder. Folders could be set up according to the following guidelines. The project folder should contain the student’s 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 the 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 work's nature, the student can have a "calculation" (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.
- The student should make sure that the 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)

To start a thesis work, the student must have chosen a subject and perhaps discussed a possible research focus with the 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 WUR library: <https://www.wur.nl/en/Library.htm>;
- 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, the student will have regular meetings with the supervisor(s) to discuss progress, e.g., once every week. The 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 the student's responsibility. The supervisor(s) will provide written comments on the final draft, and with suggestions to improve or further clarify the problem statement, objective and research questions, and enhance the methodology. The student should take these comments seriously while elaborating the research and writing the final thesis.

The final draft of the research proposal is required to share to another ESA supervisor for a **go/no go** decision. If the proposal receives a no go, then depending on the issues encountered, either more time and effort is needed to improve the proposal to an acceptable level, or the student must write a new proposal, possibly about a new thesis subject with another supervisor. The student will have to submit and present a new proposal.

The student will also require presenting **the final research proposal** in a so-called "Start Colloquium" to staff and other thesis students of the Environmental Systems Analysis group. The student needs to send the research proposal together with three lines explaining the research to the secretary after made the appointment for the colloquium. The presentation should be given in English, ideally after the proposal has been evaluated by another ESA supervisor – but the formal approval can also take place after the presentation. After phase 1, the proposal does not end its role. The proposal constitutes the thesis' foundations and often forms an essential part of the introduction chapter. **The student is required to upload the final proposal through Turnitin (Brightspace ESA Thesis Ring).**

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, the supervisor will closely guide the research, in particular in the early phase. When the research proceeds, the student will learn to work more individually, and take initiatives. A fieldwork period of several months may be part of phase 2, sometimes

abroad. During phase 2 the student 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. The student is responsible to regularly report on progress, ask advice and request for appointments.

3.3.1 Mid-term evaluation

During phase 2 the supervisor and the student should plan a mid-term evaluation. The mid-term evaluation meeting is designed to evaluate the progress of the thesis (e.g., using the Rubric MSc thesis) and reflect upon how things are going, where the main room for improvement is, etc. The student is also invited to indicate if anything needs to change in the supervision. Hence, the student is advised to write some short minutes about this meeting.

The progress evaluation functions as an early-warning system to the student and should result in less delay in the final phase of the thesis. In case of problems, this can be a wake-up call for action such as switching to another method to answer the research (sub)questions or seeking help from the writing lab or following a scientific writing course at the library.

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

After the student has accomplished the research (field work and/or other data collection, data analysis and visualisation of the results), the student will have to document this in the thesis. The thesis report should be written in English and should be as concise as possible: approximately 50 pages, including title page, table of content, references, and appendixes. The word limit for the main text (i.e., Introduction to Conclusions) is 20,000. **Write concisely and comprehensively and structure your thesis in a logical way!** Additional material (e.g., questionnaires, model code and basic data) can be added to appendixes.

During phase 3, the student will meet with the supervisor(s) on a regular basis (preferably once every one or two weeks). The student will write the thesis and consult it with the supervisor. Writing a thesis is usually a time-consuming activity. Both the student and the supervisor(s) 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.

Once the supervisor and the student agreed that the thesis is ready (about 90% - 95% draft), the student should ask one of peer students to review this draft thesis. Further, the student is required to start the process of final colloquium by selecting a time through the Environmental Systems Analysis secretariat.

3.4.1 Phase 3.1. Finalisation of the report

The student is free to choose the format of the thesis 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 the student will produce different (intermediate) products:

(1) Annotated outline

At the beginning of phase 3 (usually 2-3 months before the end of thesis project) the student should hand in an *annotated outline* of the 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. The student can take the outline that was part of the proposal as a basis.

(2) Intermediate drafts

Depending on the topic and arrangements with the supervisor, the student could write several drafts and discuss them. At least 6 weeks before the end of the project, the student should have a *first comprehensive draft* of the 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 then be discussed in detail with the 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 the thesis, 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 at least two weeks before the end of the thesis project (and before the final presentation in the final colloquium). This version is almost finished (at 95% of the text ready) and only needs minor editorial work (e.g., on some figures, tables, references and/or overall layout). Also, the summary is included. The supervisor can suggest changes to improve the final thesis. After the final presentation (see further), the student will have restricted time 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. The student is required to hand in a word file and PDF file of the final report to the supervisor who will forward the PDF file to the examiner. **The final report will be discussed during a one-hour appointment with the examiner** (see further). The discussion focuses on the contents of the thesis, in which the student's knowledge, understanding, insights, as well as creativity and scientific attitude are evaluated. The student is expected to be able to place the results and conclusions in the context of the field of science and to indicate possibilities for applying the findings in practice. During this meeting the student is also invited to evaluate the supervision received.

After the discussion with the examiner, the student is requested to upload the final word version in Turnitin at the Brightspace page of the Thesis Ring and hand in a PDF file of the

final report and the data to supervisor(s), and to the secretariat of the Environmental Systems Analysis Group. If the student did fieldwork, it is advised to consider sending electronic copies of the report to the local supervisors. If the student has a lot of material, the student can choose to send the PDF of thesis and data, the main literature used, pictures from the fieldwork, etc. via <https://filesender.surf.nl/>. The student should discuss this option with the 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 the student as single author. In these chapters the student can show the ability to place the work in a broader perspective.

3.4.3 Phase 3.2. Oral presentation and defense

Oral presentation

At least two weeks before the end of the project, the student will present the results to other students, staff of the ESA Group and other people who are interested. **The student is required to make an appointment for the final presentation with the secretary (Mathilde Witteveen,) of the ESA Group** (after consultation with the supervisor). **Note: the final colloquium can only be requested after the supervisor agreed upon the thesis and time.** The ESA Group secretary 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. The student will discuss and, if necessary, practice the presentation with the supervisor, at least a week before the actual presentation. The supervisor will comment on the content and structure of the presentation, and on presentation skills. The supervisor will then evaluate the actual presentation with the student.

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

- the title of the 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 does the student still have?

Note for the fellow student as a reviewer: 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 the start and final presentations of their peers. **During the thesis, the student must attend at least four final thesis presentations, of which he/she must be reviewed on one.** Please download this [attendance form for final presentations](#) and make sure to get signatures of the supervisors of the presenters. **Without a completed form the student will not be able to graduate.** In the case the student is unable to attend four presentations, due to fieldwork abroad or a lack of presentations in the period of the thesis, he/she needs to discuss this with the supervisor.

Oral defense

The examination/oral defense should take ca. one hour. The examiner starts and asks most of the questions, the supervisor(s) can then also ask new questions or follow-up questions. The discussion focuses on the content of the thesis, in which the student's knowledge, understanding, insights, as well as creativity and scientific attitude are evaluated. The student is expected to be able to place the results and conclusions in the wider context of the field of science.

Afterwards, both supervisor and examiner discuss the grades until ideally, they reach consensus on the final grade. In the unlikely case that they do not reach an agreement, a third person, if possible, the chair holder, is asked for advice and decision. The supervisor communicates the final grade and mentions the strong and weak points (see section 4 Grading). The examiner adds to that. If no decision was made, this is communicated. As last agenda point before closing the meeting, the student is asked to give feedback to the supervisor(s) about the supervision. The examiner enters the grade in OSIRIS within 10 days.

The student is expected to provide final version of the thesis and upload it into OSIRIS to be assessed by the examiner. **Note: examiners need at least one to two weeks to read the thesis, so the student must upload the final thesis on time.** Making an appointment on short notice is often difficult, hence it is strongly advised for the student and the supervisor(s) to arrange the appointment with the examiner well in advance and consider that during some periods (e.g., the summer vacation in July and August) examiners may not be available.

3.5 After completing the thesis

The supervisor and examiner will determine the student's final grade based on a series of different criteria (see Section 4) and the examiner will upload the grade in OSIRIS. Be aware of the required time for the supervisor and the examiner to read and mark the thesis, when the student wants to finalize the studies before a specific date, and plan accordingly. This is especially important for the summer period, July and August, when the supervisor and the examiner may have holidays. The student is also required to send Form attendance final presentation and all result of the thesis work (data, computer programs etc.) with proper documentation to ESA secretary (in case the files are large, it is advised to use SURFfilesender).

The digital (pdf) version of the thesis and the DATA file, which are submitted to the ESA secretariat, will be archived. We do not intend to publish the 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. A selection of ESA theses will be uploaded in the WUR thesis library. The student will be asked for approval before his/her thesis is uploaded.

If the research findings are innovative and interesting, and the thesis has sufficient scientific quality, the supervisors and the examiners will stimulate the student to use this thesis as a basis for a scientific publication. Depending on the available resources (e.g., time), the student or the supervisor should take a lead in writing such a paper and submitting it to a peer-reviewed scientific journal. Generally, the student and the 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 the student's CV.

Sometimes, a publisher, who has browsed the titles of different theses on the internet, will approach the student to publish the thesis as a book. Wageningen University and the ESA group **discourage** students from publishing their thesis in such a way. If the student is approached by a publisher, we would appreciate it if the student declined such an invitation. Such publishers don't always have good intentions. The same is true with invitations to present the student's work at a conference or to submit a paper in a journal (so-called predatory publishers).

Note: If the student wants to pursue a broader publication and outreach of his/her thesis results, s/he should discuss this first with the supervisor!

4 GRADING

4.1 Grading procedure

The grading of the thesis will be done after the research has been completed, the final report and data are handed in and after the oral presentation. The supervisor and the examiner (see Section 1.2) will always be involved in the final grading. They fill in the official Thesis Assessment Form of Wageningen University (see Appendix E).

During this final meeting with the supervisor, he or she discusses the thesis work with the student, explains the strong and weak points of the thesis work. The “Rubric for the Assessment of an MSc thesis” is used to determine the grade for each point of the assessment form. The rubric will also help the student to understand the grades better. During this final meeting the student is also invited to give the supervisor feedback on the given supervision.

Since the supervisors and examiners are very much aware of the importance of the grading, the decisions on the grades are not taken lightly. However, in case the student has good grounds to disagree on the proposed grade, s/he can of course express this during the final meeting with the 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) research skills, b) research report, c) oral presentation, and d) 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 THE THESIS WORK

If the student faces any serious problems or complaints having to do with supervision or evaluation during the thesis work, there are several people of help at Wageningen University. Of course, the first one to contact is the supervisor, but if the student feel s/he cannot solve the problem with him/her, it is advised to contact others.

5.1 The 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. Hence, it is advised to make a clear agreement 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 the student start the thesis work, these agreements will be recorded in the Master Thesis Learning Agreement. In this contract, the student will 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 the student and the supervisor.

The student is highly encouraged to contact the supervisor regularly and to discuss problems in an early stage (if any)! As a guideline, the student should contact the primary supervisor at least once every two weeks, unless circumstances do not allow such a frequency.

5.2 The examiner, the educational coordinator or the head of the group

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

5.3 Study advisor

The Study Advisor is always available for questions, advice or comments concerning the study.

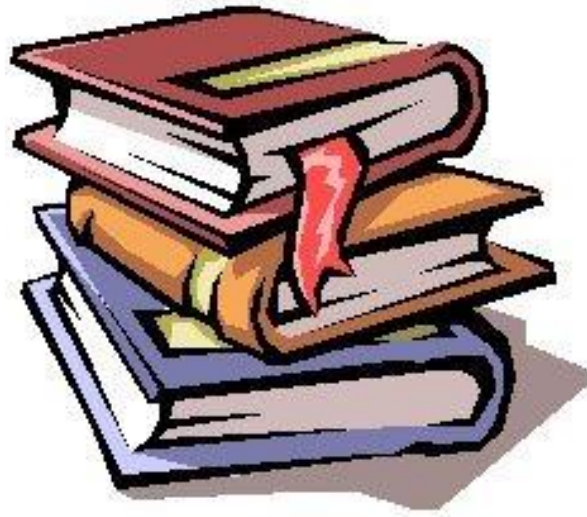
5.4 Student Counsellor

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. The student should discuss with the supervisor the possible assistance of the Writing Lab for writing the thesis. The sessions are free, visit [the Writing Lab](#) 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).
2. Several PC's are available for the students who work on their theses. Mathilde Witteveen is in charge of allocating these PC's to students. The students are also encouraged to participate in the coffee breaks of the ESA group.
3. The students must attend at least four colloquia of other students and peer review at least one thesis of another ESA student
4. The students should register for and attend the Thesis Ring meetings. If the students are not able to participate in the thesis ring, this should be mentioned and motivated in the Master Thesis Learning Agreement.
5. The students must request the ESA secretary to enrol them in OSIRIS-Basis after supervisor approves final thesis and before the examination date.
6. Any copies of literature are at the student's own expense.
7. The 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 can only obtain at the secretariat.
8. Any contacts with people outside the university are to be made after consulting the supervisor.
9. International phone calls are at the student's own expense.
10. At the end of the thesis project, students receive an e-mail about the evaluation of the received supervision? Please complete this evaluation.



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.

2. Introduction

The introduction includes the background of the problem, a ‘problem statement’, and provides an overview of the scientific literature², 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.

3. 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.

4. Method

A description is given of how the research questions will be answered. The research method(s) and tools used are described and should explain why these are the most appropriate for the 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.

5. 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.

6. Supervision

The names of the WUR supervisor(s) are mentioned here as well as possible supervisors or contact people in the fieldwork-site (this can be part of the title page of the proposal).

² Use [WUR library](#) search options and other search programs

7. 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).

8. 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

9. 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, with a word limit of 20,000, 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 included headings of maximum 3 digits. It can be generated automatically using Word Heading 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. Also clearly describe the assumptions you have made. 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. You should indicate which weaknesses affect your conclusions most. 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. NB don't end your thesis with a statement that "more research is necessary" because that will always be the case. If the weaknesses in your research ask for more research, you better state that in the Discussion section.

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 Excel option). Each axis in a figure must be clearly labelled and its units must be specified.
- Clearly refer to the source: in case you copied the entire table or figure from another publication you should cite the original source and even require official 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: [Citing and Referencing](#)
- 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 scientific literature can be obtained, for example, through Web of Science, Scholar Google and Scopus. All these scientific literature databases are available through the WUR library. 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 Headings

Some students still use Word as an old-fashioned typewriter. They format the text with the font and paragraph buttons of the 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 <https://support.microsoft.com/en-us/office/add-a-heading-3eb8b917-56dc-4a17-891a-a026b2c790f2>

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)

Examiner:

1) (ESA)

+ contact details

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Appendix D. Guidelines for preparing an oral presentation

The oral proposal presentation is based on a PowerPoint presentation and should be 10 minutes maximum, followed by 5 minutes discussion. It should at least include the following subjects:

- Background information;
- The problem statement;
- Objective of your research;
- Research questions;
- Methodology that you will apply;
- Planning of your research.

The final oral presentation (colloquium) is based on a PowerPoint 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);
- 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.

Appendix E. Thesis evaluation form Wageningen University

Assessment Form MSc Thesis Wageningen University

version of date 11-11-2021 (version 1.3)

NOTE: each assessor fills in a separate form. The forms need to be uploaded in OSIRIS.

Complete the green fields boxed with a single line. (use decimal point or comma, depending on the language setting of Excel)

Only provide marks for those criteria for which you have sufficient information to make an assessment

Name chair group		<table border="1"> <thead> <tr> <th colspan="2">Fill-in by supervisor chair group</th> </tr> <tr> <th>Fee Percentage per chair group</th> <th></th> </tr> </thead> <tbody> <tr> <td>select</td> <td>100%</td> </tr> <tr> <td>select</td> <td>0%</td> </tr> <tr> <td>select</td> <td>0%</td> </tr> </tbody> </table>	Fill-in by supervisor chair group		Fee Percentage per chair group		select	100%	select	0%	select	0%
Fill-in by supervisor chair group												
Fee Percentage per chair group												
select	100%											
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Name student												
Registration number												
MSc programme												
Specialisation												
Course code thesis												
Size of thesis (number of credits)												
Short title thesis report												
Which assessment (1st, 2nd or final; drop down)	select											
Date assessment												
Assessor that filled in the scores below	Name	Signature (you can copy your scanned signature)										
Please select above which assessment (1st, 2nd, final)												

	Grading Mark 1-10		
1. Performance (40%)			
1 Independence, initiative and creativity		→	-
2 Commitment, perseverance and adaptivity			
3 Receiving and providing feedback			
4 Development of knowledge and skills			
5 Time management			
6 Performance on research			
7 Execution of research			
2. Research report (50%)			
1 Context, goals and delineation of research/project		→	-
2 Theoretical underpinning of goals and framework			
3 Description and choice of methods and processing of information/data			
4 Presentation of data and results			
5 Evaluation of results			
6 Clarity and justification of conclusions			
7 Writing skills			
3. Oral presentation (5%)			
1 Level and structure of presentation		→	-
2 Interaction with audience			
3 Presentation of data and results			
4 Clarity and justification of conclusions			
4. Oral defence (5%)			
1 Defence of the thesis		→	-
Total grade (unrounded)			-
Total grade (rounded)			-

Extensive comments by assessor on next page

Underpinning of grading (compulsory)

(Please use ALT+ENTER to open a new line; you can resize the cells below if you need more vertical space)

The underpinning illustrates the specifics of the work of the student, in connection to the more general descriptions in the rubric. Describe, for each category (performance, report, presentation, defence) the aspects of the student's work that most clearly illustrate your assessment. As a guideline you could give examples for the criteria that you assessed lowest and highest, as well as a criterion that received an average assessment. If applicable, you should also mention aspects that are not mentioned in the rubric but you find relevant in your assessment, in particular points of excellence that make you deviate from the suggested scoring in the rubric.

Performance:

Research report:

Oral presentation:

Oral defence:

Feedback to student (not compulsory to fill in here)

(Please use ALT+ENTER to open a new line; you can resize the cells below if you need more vertical space)

Provide feedback to the student that is not directly related to the grading (this feedback may also be given to the student by other means)