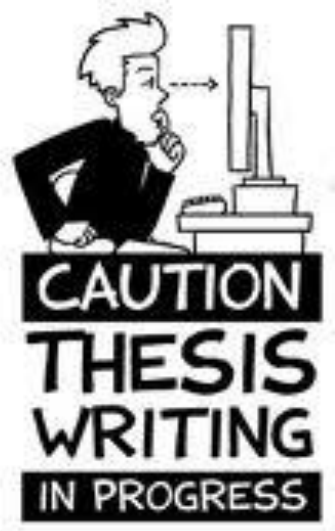
YEI-80812
BSc Thesis International Land and Water Management

--- Writing skill sessions for BIL internship students
&
"how to finish your BSc thesis within a month" ---



The writing skills sessions are meant for BIL students who are finishing their BSc thesis report. The goal is to help you improve your reporting skills during the writing of your thesis, and to guide you towards finishing your BSc thesis within a month.

The sessions in YEI-80812 are designed in such a way that they only focus on the main writing skills that might help you forward, without requiring too much time and distraction from the writing process which is your main focus during this month!

This document contains:

1. The course schedule
2. The assignments that help you improve your writing skills
3. A short guide to writing a BSc thesis report

Wageningen, January 2013

Aad Kessler
Bert Bruins

1. Course schedule

Week 18		
Monday January 7 *13.00 – 15.30*	***Back-from-internship session*** Informal plenary session to exchange internship experiences. Short presentations (in Dutch) of what you have learned professionally and personally, plus ideas about your future learning path and career.	*Atlas 1* *Aad Kessler* *Bert Bruins*
Tuesday January 8 *09.00 – 10.30*	***BSc thesis writing session*** Overview of the course schedule, the different sessions, the assignments, and formation of peer-review groups Lecture on how to write a BSc thesis report	*Atlas 2* *Aad kessler* *Bert Bruins*
Friday January 11	*DEADLINE ASSIGNMENT 1* ➔ *Send-in before 24.00 to your group mates with copy to Aad Kessler, Bert Bruins and your WU supervisor*	
Week 19		
Tuesday January 15	***Feedback session Assignment 1*** In groups of 4-5 you give feedback on Assignment 1 of your fellow students (group mates). *Prepare this at home!*	*Time and place open*
Friday January 18	*DEADLINE ASSIGNMENT 2* ➔ *Send-in before 24.00 to your group mates with copy to Aad Kessler, Bert Bruins and your WU supervisor*	
Week 20		
Wednesday June 23 13.30 – 17.00	***Feedback session Assignment 2*** In groups of 4-5 you give feedback on Assignment 2 of your fellow students (group mates). *Prepare this at home!*	*Time and place open*
Week 21		
Thursday January 31 *09.00 – 12.00*	***Presentations BSc thesis results*** In two separated groups you present your BSc thesis results for your fellow students, supervisor and one of the course coordinators.	*Atlas 1* *Bert Bruins* *Aad Kessler* *WU supervisor*
Friday February 1	*DEADLINE FOR DELIVERY BSc THESIS REPORT!* ➔ *Send-in before 24.00 to your WU supervisor with copy to Aad Kessler and Bert Bruins*	

2. Assignments

Assignment 1: Structuring your report

The first assignment has three components:

1. Table of contents
2. Main findings
3. Planning of writing

All this together should not cover more than 3 pages and must be send-in to your group mates, to the teachers of the course and to your WU supervisor. You will receive feedback from your group mates anyway (during the feedback session) and you might also get feedback from Bert or Aad and from your WU supervisor. This will help you make improvements.

1. Table of Contents

→ What to do?
Make a table of contents that shows the set-up of your thesis as you currently have it in mind (see also chapter 3 of the Short Guide). For each chapter, shortly indicate what you want to tell there. Think of sub-headers for the longest chapters, and also indicate per sub-header what you are planning to write there. All this should be done in max one page.

→ Why?
It is hard to keep the overview of things when writing a large report. This assignment helps you to structure the whole project and think about the different ways to arrange the elements of your thesis.

2. Main Findings

→ What to do?
Give a short summary of the main (expected) results of your research (observations you have done, new data you have found, insights you have gained). Subsequently, indicate which (preliminary) conclusions you draw from these results. You might also define the main message of your research: what is that you want to tell and who is your audience? Check also Chapter 2.1. Use max 1 page.

→ Why?
You start with the results and the conclusion, because they constitute the core of the thesis. All other parts are only there to support this core, by answering questions like: 'how did you get these data' (Methods); 'what did you need this data for?' (Introduction), or 'are these conclusions also applicable to other contexts?' (Background, Conclusion). Furthermore, and most important, if you already have clearly in mind what the end-result will be, it is much easier to write the report and leave out (less important) data and information that does not contribute to these findings and conclusions. Hence, it allows you to better focus during the writing process, and reduces the risk that you get lost in all the data, information and observations that you have collected during the internship.

3. Planning

With this you finalize the assignment; a proper planning gives structure to your writing process during this month and helps you finish your thesis within this month (see the annexed Short Guide, chapter 2.2).

Assessment of Assignment 1

On Tuesday June 19th you discuss Assignment 1 in groups of four. Therefore, write down the feedback for your fellow students before the start of this feedback session! Each student gets his/her turn to receive feedback from all others in the group. Try to give feedback in such a way that the writer can learn from it as much as possible. Discuss the Table of Contents using the following criteria:

1. Structure – is the set-up logical and coherent? Do the different components fit together smoothly?
2. Completeness – is everything there? What is missing? What things are double?
3. Consistency – Is it clear which principles are used (see Annex, chapter 3)? Are these principles consistently applied?

Subsequently, discuss the scientific quality of the main findings. Also ask questions with regard to the methods, data collection, research questions etc. You may use the following guiding questions:

1. Have the main findings and conclusions been clearly formulated?
2. Is it made clear which data and conclusions are original (from the BSc research itself) and which are taken from other sources?
3. How reliable are the results? You might ask questions – if necessary – concerning the used methods or possible problems that arose during data collection.
4. To what extent are the conclusions drawn also representative for a larger group?

Assignment 2: Writing skills

→ What to do?
Hand in four pages (around 2000 words) of text that you regard as good enough to be inserted into your report. It does not matter which part of the report it is, the point is that you send in something on which others can give feedback. You can then use this feedback to improve upon your writing skills. Fellow students and a teacher will give oral feedback on this text during the feedback session. You might use *Track Changes* and *Comments* (in MS Word) to even better and more thoroughly review the text, but this is not required. Be sure that you really read the text and give constructive comments to improve it.

→ Why?
The aim of the assignment is to improve your writing skills, not to discuss the contents. In other words, it is about getting your message across well, not about the message itself.

→ How?
Assess the texts of your group mates and focus on how well they succeed to bring their message across in their text. Please read very well the instruction and hints given in Chapter 4 of the Short Guide. It might be helpful to respond to the following questions when reviewing the text:

- What is the message of this text? Was it easy to find out? If it was hard to identify the main message, what can the author do to make that easier?

- Is the whole text related to this message? Which parts are not? How can the author make clear how these sections are related to the message?

- Does the text (or chapter, or paragraph) have a head (indication of what is to come) and a tail (short recap of the main points made)? Do they serve to get the message across?

The aim of giving feedback is to help the other to improve his/her writing. That is quite a challenge: you don't want to hurt the other's feelings, but you do want to be honest about improvements that are needed. This is possible, if you take care to point out specific things in the text, and explain what the (positive or negative) effect was on you. Some examples:

"I don't get it"

"Between paragraph 2 and 3 you make a step in your reasoning, but you have not written it down; for that reason, I do not grasp what point you are trying to make exactly.

"I lost track of the story toward the end"

"in the concluding paragraph you suddenly broach a new topic (i.e., the plans of the village council to begin a vegetable garden) en it is not clear to me what that has to do with what went before."

"the third paragraph is messy"

"I found the third paragraph hard to understand, because you start out with a chronological ordering, and then you suddenly switch to a geographic ordering"

Feedback is even better if you also provide suggestions for improvement. For example: "I found the text a bit dull because you wait until paragraph 4 to make your point (i.e., that for farmers in Sta. Luca erosion is no problem at all). If you open with this important sentence, you immediately grasp the reader's attention."

Take care to also stress what you liked; the writer can learn a lot from that too. Again, be specific; for example: "The opening sentence immediately grasped my attention."

Short guide to writing a BSc thesis report

Contents

1. Introduction

After coming back, your mind is full of experiences and memories and you need some time to re-adjust to being in the Netherlands. After a few weeks, things are more or less back to normal – and then you have to sort out your research results. Perhaps it is a great messy heap of measurements, interview tapes, field notes, and project reports. Hopefully, you have already partly analyzed the data. Now it is time to get to work and forge everything into a neat little report by the end of the month. How do you do that? That's what this short guide will try to tell you.

This guide is written for third year BIL students who have finished the data collection for their thesis, and have, preferably, also done the first data analysis. It supports the writing skills trainings in the course YEI-80812, by the end of which students must deliver an academic thesis report on their bachelor completion project.

A thesis report presents and discusses the findings of the research conducted, and relates these findings to their academic context (e.g., existing theories and models; on-going academic debates; similar, previously conducted research). This link to the academic context does not have to be very elaborate; it will suffice to relate your research results to two or three other relevant publications. However, if you are enthusiastic about the topic, you may of course dig deeper into the theoretical backgrounds of your research, which can also increase your mark.

Although the requirements for your specific thesis will be defined between you and your supervisor(s), a number of **general minimum requirements** can be given. Firstly, you are expected to prepare for report writing already during your stay abroad. Before your return you should already have a clear idea of your main findings and have set up a basic structure for your report. You should also have an idea of how you are going to analyze your data, and, preferably, already have started this analysis. The length of the thesis should be some 20-25 pages (main text, annexes not counted), with an emphasis on the Results. An example of how these pages can be divided over the different components:

Front matter (Title page, Table of Contents, etc.)	3
Introduction	1-2
Background	1-2
Materials and Methods	1-2
(Concepts & Theories)	(1)
Results	10
Discussion	2-3
Conclusion	1
References	1
TOTAL	20-25

The **structure of this guide** is more or less chronological: it follows the sequence of activities involved in thesis writing, although in reality many activities will be repeated. We will look at how you can manage the writing process in such a way that you are able to produce a report of sufficient quality before the

deadline (Chapter 2). We will then shortly discuss how to organize and structure the report (Chapter 3). But after having put everything in the right place, you also have to engage an audience, attract and keep the reader's attention. Chapter 4 therefore deals with attractive writing. This is only a short guide, specifically for writing BSc theses. Of the wide range of much more elaborate publications on writing skills and (academic) reporting the References provide a small selection. Most of the publications mentioned there can also be obtained from the university library.

2. The writing process: how to deliver a good report before the deadline

2.1 How to get started

If you don't know where you are going, you cannot get there in time. So, where are you going with your BSc thesis report? Start your writing process by thinking about the **aim** of your report. Why do you present your findings? Is it relevant to some academic debate? Will you use them to recommend certain policies? Does it help your host organization with a particular problem? Formulating a clear aim of the report guides you through the process of writing.

Think of the report as a way of communicating about your research. In all forms of **communication**, there is a sender and a receiver, a message, and a medium. In this case, it is clear who the sender is (you!) and the medium is usually set (a written report and an oral presentation). It will help you tremendously in the writing process if you also have clearly in mind what the other two are: what is your *message* and who is your *audience*?

The **main message** relates to all the report's chapters. Someone who has decided to read your report has probably already read the Title and Abstract. The reader will then look for the most direct formulation of the main message, in the Conclusion. The conclusions are based on the outcomes of your research (in Results) and their interpretation (in Discussion), so the main message determines how you select and order your data. To show how reliable this data is and that they allow you to draw the conclusions you draw, you have to explain how you got the data (in Materials and Methods). Your audience will also require some background information to understand your main message (Introduction or Background), and perhaps how your message relates to other research and academic debates (Concepts and Theories). Finally, you need to attract attention to your main message, by showing them how it is relevant to them (Introduction). As you can see, the main message is the red thread throughout the report, and many choices you face during writing are facilitated by going back to that main message.

The **audience** you define also determines a number of writing choices. Your conceptual framework, for example, may be familiar to the professor of your chair group, but new to your fellow students. If the professor is your audience, some quick references to the main theories used will suffice; for your fellow students, an elaborate explanation is required. However, your professor won't know anything about the research area, whereas your colleagues at your host organization will know even more about it then you

do. Your supervisor may understand your theoretical perspective, but also wants you to demonstrate that you understand it. Roughly, the main message determines *what* you write, the audience determines *how* you write it.

2.2 Planning

As soon as you have defined the aim, main message and audience of the report, you make a planning. The planning is a valuable tool for meeting the required deadline. A good planning contains the following components.

Description of the end product(s). The end product is usually a written report and an oral presentation. Also include things like maps, databases, and models if applicable. For example:

✔ *"The end products are a thesis report and an oral presentation. The report will provide an overview of currently used wastewater treatment methods in Northern Ghana, and give policy recommendations on this issue, in 20-25 pages. The report also includes annexes with technical details of the different wastewater treatment methods. The oral presentation will take 20 minutes, for a small audience of BIL students and teachers"*

Overview of activities. "How do you eat an elephant? Slice by slice!" (Greasley, 2011:29). Making a detailed overview of activities makes the thesis writing project manageable. In the overview you describe what you need to do to get to the end product. Be as specific as possible and don't forget to also list what others have to do (e.g., review of drafts by your supervisor). Examples:

✘ *"Read literature"*

✔ *"Read five papers on climate change impacts in Cameroon"*

Timetable. You estimate the required time for each activity and decide in which order you have to execute them. By putting them in a timetable you can determine how much time you can spend on each activity to be able to meet the deadline. Take special care with literature review and data analysis: if you do not set a specific aim for these activities, there is a high chance that you will not execute these activities in the time set for them. For literature review, set a limit to the number of papers you will read on a subject (on average, students read about 8 pages of academic text per hour).

In-between products and deadlines. For each activity or time period (e.g. for each week), you describe the product, including a deadline for that product. These products can be the different draft versions, but also chapters, sections, tables, graphs, etc. Example:

✔

Products week 2 *Deadline: June 16*	-final draft of introduction, background, and methods -first draft of chapter 4.1 (rainfall simulator results) -written notes based on the 5 papers on climate change impacts in Cameroon

Risks and assumptions. Expect the unexpected – projects are rarely executed exactly according to planning. Identify the most important risks to your planning beforehand. Activities for which you depend on others (such as supervisors or friends that review your drafts) are particularly risky, because they may not be available to you when you need them. For each risk, try to find a way to decrease it or to reserve extra time in case something unexpected happens. For example:

Time	Activity	Assumptions
June 20-25	Find and analyse ten papers on rural-urban migration in Ethiopia	- These papers exist - I can find them within two days (because the rest of the week is needed for analysis)

Back-up plans. Think about your possibilities in case your planning does not work and formulate back-up plans.

"My current planning leaves little room for unexpected events, so there is quite a chance that I will not finish before the deadline. I will go on holiday one week later, so I can use that week as a buffer. I checked with my supervisor; she is ok with it too."

2.3 From raw data to final report

When you prepare a nice dinner, you don't start by putting some random ingredient in the frying pan. You first collect the necessary tools and ingredients, slice up the vegetables and remove the inedible parts. The same is needed when writing a thesis report. Of course, just as the way you cook a meal depends on your style and personal preferences, so does writing a report. However, you may feel a bit lost, not knowing how to proceed or even **how to get started**. One trick is to write a short, one or two page 'letter' to someone close to you (like your mother or boyfriend) in which you explain to them what you have found, how you found it, why it matters, etc. This will already help you discover what is important and what is not, and develop a structure to explain these things.

You can also use Lamers' (1993) more structured method. He presents an orderly process to prepare for writing in five steps: inventory, selection, arranging, ordering, and verification. By the end of this process, you have constructed the report's 'skeleton', the **report outline**. The report outline allows you to identify which parts of the report can be written right away, and for which parts further literature review or data analysis is necessary.

- Inventory is the first step; you list all your data, ideas, findings, conclusions, methods – in short, anything you think might have to be included in the report in some way.
- During selection, you decide for each item on the inventory list whether or not to include it in the report. You select those elements that further the *aim* of the report, support the *main message,* and are of interest to the *audience*. Have the guts to throw out anything that does not meet these criteria will considerably increase the quality of your report.

- The selected items are then arranged**.** All items with something in common are grouped. The challenge is that there are many different ways to arrange the same set of items. Therefore, this step will be explained more elaborately in section 3.1.
- Next, the groups are ordered. You provide each group with a header and decide the sequence in which the different subjects have to be presented in the report.
- Afterwards, verification is needed to check whether you have consistently used the same arrangement principle (or a combination of them) and whether the chosen arrangement and ordering have the desired result (a clear structure that draws attention to the most important). If you are not satisfied, you can rearrange.

When you have structured your story, analyzed all data and reviewed the necessary literature, you can start writing the **first draft**. It often helps to start writing without paying too much attention to the details. At first, the paper may be a document with some terrible sentences, spelling and grammar mistakes, faulty argumentations, missing references, etc. That is no problem in this phase; what matters at first is that you put your thoughts on paper in a structured way. But the last thing you want of course, is to annoy your supervisor (who, after all, is the one to give you your mark!) by handing in a first draft that is fraught with easy-to-fix mistakes and imperfections (e.g., spelling and grammar errors, important tables and figures that are missing, etc.). The first draft you hand in is a well readable version of your thesis in which you clearly point out (e.g. using Comments in MS Word) *which* sections are still incomplete and *what* is missing, *changes* that you are still planning to make, and things you need *feedback* on.

The **final draft** is a complete version of the report, for which you cannot think of any further major improvements. Your supervisor can point out to you which minor improvements you need to make. Shortly after, you can finish and print the report. Refer to the *BIL Completion Guidelines* (last page) for instructions on **sending in** the report.

Tips for making drafts!

→ Take a little break (e.g., a weekend) before giving the finishing touch to the drafts or final version.
→ Ask your friends to review drafts and give feedback.
→ Reviewing drafts is a time-consuming affair for supervisors (and also for your friends), so plan this well ahead with them.

2.4 Referencing: how to borrow and steal ideas

As was mentioned in the Introduction, a thesis report does not only present findings, but also relates these findings to their academic context. To achieve this, scientific papers and perhaps other sources have to be referred to, paraphrased or cited. **References** are used to show that you are part of an academic community (and which), to give credit to those who deserve it, to point out to interested

readers where they can read more about the topic, and making your thesis report more authoritative (Rosen, 2009).

So it is good and necessary to borrow ideas; but do it properly. Take care to use the same **format for referring to literature** and other sources throughout the report. The most common system is the Harvard system. Instructions can easily be found on the internet by searching for 'referencing Harvard system'[1].

Important as it is to borrow experts' ideas, borrowing should not become stealing (**plagiarism**). And the line between the two is thin. You have to know and apply the rules for crediting sources, but also be careful not to plagiarize unintended. Some **rules for crediting sources** (Booth *et al.*, 2008):

- Provide the source of all (parts of) sentences that are taken from other sources. This applied not only to parts that are literally cited, but also to those that are paraphrased or summarized.
- Clearly distinguish between borrowed ideas and original ideas or data. Use signal words and lay-out to achieve this.
- Do not 'half-cite': if your paraphrase is too similar to the original (in words or sentence structure), it is also plagiarism. If the original puts it better than you can, use a proper citation (with quotation marks). If your paraphrase makes it more suitable to your purpose, you can use paraphrase.
- You do not have to provide citations for common knowledge, ideas that are not connected to specific (groups of) scholars, such as 'water flows downward' or 'most plants grow in soil'. If you are not sure whether something counts as common knowledge in your research field, discuss it with your supervisor.

Even if you try to keep to these rules, you may **plagiarize by accident**; Booth et al. (2008) also provide some tips to prevent this: keep track of your sources during note-taking helps (also distinguish between citations, paraphrases and summaries in your notes!). When paraphrasing, take a short break between reading something and paraphrasing it, so that you really write down the contents, not the sentence structures or words. Using synonyms for each word is not a proper way to paraphrase!

3. Report structure

3.1 Creating order from chaos: structuring your story

To get a report's message across quickly, it is essential to structure the text well; a report is not a novel that people read from start to finish giving the same attention to each sentence. Most readers are looking for specific information or want to know only the main message. Lamers (1993) distinguishes between a number of principles on the basis of which a text can be structured. Five of them are important when writing a thesis: methodical, thematic, chronological, geographical, and persuasive.

[1] For example: http://education.exeter.ac.uk/dll/studyskills/harvard_referencing.htm.

The **methodical** principle is used for the common structure of scientific reports that present original research (as opposed to literature reviews). It uses the common scheme of Introduction-Methods-Results-Discussion-Conclusion. Because this structure is particularly important, a separate section in this guide is devoted to it (3.2).

When the **thematic** principle is used, different units of text are devoted to themes that are related in a logical way. The themes can be aspects, parts, persons or stakeholder groups.

- If the text is structured by aspect, each text unit discusses a particular aspect of the subject at hand. For example, if a chapter is about 'the effects of water erosion', sections are devoted to aspects of these effects: i) soil-related aspects; ii) agronomical aspects; political aspects; economic aspects; social aspects.
- If the subject involves tangible things, the text can be structured by its parts. For example, a chapter on 'the dangers of sedimentation in an irrigation system' can be structured according to the parts of the irrigation system. The sections will deal with dangers for: i) primary and secondary canals; ii) tertiary canals; iii) distribution structures; iv) outlets; v) drip tubes.
- If the subject of a text (e.g., a chapter in your thesis) discusses ideas or theories, you can structure it by person. For example, a chapter on 'the development of social capital theory' can have sections which are each devoted to one influential scholar: i) Pierre Bourdieu; ii) James Coleman; iii) Robert Putnam; iv) Nan Lin.
- You can also structure the text according to the (views of) different stakeholder groups involved. For example, in a chapter on 'views on desertification' sections can be devoted to: i) crop farmers; ii) livestock farmers; iii) government agents; iv) academics.

The **chronological** principle can be used to structures a text based on *when* something happened; each text unit describes a what happened during a certain period in time.

The **geographical** principle structures a text on the basis of *where* something takes place. The text units can be ordered in three different ways:

- From large to small geographical unit. Example: Land rights in i) Asia; ii) Indonesia; iii) Kalimantan; iv) Batoemandi.
- From small to large geographical unit. Example: Farmer organizations on the level of i) the village; ii) the province; iii) national; iv) global.
- Comparing equivalent geographical units. Example: flood prevention in i) Egypt; ii) Holland; iii) Bangladesh; iv) Vietnam.

The **persuasive** principle is used in texts that intend to convince the reader. Several textual structures are possible, for example situation-causes-effects-desired situation-recommendations (Lamers, 1993). Another example is introduction-claim-support for the claim-counterarguments and rebuttal-conclusion (Rosen *et al.*, 2009:283). For a detailed guide, see Rosen *et al.* (2009:281-305).

Usually, several of these principles are combined within one report. For example, a thesis report on water governance in Brazil may use the methodical structure (introduction-methods-results-discussion-

conclusion). The Methods chapter may be structured chronologically, the Results chapter geographically, and the Conclusion persuasively. The important thing is to stick to the principle that you chose for a particular text unit, and not switch to another arrangement principle halfway the chapter.

3.2 The standard structure

3.2.1 Report structure: variations on the same theme

The structure of BSc theses can vary, depending on aim, topic, method, or academic discipline. In most cases however, these are only differences of emphasis. We will therefore first present the methodical structure as the general starting point (introduction-methods-results-discussion-conclusion), and then point out some common variations on it. On that basis, you can create a structure that is suited to your particular situation, in collaboration with your supervisor.

The different chapters in the methodical structure should form a **coherent whole**. The core of the methodical structure is formed by the methods, results, and discussion. These have a narrow focus on one case, model, or example. But you also have to show what your research is a case/model/example *of*. This connection between the specific focus of the research to the broader context is made in the introduction and the conclusion. The introduction starts with a broad focus on the context and leads the reader to the specific focus of the thesis research. The conclusion does the opposite: it relates the specificities of the research back to the context that was given in the introduction. The introduction and conclusion are thus each other's mirror image.

3.2.2 The Introduction

The introduction convinces the reader to read your report (for 'convinces' you may also read: invites, provokes, seduces, etc. – depending on your style). This is only the case when the introduction: i) convinces the reader that the report is relevant; ii) attunes the reader's level of background knowledge to the content; and iii) gives the reader the right expectations of the contents.

(i) Convincing the reader that the report is relevant. What makes your research relevant, is its context. For example, if you report's main message is that 'the sanctity of the Ganges does not prevent its pollution', it only has academic relevance within the context of the wider debate on 'Water and Culture'(example taken from Buit, 2010). You can demonstrate the academic relevance by explaining the on-going scientific debate that your research is part of, and showing the specific questions or points of debate that your research addresses within that greater whole. You do this by referring to the relevant literature. Similarly, the report on Ganges pollution only has societal relevance within the context of the realities of Ganges pollution and religious beliefs and practices of Hindus. The societal relevance can be demonstrated only by sketching the practical context and current practical challenges, and pointing out how your research addresses one of these challenges.

(ii) Attuning the reader's level of background knowledge to the report's content. Reading a report without sufficient background knowledge leads to misunderstanding and frustration. The introduction thus also serves to bring the background knowledge of your whole audience to the level required for understanding the rest of the report. For example, if your report is about 'soil water repellency caused by wildfires', you will have to devote one part of the introduction to explaining what soil water

repellency is, how it comes about, and why it is related to wildfires (example taken from Voogt, 2010). However, also take care not to bore your audience by giving too much background information. This often has two reasons: i) you underestimate your reader, and are inclined to explain things too much; ii) you are so enthusiastic about all kinds of things you forget to ask yourself if the reader really needs this information to understand the report. If there are too many things that really *have* to be included as background information, you can devote a separate chapter to this (right after the Introduction).

(iii) Giving the reader the right expectations. To give the reader the right expectations, the introduction pays attention to a number of elements. Of course, the subject is introduced, taking into account that the reader has already gotten a general idea of it by the report's title. You can also describe for what audience this report is written. A reader that finds out that he is not part of the intended audience already expects having a hard time understanding the report or finding information not relevant to him. The introduction also describes your general approach to the subject, e.g., your academic background or outlook, and a general indication of your methods. After the context and background knowledge are given, the aim or research question is stated to make clear what information the reader may gather by reading your report. The research sub-questions are listed to specify the information to be expected. In many cases, the structure of the Methods and the Results follows the sequence of the sub-questions; in that case, listing them already gives the reader an indication of the report's structure. By describing the scope or limitations of your research, you also clarify what the reader will *not* be able to find in your report. The introduction ends with a report overview, so that the reader does not only know what to expect from the report, but also where to expect it.

All in all, an introduction is a rather complicated text to write, especially because it should not only serve all the above mentioned functions, but also be concise (one or two pages) and attractive to read. It may help to think of **the introduction as a funnel**, starting broad and ending narrow. You start at a broad and general level that corresponds to the reader's level of knowledge and insight. Then you guide the reader, arguing step-by-step, to a short and specific indication of the reports contents: the aims or research question. Make sure you do not dryly describe all the elements of the introduction one after the other; instead, use the funnel structure to weave it into an attractively structured whole. Tip: thoroughly revise the introduction when you have finished the rest of the report.

3.2.3 The Methods chapter

In the Methods[2] chapter you describe how you collected and analyzed the data. This is important, because it allows readers to assess how reliable and representative your data is, the uncertainties that follow from them, and the suitability of the used methods to answer the research questions. The methods should logically follow from the research questions and give a satisfying answer to the reader's question 'how are these research sub-questions going to be answered?'. The specific requirements for the description of the methods used will not be discussed here, because of the wide variety of methods used in ILWM research. With help of your supervisor, you will be able to decide on the specific requirements for the methodology.

[2] Alternatively: 'Materials and Methods' (more common in natural sciences) or 'Methodology' (meaning 'description of the methods').

The methods chapter in the report is usually **adapted from the research proposal**. There are, however, a few differences. In the report, you describe what *actually* happened during research (including what went wrong, as far as it affects the reliability and representativeness of your data), which is often very different from what was planned in the proposal. Any decisions that were taken during the research with regard to the methods should be explained and motivated. Another difference with the proposal is that you have to explain in more detail how you have analyzed the data. Note that the tense of the verbs should be changed as well, from future to past.

3.2.4 The Results chapter

In the Results chapter, you **present observations and measurements**, making very clear where all the results come from. Present only a selection of all the observations you did during research; do not present findings that you cannot in any way relate to the report's main message. Stay close to the research sub-questions: that will help you to decide what to include and it will increase the coherence between the research question, Methods, and Results. Also take care to separate your interpretations from your research results, as the interpretations belong in the Discussion chapter. As this chapter will usually be one of the longest of the thesis report, think very well about how to structure it (see also 3.1). The easiest way is often to present the results following the same sequence as the Methods (Blackwell & Martin, 2011), but only do this if it helps bring across your main message clearly.

Results can often be conveniently presented in **tables and figures**[3]. Tables should not present too much information at once; on the other hand, if it is possible to present the same information in short text, text is preferable. For example, it is more efficient to state something like "In group A, 34% of the farmers indicated using drip irrigation; this was 45% in group B" then to supply a figure or table. On the other hand, a table would be much more efficient when, for example, five soil characteristics were measured for three different soils. If you are in doubt whether to use a table or a figure, opt a for table if the exact values themselves are most important. Choose a figure if the relationship between the values (e.g., a corrolation or pattern) is most important. Lamers (1993) gives detailed guidelines for tables and figures, the most important of which are listed here. All tables and figures should be:

- Numbered;
- Referred to in the main text;
- Understandable on their own (i.e., without reading the main text), which is mainly achieved by choosing the title and legend well;
- Be given a title (figures' titles are placed below and tables' titles are place above);
- Have dimensions for the variables (in the legend, title and/or explanatory text);
- Clear and easy to interpret ;
- Give a right impression of the facts and lead to false interpretations;

[3] This discussion of tables and figures is largely based on Blackwell and Martin (2011)

3.2.5 The Discussion

It is nice enough that you have presented all kinds of observations and measurements in the Results chapter. But, are they reliable? Do they make sense? What do they mean? Those are the questions you answer in the Discussion.

The **reliability of the results** depends mainly on your methods. So if your methods are perfect, and no problems occurred during the research execution, there is probably not much to discuss about reliability. In most cases however, methods are not perfect, because of time or budget constraints, or the occurrence of unexpected events. Discuss the implications of these imperfections: are the results 'hard' evidence for something, or only indications? To what group can the results be applied? Etc. You can also show that your data makes (no) sense by comparing the results with **results from other research**. You have two options here (Katz, 2009). You can connect your research to research with similar results (but perhaps different methods), or with research that used similar methods (and results that were either similar or different to yours).

Sifting out a meaning from your results (i.e., **interpretation**) is the final aim of the Discussion. In doing this, stay as close to the data as possible. The Conclusion allows more space to make proposals about the implications of the results for the wider debate, for current scientific theories and models, etc. But in the Discussion, only interpret what your observations and measurements mean for the case the you studied. For example, you assessed soil compaction and interviewed farmers about their farming practices in a site in Uganda. In the Discussion, you can state something like: 'A correlation was found between the number of times a soil was ploughed and the compaction of deeper soil horizons. This shows that these practices of Ugandan farmers in the study site cause compaction in their soils.' But a wider or more general application of these findings, such as 'the results show that ploughing leads to compaction', is reserved for the conclusion. NB: even in the conclusion, a formulation that is as 'hard' and general as the example can hardly be justified by three months of thesis research.

3.2.6 The Conclusion

In the Conclusion, you **answer to the aim or research question**. You also relate the results back to the context that was sketched in the introduction. Even though the Conclusion inevitably *includes* a summary of the most important findings, it *is* not a summary. It is rather an argument, in which the findings support a claim or recommendation (depending on the report's aim). This argument should not introduce new supportive material; all support to the claim must already have been presented in the report. So, the reason that you summarize the most important points of the report is to help your reader, who may have forgotten the exact aim of the research or have gotten a wrong idea of the report's main line. At the end of a conclusion you can also suggest possible applications of the research results or hypotheses for further research. Being concise is important in all sections of the report, but most of all in the conclusion. It should not exceed one page, because the Conclusion must enable readers to get your main message at a glance.

3.3 Variations on the standard structure

3.3.1 Social sciences vs. natural sciences

Each academic discipline has its own conventions, also where report structure is concerned. In **social sciences**, conceptual frameworks and theories are seen as a starting point on which you base your approach to the subject. They highly influence the kind of research questions you ask and the way you interpret your results. There are different schools of thought (broad groupings of scholars that work within similar conceptual frameworks). Each school has its own set of assumptions and produces its own set of research questions. For this reason, in a thesis about a social science subject, you will need to clarify your own viewpoint and conceptual framework and how this relates to those of others. A separate chapter can be reserved for this: 'Concepts and Theories' or 'Conceptual Framework' (although it is not usually required for a BSc thesis to do this very elaborately). Because your conceptual framework will influence the whole set-up of your research, it is already included in the proposal; in the thesis report, you can often use much of the same text again. After presenting the results, a link must again be made (in the Conclusion) between the research results and the concepts and theories used.

In the **natural sciences**, schools of thought do not play such a major role. When relating to previous research, it suffices to explain what is already known, what questions are still unanswered, and what part of these questions the current paper helps to answer. Such a discussion is usually so short that it can be included in the Introduction, and no separate chapter is needed. After presenting the results, comparisons must again be made to results in similar research (in the Discussion chapter).

3.3.2 Literature review

If your thesis report is a literature review that does not use new data, the methods-results-discussion-conclusion structure is probably not the most appropriate. There is not much to explain about your method, and it is more convenient to merge the 'results' with the discussion. You could use a thematic arrangement principle instead (see 3.1.). The report will, of course, still have an introduction and conclusion, but the chapters in between are named after the themes you discuss in those chapters.

3.4 Administrative components

Apart from the chapters (Introduction through Conclusion, which are numbered), the BSc thesis report contains other components (which are not numbered). These components are listed below, in the same sequence as they should have in the report.

Cover page and title page. The cover page is the outside of the report and includes at least the title and name of the author, and leaves room for all your spiffy, creative ideas. The title page (the second page) is purely informative and includes all the information that is necessary for administrative purposes: month and year; author name and student number; names and organizations supervisors; and the course code (YEI-80812). For LDD theses, a cover and title page format can be downloaded from http://www.ldd.wur.nl/UK/education/BSc+thesis/.

Abstract. The abstract is a short summary (<250 words) of the full contents that can be read independently from the report. The abstract does not have separate paragraphs, and does not refer to

the report's main text, graphs, or tables. At the end of the abstract, list keywords that indicate the topics and geographical location of the study. (Lamers, 1993).

Table of contents. Includes the titles and numbers of all chapters, sections, and sub-sections, with their corresponding page numbers, plus all other components that follow after the table of contents.

Preface or acknowledgements. The Preface is a personal note to the report, that is not important to the contents. It may contain information about the context in which the report was written, your personal inspirations or experiences with the research, perhaps even some interesting anecdotes, and expressions of thanks. (Lamers, 1993). Instead of a Preface at the start of the report, Acknowledgements may be included at the end. Acknowledgements are shorter and only list the persons you want to thank. A Preface or Acknowledgements is optional.

Glossary and/or acronyms. A list of acronyms and words the audience is not familiar with may be included if there are very many. Still explain their meaning in the main text the first time you use them.

References. See 2.4.

Annexes. Annexes include: figures too large to fit in the main text (e.g., maps and blueprints); detailed descriptions of equipment or methods used; tables and figures that the reader needs to consult often during reading; tables and figures that are of secondary importance; survey forms and interview topic lists. (Lamers, 1993)

4. Clear and attractive writing

4.1 General remarks

So far, we have discussed mainly how to structure a thesis report. A good structure goes a long way in making a report readable and attractive, but the text itself, of course, must be readable and attractive too. That is discussed in this chapter, from the higher textual levels (chapters, sections, and sub-sections), to paragraphs and finally to the level of the sentence.

The most important advice for attractive writing is **write for an audience**. Your words are not directed to your computer screen, or the paper your thesis is printed on. They are meant to be read and understood by people who, unlike you, have not spent the last 5 months working on this topic. Keep them people in mind with every sentence, paragraph, or chapter you write. Keep everything as short and simple as possible.

Informative texts are more attractive when it is clear what they are informing about. Therefore, each structural unit (chapter, section, paragraph) must have a **clearly demarcated subject**. It should also have a clear head and tail. At the start of a chapter, give the reader a quick indication of the chapter's subject. At the end of the chapter, a short remark that quickly summarizes that chapter's main point(s) is helpful.

4.2 Designing paragraphs (*alinea's*)

Paragraphs (Dutch: *alinea's*) are the building blocks of a text, and therefore deserve special attention when it comes to clear and attractive writing. Hermans (2002) provides detailed guidelines for writing effective paragraphs; the most important of them are summarized and adapted here.

To start with, paragraphs should **convey one single message**. If you have a hard time to formulate paragraph's message in one short sentence, it probably contains more than one message. In that case, split it in two. If two subsequent paragraphs have the same main message, it is probably a good idea to merge them. To convey the paragraph's message, use a *core sentence* and built the paragraph upon it as a *coherent whole.*

The **core sentence** is the sentence that contains the main message of the paragraph; the other sentences are all there to support it. The core sentence is often the first sentence of the paragraph, but exceptions can be made to allow for sentences that connect one paragraph to the other. In that case, the first sentence shows the connection to the former paragraph, and the second sentence is the core one. In argumentative paragraphs, the core sentence is the conclusion of the argument and may be put at the end.

To forge the core and supportive sentences into a **coherent whole**, it helps to think about the functions of the supportive sentences in relation to the core sentence. Possible functions of supportive sentences are shown in Table 1, along with some cue words that can be used to indicate this function to the reader. These cue words should be chosen carefully; for example, a sentence that starts with 'however' is very confusing if no opposition follows.

Function	**Cue words**
Exemplification	For example, e.g., for instance, such as
Explanation or definition	This means, this can be understood as/defined as
Comparison, opposition	but, though, even though, still, however, although, on the one/other hand, while, yet, differs from, unlike
Causality	so that, caused by, consequently, subsequently, since, results in, accordingly, on account of, due to, leads to, for this reason, hence, brought about, was responsible for, give rise to
Argumentation	therefore, hence, thus, so, consequently, we may infer/conclude, this implies that, as a result, because, for, since, as, as shown/indicated by, given that

Table 1: Functions of sentences that support the core sentence in a paragraph, and corresponding cue words.

Finally: to keep the reader's attention, **variation** is also needed. 'Put the core sentence first' should be understood as a guideline, not as a strict rule – the text becomes tedious if all paragraphs are structured in the exact same way. Also the words that connect one paragraph to the one before should be varied (e.g., do not start every paragraph with 'moreover' or 'furthermore').

4.3 Writing good sentences

More often than not, thesis reports contain sentences that are unclear even after reading them three times. This distracts that attention from the content. What follows are some tips for writing easy to read sentences (selected and summarized from Hermans, 2002; examples are original).

Be complete. All sentences must contain a subject and a verb. Take a look at the following example.

 "Thirteen cases were investigated. Eight in Vietnam and five in Cambodia."

The first sentence is fine: the subject is 'thirteen cases' and the verb is 'to be'. The second sentence does not contain any verb, and is therefore not a real sentence. It works if the two are joined in one sentence:

 "Thirteen cases were investigated, of which eight in Vietnam and five in Cambodia."

Be exact. Be careful with words that express uncertainty, like: possibly, may, might, could, or appear. Use them only in cases where there actually is uncertainty. Also avoid combining two or more of them in one sentence, as in "The thief may possibly have been caught". Also be careful with words that indicate amounts without mentioning numbers, for instance: some, many, a few, or a lot. Always use exact amounts if possible ('five soil samples' instead of 'a few soil samples'), or try to make a comparison ('a higher income than the poorest 80% of the population' rather than 'a high income').

Keep it short. The longer the sentence, the harder it is to understand. As a rule of thumb, sentences should not exceed thirty words. Long sentences can be cut in shorter pieces and all redundant words should be removed. In the example below, all redundant parts are underlined.

 "With regard to the adoption of soil and water conservation practices, it can be said that the farmers from village A were more inclined to adopt during the time that government support was high than during the time that government support was low, while the farmers from village B did not have a positive opinion toward soil and water conservation in either of these periods." (65 words)

Removing the redundant parts, the sentence would become:

 "The farmers from village A adopted more soil and water conservation practices when government support was high, while the farmers from village B did not like soil and water conservation in either of these periods." (35 words)

Cutting the sentence in two would give:

 "The farmers from village A adopted more soil and water conservation practices when government support was high. The farmers from village B did not like soil and water conservation in either of these periods." (2x17 words)

Note that a pleasant read also requires rhythm, created by varation between short and long sentences. Try to use short sentences (<20 words), particularly for complicated messages. Use long sentences (20-35 words) more sparingly, and only when the message is simple.

Keep it simple. Sentences that contain many subordinate clauses (*bijzinnen*) are hard to read and should be cut in pieces. Example:

"The irrigation engineer, who was interviewed once during the dry season and twice during the wet season, was convinced that water was being stolen all the time, especially in the dry season, but sometimes also in the wet, although he did not know by whom."

The main clause (*hoofdzin*) is "The irrigation engineer was convinced that water was being stolen all the time." It becomes much more readable when the sentence is divided:

"The irrigation engineer was interviewed once during the dry season and twice during the wet season. He was convinced that water was being stolen all the time. He thought that this happened especially in the dry season, but sometimes also in the wet. He did not know who stole the water."

If you do use subordinate clauses, do not put them in the middle of a sentence, but at the start or end. For example: "The soil in the study area, which is not far from the company that supplies the fertilizers, has severe fertility problems." (The subordinate clause in underlined). It becomes clearer if we put the subordinate clause not in the middle, but at the beginning or start of the sentence: "The study area is not far from the company that supplies the fertilizers, *but still* the soil in the study area has severe fertility problems."

'Keeping it simple' applies not only to sentences, but also to words. Do not write: "The foregoing demonstrates the more frequent occurrence of anxiety toward violent thefts in the female part of the population than in the male part of the population." But write "This shows that women are more often afraid of being robbed than men." Only use a difficult word when it communicates your message more accurately than its simpler alternative.

Make it active. Active sentences are easier to read than passive sentences. For example, do not write "The fodder grass is harvested by the children" or "The harvest of the fodder grass is done by the children", but "The children harvest the fodder grass." In the first two versions, the subject ('the grass' in the first, 'the harvest' in the second) does not perform an action. In the rewritten version, the subject ('the children') does perform the action.

Make it positive. Positively formulated sentences are easier to read than sentences with negations (*ontkenningen*). So, instead of "the hill's slope is not steep", write "the hill has a gentle slope". Sentences with double negations are particularly hard to understand. Instead of "when water is scarce, water conflicts are not absent" but write "when water is scarce, there are water conflicts".

References

Lamers, H.A.J.M. (1993). *Hoe schrijf ik een wetenschappelijke tekst*. Sixth, revised edition. Amsterdam: Coutinho.

Greasly, P. (2011). *Doing essays and assignments : essential tips for students.* First edition. London: SAGE Publications.

Blackwell, J. & Martin, J. (2011). *A scientific approach to scientific writing*. New York: Springer Science & Business Media.

Hermans, M. (2002). *Schrijven met effect: Stijlcursus doeltreffend schrijven.* Second, revised edition. Amsterdam: Coutinho.

Katz, M.J. (2009). *From research to manuscript: A guide to scientific writing.* First edition. Dordrecht: Springer Netherlands.

Rosen, L.J. (2009). *The academic writer's handbook.* Second edition. New York: Longman.

Booth, W.C., Colomb, G.G., & Williams, J.M. (2008). *The craft of research.* Third edition. Chicago: University of Chicago Press.

Voogt, A. (2010). *Post-fire effects on hydrological and erodibility factors in a simulated burn and rainfall experiment*. MSc. thesis, July 2010. Wageningen: Wageningen University/Land Degradation and Development Group.

Buit, G. (2011). *Pure and polluted: An analysis of a Water and Culture perspective towards water quality conservation*. MSc. thesis, December 2010. Wageningen: Wageningen University: Irrigation and Water Engineering Group.