Preparing an MSc-Thesis within the MEG-Programme

Recommendations by

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based on an earlier version of Heiner Schanz and
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1 Preface

These guidelines contain recommendations with regards to the preparation of a Master's of Science thesis. **They are neither an official document nor are they binding; and in no way these guidelines intend to replace many excellent textbooks providing an introduction to science or the writing of research proposals.** Rather they should provide students with first directions on how to start a master's thesis project in the MEG-Programme. **The individual supervisors ultimately fix – within the framework provided by the official examination regulation – the individual requirements and standards for an individual master's thesis**.

These guidelines describe the typical steps and procedures for preparing a master's thesis. It takes its departure from the general information and terms of reference for preparing a master's thesis at the Faculty of Environment and Natural Resources (see the study handbook). Under certain conditions (e.g., carrying out research in the tropics or participating in larger projects), it may be necessary to come to specific arrangements departing from the regular procedures. In these cases, please contact your supervisor and your MEG-programme director early enough for the necessary arrangements.

These guidelines build on the 2008 version developed by Heiner Schanz and Dirk Ifenthaler. They were significantly revised by Olga Malets and Heiner Schanz in 2015. The guidelines are discussed extensively in the Research Skills module and are most helpful in combination with a book by Uwe Flick "Introducing Research Methodology: A Beginner's Guide to Doing a Research Project" (2015, 2nd Edition, Los Angeles, London: SAGE, cited in these guidelines as Flick 2015). Several copies are available in the library of the Faculty of Environment and Natural Resources.

We start these guidelines with an introduction (Section 2) that reviews the goals of the master's thesis, introduces the basic principles of science and research, reviews scientific standards and lists basic requirements and necessary skills as preconditions for a master's thesis. Section 3 describes the basic steps in a master's research process, including the development of a research proposal, conducting a research project and writing a thesis. Section 4 focuses on the rules of good scientific practice. Section 5 reviews formal administrative issues related to a master's thesis, including its registration, submission and grading. Section 6 contains supplementary materials, including helpful literature on the logic of scientific inquiry, social science methodology and methods.

2 Introduction

2.1 Master's thesis: the crown of higher academic education

Many people see the writing of a master's thesis as the coronation of higher academic education. And indeed, the importance of the thesis work is reflected by the prominent role it takes within the whole master program. After completing compulsory and elective modules in the educational program the master's thesis offers the challenge to set up and to carry out a scientific research project in an almost fully self-responsible manner. This challenge includes:

- assuring the adequate delineation and definition of a research topic,
- conducting a comprehensive literature review on a selected topic
- formulating appropriate and manageable research objectives and research questions
- building a sound theoretical framework guiding the research,
- (most likely but not necessarily) collecting data in a systematic and verifiable manner
- analyzing the data critically,
- presenting the results comprehensibly,
- drawing sound conclusions based on a comprehensive discussion of the results, and
- showing a potential contribution of the research to the theoretical reconstruction of the topic.

2.2 What is a "scientific" masterpiece?

Most master candidates have already some experience in carrying out research, e.g., in doing experiments during their internships. But in working on their master's thesis they face, usually for the first time, the requirement that the thesis has to be a "scientific work". What this exactly means is mostly not clear in the beginning.

Epistemology of science

The question "What is science?" has been answered in many different ways. As this is a very fundamental question and as so many incompatible answers have evolved over time, even an own discipline has been formed dealing only with this question, namely the epistemology/philosophy of science (or, if you want the "science about science"). This guideline cannot provide an overview on the different epistemological approaches (such as positivism, hermeneutics, critical rationalism, etc.). Many excellent introductory textbooks on the epistemology of science are available to orient the student on this question. Nor does this guideline favor one approach over the other. However, it is argued here that the researcher has to be clear about his or her own understanding of what science is within the different epistemological approaches, as this determines to a large extent the logic and also sequence of the research process. An overview on the ideal-type distinction between different epistemological approaches is provided in Table 1.

Table 1: Ideal-type distinction of main epistemological approaches (Source: KRIZ, J.; LÜCK, H.; HEIDBRINK, H. (1996): Wissenschafts- und Erkenntnistheorie. Opladen: 151)

	Normative-ontologic theory principles	***Neopositivistic c.q. empiric-analytical theory principles***	***Critical or dialectic theory principles***
***Epistemological claims**:*			
• *Epistemological goal*	idiographic ‚description', practical advice	Nomothetic principles; technological instructions	Historic law of social criticism
• *Epistemological interest*	Practical (consensus of actors)	technical (access to concretized processes)	Emancipatory (self-reflection)
• *Epistemological object*	Meaning and purpose of government, society, man, the educational system, etc.	Behaviour of individuals, groups, organisations	Society
Epistemological tool (methodology):			
• *Cognitive methods*	Hermeneutics, phenomenology, cognitive psychology	Logical empiricism, critical rationalism	Dialectics, hermeneutics
• *Activity of the scientist*	Scientific cogitation and anticipatory thought, understanding	Describing, explaining, prognosis (critical control of experience)	Critical confrontation and political function (critical correction of experience)
• *Approaches*	Historic-genetic, ideological	Structural-functional	Critical historic and ‚critical-empiric'
• *Research methods and techniques*	Source and text criticism, historic-philosophical argumentation	Rules and techniques of empiric social research	historic-economic, ideological-critical analysis with empiric social research as a tool
Basic positions:			
• *Value problems*	Inclusion of ontologic and anthropologically based values	Striving toward freedom from value judgements (at least in the research process)	‚Emancipation' and other historically based values are included
• *Relationship between science and society*	Assigning meaning (explanation as conservative moment), adviser	Separation (explanation that is free of value judgements)	Social-critical function of science, science as a social production factor

Science and research

Another thing that is very often confusing for students starting with their thesis is the sometimes synonymously, sometimes complementary or even contradictory use of the terms ‘science’ and ‘research’.

To make it very clear: definitions do not contain the truth, but reflect different interpretations that are seen as suitable for the respective situation.

In these guidelines, it is argued that science and research both aim at a deeper understanding, or enlightenment, of phenomena in the real world. *Research* in this understanding does this through empirically accessing and depicting the real world phenomena in a systematic, consistent and comprehensive manner. Research questions are therefore mainly formulated as “what”-, “who”-, and “how”-questions (e.g., “what conflict resolution mechanisms do forest owners prefer?”, “who is participating in collaborative management approaches?”, “how many farmers depend with their income on forest use?”). *Science* aims at enlightening real world phenomena through a process of theoretical reconstruction of the phenomena at stake. Scientific questions are therefore first and foremost “Why”-questions, searching for explanations for the empirical reality (e.g., why do people enjoy recreating in forest landscapes?). However, also within its process of theoretical reconstruction science relays to a variable degree on research. “Why”-questions are therefore supported or – in case of explorative studies – even replaced by “what”-questions (e.g., how many people are visiting forests per year?), with the intention to contribute to the process of theoretical reconstruction of the topic.

Another way to approach the distinction between research and science is to look at the level of abstraction of a study, in addition to the type of a question formulated for a project (e.g. why-questions vs. who-, what- and how-questions). Research can also ask why-questions and aim at the discovery and exploration of concrete factors and processes that have influenced or led to specific outcomes. The key difference to science is that science aims at the development of abstract concepts or categories, the (re-)construction of causal relationships between the concepts on a more abstract level and drawing more general conclusions compared to specific empirical research. For instance, a solid research project can explore why people in a specific area install solar panels on their roofs and establish that tax cuts and personal environmental convictions influence people’s choices. A scientific study requires in this case that the inquiry builds on and further develops a more abstract theory specifying the relationship between environmental values, institutional frameworks and environmental behavior.

What are our expectations related to master’s theses? In a nutshell, students are expected to design and conduct a solid *research* project based on a sound research methodology, including a theoretical framework and proper methods of data collection and analysis. In other words, they are required to come up with a sound research question, select an appropriate theoretical framework and methods, collect and analyze data, and draw convincing conclusions. Students are not expected to develop a new theory or method in their master’s theses (unless they are specifically interested in it and a supervisor is willing to supervise such a study). A theoretical reconstruction of phenomena and the eventual development of innovative methods and theories stand central in the doctoral studies and later on in the career in science. Master students are expected to apply existing appropriate methods and theories to a real world phenomenon. In sum, students are required to *construct at least* a sound research approach, including a theoretical framework and proper methodology, in order to fulfill the requirements for a master's thesis.

The students should keep in mind, however, that concrete requirements for the theoretical, methodological and empirical work for a master's thesis may vary across disciplines, research groups and individual supervisors. Thesis research objectives, questions, theoretical foundations and methods also depend on students' interests. In any case, they should be discussed directly with potential supervisors.

But no matter what kind of a project students conduct for their master's theses, several scientific standards have to be followed:

Scientific standards

Independent from which understanding of science and research has been chosen, broad agreement exists on major scientific standards. Therefore these scientific standards also have to be applied (and to be proven) by the student in his or her master's thesis:

- The thesis must be <u>theory-based</u>. Theories in this respect can be understood as explanation systems for observable phenomena in the real world. The student's departure in enlightening real world phenomena has to be taken from existing theoretical literature. The student is furthermore expected to discuss and to reflect his or her findings against the existing theoretical and empirical literature. Theoretical literature claims to contain explanation systems for real world phenomena, whereas empirical literature is characterized by a descriptive focus on specific cases and situations.

- The thesis must be <u>verifiable</u>. This is only possible if a clear line of argumentation based on the existing theoretical and empirical literature is given, and the underlying assumptions are made explicit. Ideally, also the original data should be included in the work (usually as an appendix) to allow the reader to verify the drawn conclusions. It is a matter of course that science is always at least partially subjective, as science in itself is a social activity carried out by social beings. However, this fact should never lead to the rejection of the call for scientific objectivity. Scientific objectivity thereby does not result out of a fictive unconditional assumption, but out of the clear exemplification and reflection of the conditions and assumptions underlying the research process.

- The thesis must be in principle <u>replicable</u>. It should (at least in principle) be possible to repeat the empirical part and arrive at similar results and conclusions. This is only possible if the methods for data collection and for data analysis are clearly described, and if the work process is as much unbiased and reflective as possible.

2.3 Basic requirements and necessary skills

For a successful start and completion of a master's thesis, acquiring specific knowledge and skills are important prerequisites. We recommend that students should start to work on their theses only after they have obtained at least 50-70 ECTS within the MEG-programme and several courses in Environmental Governance relevant to their research. You cannot officially register your thesis before you have collected 70 ECTS (see Section 5.1).

In any case, we recommend at least completing a course on the logic and methodological aspects of socio-empirical research before starting the thesis work, such as a module on Research Skills This module provides an overview of quantitative, qualitative, and mixed research methods. In discussing the *research process* (identifying a research problem, reviewing literature, specifying research objectives, formulating a research question, selecting a theoretical framework, deciding on your methods, collecting data, analyzing and interpreting data, and reporting, discussing and presenting results) and generating first ideas for a master's thesis project, this module is an excellent starting point of the thesis.

Moreover, students are expected to acquire in advance further specific research skills and knowledge of specific methods and research tools for data collection and analysis that are required for completing an envisioned research project. It is the student's own responsibility, not their supervisors', to obtain all the necessary methodological knowledge and skills before starting a project. We urge the students to discuss as early as possible the competences required for a research project with potential supervisors in order to avoid misunderstandings and disappointments later on.

One way to strengthen your general methodological competences and learn specific methods is to complete an online course in research methodology and methods offered on one of several MOOC (massive open online course) platforms.

MOOC providers:

- Coursera: https://www.coursera.com (see, for example, several methodology courses offered by the University of Amsterdam instructors: https://www.coursera.org/learn/quantitative-methods)
- edX: https://www.edx.org

In some cases, students will be able to acquire necessary skills during their research, especially if their thesis is a part of a larger research project led by their supervisor. We strongly recommend speaking with the supervisors about it before you start to work on a project.

Furthermore, sound skills in using modern text, databases, spreadsheets, graphic and reference management software are expected from the beginning. Special attention should be given to statistical data analysis packages, such as SPSS or R for Statistical Computing, and to text analysis software, such as MaxQDA and Atlas.ti.

Useful software and applications:

- R for Statistical Computing (http://www.r-project.org/), freeware
- SPSS, statistical data analysis package (www.spss.com), available at a special rate to the University of Freiburg students and staff; see the University of Freiburg IT support webpage: https://www.rz.uni-freiburg.de/services/beschaffung/software/statistiksoftware
- MaxQDA (http://www.maxqda.com/) for the analysis of qualitative text data, available in the computer room CIP 3
- Atlas.ti (http://atlasti.com/) for the analysis of qualitative text data
- AQUAD (http://www.aquad.de/en/), freeware for the analysis of qualitative data
- NVivo (www.qsrinternational.com) for in-depth analysis of text based data
- WinGen (http://www.umass.edu/remp/software/wingen/) for generating IRT parameters and item responses
- LISREL (http://www.ssicentral.com/) for structural equation modelling
- HLM (http://www.ssicentral.com/) for analysis of hierarchical data
- JabRef (http://jabref.sourceforge.net/), open source bibliography reference manager
- EndNote (http://www.endnote.com/), bibliography reference manager
- Citavi (https://citavi.com) reference manager available for free through the University Library
- Zotero (https://www.zotero.org/), reference manager, freeware
- TEXnicCenter (http://www.toolscenter.org/) for developing LaTex documents

An overview of reference management software and freeware available to all University of Freiburg students and staff members, compiled by the University Library: https://www.ub.uni-freiburg.de/unterstuetzung/literaturverwaltung/. The Library also offers trainings in literature search and referencing.

A soccer player and his/her coach

A great deal of independence is expected from the student in preparing the master’s thesis. The role of the supervisor is mainly to guide the learning process and much less to provide specific knowledge and methodological skills. In this respect the relationship between the student and the supervisor can be compared to the one of a soccer player and a coach: it is the player who scores, but it is the coach who regularly provides the player with hints and tactics. In contrast to soccer, not only the goals but also the training itself is central part of the game. The grading of the thesis at the end is thus not a characterization of the student's qualities as a scientist, but rather a feedback on his or her scientific training progress and the quality of the thesis report.

Given the intensive training process, it is important that the expectations of both parties involved, the student as well as the supervisor, are clear from the beginning, finally resulting in an unambiguous agreement the terms of cooperation and communication. Make sure to speak with your potential supervisors as early as possible.

As has been mentioned already, the role of the supervisor is focused mainly on guiding the learning process and less on providing specific knowledge on the thesis topic. Students cannot therefore expect the supervisor to provide them with more than background information on the topic and some start literature. Finding relevant literature, working out a good problem statement, defining objectives and research questions, and elaborating a sound conceptual as well as methodological framework is already one of the core issues of scientific work and has therefore to be carried out by the student independent from the supervisor as much as possible. It is an important learning experience to find out that science is much more than just the "blood-and-sweat"-part of data collection and analysis! Nevertheless, the supervisor will be ready to assist the students in all phases, if requested.

The supervisor is the person that provides feedback at the different stages throughout the process of preparing the master's thesis as well as controlling the process itself. No general rules on the frequency of supervision meetings exist – instead the frequency depends on the individual agreements between the student and the supervisor. It is the student's responsibility to signal the need for meetings with the supervisor timely in advance.

If for any reason the student is not satisfied with his or her supervision, the MEG-program director or the study dean should be contacted directly by the student.

3 Steps in the master's thesis preparation

3.1 Selection of a topic and a supervisor

The first step in working on a master's thesis is the selection of a topic and a supervisor. Essentially, a topic is a title of your prospective master's thesis. It is closely related to a research problem, research objectives and research questions of your study. The topic should reflect what you are specifically interested in studying within a broader filed of inquiry. It means that students should avoid formulating their topics too broadly (e.g. Governance of Natural Resources in the Congo Basin), but should try to focus on a specific aspect of a research area (e.g. The Role of NGOs in Forest Governance in the Congo Basin: An Institutional Entrepreneurship Approach). Please see Section 3.2 for recommendations on translating initial research interests and ideas into research problems, objectives and questions

There are in principle two different ways to find a topic:

- <u>Topics offered by the chair groups or professors</u>: The topics offered are originating from within the chair groups, mainly related to ongoing or planned larger research projects of the chair group. Students interested in such a topic should contact the respective project leaders or professors.

- <u>A student proposes a topic:</u> In this case the student has to find an eligible supervisor (Professor, Privatdozentin, or Post Doc) at one of the chair groups of the University of Freiburg, who has the expertise in the suggested field and is at the same time willing to take over the role as first supervisor. NOTE: Even if it might be one of the “hottest” topics and worked out into a very feasible thesis proposal, if no supervisor can be found at the University, the topic cannot be elaborated in a Master-thesis! The MEG-program director will provide advice whom to contact, but it is the sole responsibility of the student to find a supervisor. In order to avoid frustrations, make sure that you have secured supervision BEFORE completing a fully-fledged research proposal.

Some students prefer to work on a topic in co-operation with or on initiative of (international) organizations and companies. The MEG-Program welcomes cooperative projects and is very open to interdisciplinary approaches. Usually the first supervisor should be a professor from the Faculty of Environment and Natural Resources. However, the examination committee may also permit an external professor or university lecturer to be a supervisor, on condition that the professor from the Faculty of Environment and Natural Resources faculty working in the relevant field of research approves the topic (a written request for approval is required) and acts as the second supervisor and the second examiner.

In some cases, it might be helpful to combine the thesis work with an internship. This holds particularly true for all thesis research, which is done outside of Germany or the respective home country of the student. In case the research is carried out abroad, adequate scientific supervision must be guaranteed in the respective country (in most cases by selecting a second supervisor from a local university) or within the respective organization. All arrangements must be settled by the student in time before the start of the thesis work, and must be agreed upon by the supervisor at the Faculty of Environment and Natural Resources and the examination office.

Some students want to write their theses outside of Freiburg and/or Germany, either in their home countries or in other places. It is possible as long as students remain enrolled at the University of Freiburg and pay all necessary fees, including health insurance.

After students select their topics, discuss them with potential supervisors and agree with them on master’s thesis terms and conditions, they register the thesis project with the examination office. Students will have six months to complete the thesis after the registration (see Section 5.1).

3.2 Preparation of a research proposal

The next step after the selection of a topic and a supervisor and the registration of the thesis is the development of a consistent and comprehensive research proposal. The thesis proposal is a product of the process of preparatory research on the topic selected for a thesis. Students must become familiar with the theoretical problems, the historical context and the empirical specificities of the topic in order to be able to define, in precise terms, what will be studied and how it will be studied. As many researchers have shown, “80% of the problem of research is to correctly define the scientific questions.” In other words, it is necessary to understand and incorporate existing social-scientific knowledge, departing from the concrete problem, to be able to advance scientific knowledge. Given its importance, this step may very well require about 20 percent of the total thesis preparation time.

The research proposal consists out of the following parts:

- **Research problem statement:** giving the motivation for the selection of the topic and a clear delineation of the problem field, ultimately resulting in a concise problem statement. If done in a sound way, this implicitly and explicitly reflects the social and scientific relevance of the selected research topic. To be able to develop a clear problem statement, a preliminary investigation must be carried out to establish a sufficiently profound knowledge base to pose the concrete problems that will be researched. This includes a review of the theoretical and empirical literature, which is most relevant to the topic, which also ensures that the topic has not already been exhausted by other researchers.

  Some supervisors offer master's projects that address very specific practical problems that need to be solved, for example, a development of a safe and efficient bicycle lane network in a specific city district. Yet, in most cases students are expected to formulate a research problem. Addressing research problems means generating new empirical data, analyzing phenomena at stake, developing new theoretical ideas and adding to existing scientific knowledge.

  Where do research problems or ideas come from? Uwe Flick (2015, Ch. 4) suggests several helpful ways to come up with a research problem:
  - Reviewing previous studies in the selected field of inquiry: many articles, book chapters and monographs develop questions for future research. Particularly useful are reviews and research agenda articles in scientific journals, as well as research handbooks.
  - Identifying empirical puzzles, i.e. counterintuitive real-life situations, processes or outcomes that cannot be explained by existing theories.
  - Identifying competing theoretical explanations that can be tested in order to identify a more accurate theory; identifying theories that generate contradictory predictions.
  - Identifying gaps in existing theoretical and empirical literature: lack of data and empirical insights in a specific issue area. Caution: A research gap per se can be an interesting starting point, but there may also be good reasons why no one has studied a specific phenomenon: for instance, the results are likely to be trivial.
  - Observing the world around: personal experience, personal observations and everyday life are great sources of inspiration. It is helpful to follow the news and read daily newspapers and periodicals, in particular sections on the environment, politics, economy and business.

- **Research objective(s) and research question(s):** stating clearly the scientific objectives of the research. Given the fact that scientific research aims at the process of theoretical reconstruction of the topic at stake (in the sense of providing explanation systems), scientific objectives are very often expressed with terms like ‘to enlighten’, 'to understand’, ‘to explore’, 'to determine’, ‘to highlight’, ‘to verify’ etc. It is important that the objectives of the research

(1) are strictly related to the research topic, that is, that they do not change the focus by introducing elements not already implicit in the topic, and
(2) exhaust the topic completely, that is, they do not leave out any object or relation already posited.

How to translate research problems or ideas into research objectives and questions? Think what you really want to know about what interests you. Is there something about the topic that you cannot explain to yourself? Is there a question that you don’t know an answer to? If you have ideas about what the answer might be, but are not sure, it’s likely to be a good question. This is what we call a pre-scientific understanding or a scientific intuition. Several guiding questions are helpful to arrive at a pre-scientific understanding:

- What do you observe (description)?
- What does it mean (understanding)?
- Why is it the way it is (explanation)?
- How are different phenomena connected to each other?
- How can a specific situation or a process be explained?

The research objectives and questions are determined first by the challenge to deepen theoretical knowledge, analytical capacities and techniques and methods of social research and, second, by pragmatic reasons, such as available time, actual research conditions (e.g., availability of resource persons, harvest seasons, hazards, political events), and the capacity of the student.

The research objective(s) should be translated into research questions, that is, stating the questions, which need to be answered in order to fulfill the research objective(s). In this respect, the research questions are an operationalization of the research topic. However, the research questions should not be mixed up with the methodologically coherent operationalization of variables for data collection (e.g., the questions in a questionnaire or in a structured interview) in the later stage of the research process (see Section 3.3 on carrying out research).

Uwe Flick (2015, Ch. 4) identifies several characteristics of good research questions (most apply to research problems and research objectives, too):

- They address socially and/or theoretically relevant issues.
- They lead to some sort of a progress: in literature, in theory, in policy or in practice.
- They are embedded – explicitly or at an early stage of research implicitly – in a theoretical framework.
- For social research: they can be studied by methods of social research, e.g. sociological, political, historical, economic, cultural or

  - ethnographic research (not metaphysical, philosophical or technical research).
  - They are clear, concise, focused, specific and directed by research objectives.
  - Last but not least: they are actual questions (not statements).

- **Theoretical framework**: The theoretical framework acts as a partial guide for the selection of the phenomena, which will come under study. Different theoretical frameworks emphasize different phenomena as the most important for explaining a specific situation, a process or an outcome. It thereby gives a direction to the overall thesis work. In other words, the theoretical framework guides the student in his or her approach to the theoretical reconstruction of the topic.

  In scientific research, researchers use theoretical categories in order to demonstrate that their research belongs to a specific discipline, school of thought and paradigm. In the exposition of the theoretical framework, the main theoretical categories/concepts should be described, along with their relations to the substantive areas under investigation. It is important to keep in mind that the theoretical framework can be seen as a chain of arguments of the student inspired by and based on existing theories and concepts and should result in the student's own conceptual model (mostly additionally summarized in form of a graphic at the end of the theoretical framework). Elaborating a theoretical framework is therefore a creative act, rather than a purely descriptive review of the existing literature.

  The argumentation based on existing theories and theoretical concepts in the theoretical framework should always be done against the background of the research objective(s) and research questions. Even though almost everything seems to be connected to everything, the research objective(s) and research questions help in determining which theories and concepts are relevant for the student's thesis research and which are not. If students are interested in the emergence of a specific environmental discourse, they should look into theories that explain the formation of new discourses, not into theories that use discourse to explain something else, e.g. policy decisions.

  And at the same time, as students work on a theoretical framework, it becomes clear that developing a research proposal is not so much a strictly linear, chronological, but rather an iterative process (in the sense of a dialectical movement between concrete reality and theory, research questions and theory or research problems and research objectives) with several "working" versions before finally writing the definitive proposal. In any case, a comprehensive review of existing theoretical and empirical literature forms the indispensable basis for moving from the pre-scientific understanding (on which the selection of the topic was based) to a deeper theoretical understanding of the topic (which is needed to actually start writing the real thesis proposal).

Developing the theoretical framework is a creative act, rather than a descriptive exercise. If there are debates around the definition of concepts or their application, the major insights in the debate should be laid out, showing the differences and similarities and finally, how the student will incorporate them into his/her research. Also if the direct application of concepts and theories is not possible to the chosen topic (e.g., because the theory is about decision-making in organizations, whereas the focus of the work might lay on individual decision-making), it should be pointed out how they have been adapted by the student respectively.

The theoretical framework, and its condensed expression in form of the conceptual model, acts as a “map” to identify those concepts in the empirical complexity of the real world, which have been found to be relevant so far by theoretical and empirical literature. It is obvious that the theoretical framework is the ‘business card’ of the student as regards the first scientific standard and determines to a large extent how easy the soccer player can “score” afterwards. Investing time and energy in preparing an analytically sharp theoretical framework is therefore always worth it and can help to save a lot “blood and sweat” afterwards.

- **Methodology:** With the theoretical framework the student indicates *which* concepts are important to be looked at in answering the research questions. In this part of the proposal it should be explained *how* these concepts will be identified and assessed empirically. Methodology in general is nothing else but the science about methods and instruments for the assessment of the real world, or more technically, the generation of data and data analysis. The function of the methodology part within the research proposal (and later in the thesis report) is to specify reliability, validity and principle replicability of your research.
  - Validity is the extent to which theoretical concepts and real-world empirical measurement correspond to each other (e.g., is a household separation and recycling of garbage a good way to measure individual environmental behavior?).
  - Reliability refers to the extent to which a study or an experiment produces similar results two or more different times under similar conditions.
  - Replicabiliby of a study is ensured if research steps, methods and procedures are carefully justified, thoroughly documented and made transparent. In other words, you should describe the research procedures in a way that would make it possible for others to repeat your study.

  The methodology part completes the student’s ‘business card’ with regards to scientific standards.

  Setting up a sound methodological framework requires justifying the selection of your methods and addressing the following points:

  a. Identify the **character of the thesis work**: is it an explorative, or comparative, or interpretative, or analytical, or historical study? Is a case study approach chosen to exemplify a certain real world phenomena or does the thesis work aim at being representative for them? It is obvious that with the selection of the topic and the formulation of the problem statement the student already implicitly provided answers to many of these questions. However, only in making them explicit, the student allows for the discussion of his work, since it enables the evaluation of the student's assumptions and the logic of argumentation.

b. Design the **data collection**: this step requires discussing and providing an answer to the following questions:

   (1) What is seen as <u>*data*</u> and from which <u>sources of information</u> (e.g., pictures, texts, individuals or groups) will they be derived? Data can be primary (that is, generated by the researcher) or secondary (a new analysis of data generated by others).

   (2) What are the criteria for determining and <u>delineating the sources</u> of information (e.g. who will be interviewed? Why those policy documents and not the others? How many people will receive a questionnaire? Why selecting this case study and not another?) The answers to these questions are partially dependent on whether qualitative or quantitative research methods are chosen (see next question).

   (3) What <u>*methods*</u> are employed to derive the data from the sources of information? The selection of adequate methods is dependent on the sources of information, which are seen as relevant to find answers to the posed research questions. Here the student has to argue why a certain method (e.g., observations, interviews, or content analysis) is the most appropriate for the research topic at stake. In general, textbooks distinguish between quantitative and qualitative socio-empirical research methods. These terms should *never* be mixed up with 'objective' and 'subjective' approaches. Both, quantitative as well as qualitative methods aim at objectivity (see Section 2.2 "What is a scientific masterpiece?"). Rather they refer to different qualities of the data, namely whether the data is accessible in direct quantifiable (or measurable) qualities (e.g., the amount of cut timber) or whether the data can only be derived in an interpretative, qualifying way (e.g., the underlying motives of illegal logging).

   As no single method is really suitable to fully capture the complexity of real world phenomena, very often a combination of different methods (e.g., observation plus questionnaire plus group discussions) is applied to assess the *same* phenomena in order not to miss important information and to fulfill the requirements of validity and reliability. This approach is called mixed methods. Especially in qualitative research, it is recommended to use three different methods in order to be able to *triangulate* your data and methods. Triangulation refers to research techniques that enable comparing and cross-validating data from different sources and generated by different methods, e.g. interviews and document analysis or surveys and qualitative case-studies (see Flick 2015, Ch. 12). Triangulation is an instrument to increase a study's validity and reliability.

(4) Which ***instruments*** within the method family will be used (e.g. questionnaires, a semi-structured interview guideline, or an observation manual)?

c. Design the **data analysis**: It should be pointed out that methods and instruments are necessary for the *data collection* (that is, to come from theory to data) as well as for *data analysis* (that is, to come from data to theory). Whereas students are most often familiar with basic methods of data collection, either quantitative or qualitative in nature, they often do not know enough about data analysis methods. How do you cope with hundreds of pages of transcribed interviews? What are the results of the interviews? Which statistical tests can be applied given the employed data collection methods? Students should therefore in advance inform themselves about the wide range of methods and the availability of respective instruments (e.g., statistical software packages, such as SPSS and R, or text analysis software, such as MaxQDA) for data analysis (see also Section 2.3).

NOTE: The Chair of Biometry and Environmental Systems Analysis offers consultations in statistics for master candidates working on their thesis projects.

The **precondition for a consultation** is that students have independently (or in cooperation with their supervisors) identified and formulated a research problem, research objectives and research questions and elaborated a preliminary methodological set-up of a study, including intended methods of data collection and analysis.

In other words, you can get feedback on your methods of data collection for statistical analysis, statistical analysis itself and other methodological issues, but do not expect feedback on you research objectives and questions or theoretical framework.

Please contact Dr. Simone Cuiti for an appointment (https://www.biom.uni-freiburg.de/mitarbeiter/ciuti?set_language=en)

- **Working plan and time scheme:** The research proposal finally should end with a comprehensive working plan, indicating the necessary steps in carrying out the research, as well as their logical order. The different steps in writing the master's thesis should be distributed in a feasible manner over the available time period. The student should also agree with the supervisor about the frequency of contacts as well as milestones for delivering certain parts of the thesis proposal or report.

Flick (2015, p. 91-93) offers a useful timescale template that students can use as a starting point for their working plans. He also develops several recommendations for setting a timescale, including defining research process milestones and deadlines for specific steps of a research process.

Preparing the working plan also includes a development of a **financial plan**, such as for example costs for travel, mailing costs, field assistance (e.g. for translation), etc. The general necessity of financial means to carry out the thesis work needs to be discussed and agreed between students and supervisors before the actual thesis work.

3.3 Carrying out research

When carrying out the research special attention should be given to organizational, ethical and safety aspects. Possible financial, social and technical constrains (e.g. rain seasons, harvesting time, or holidays of respondents/interviewees) should be taken into account as much as possible in advance of the research work. If unforeseeable circumstances do occur, the research plan should be revised and adapted to new conditions after a consultation with the supervisor.

In any case the student has to respect social, cultural and interpersonal norms and standards. This holds particularly true for privacy aspects of organizations and persons. In any case, it should be avoided that the identity of persons is discernible out of the final text, if not agreed otherwise between the respondents and the researcher. These agreements have to be laid down before information collection.

Students are required to clearly document all research activities, findings and sources, including also seemingly small details. Analytical skills should be accompanied by organizational accuracy. Experience shows that this can save a lot of time when finally preparing the thesis report (see also Section 4 on good scientific practice).

Also in the phase of carrying out the research it is recommended to keep a close contact with the supervisor.

3.4 Writing the thesis report

The research activities should finally result in a comprehensive, consistent and concise thesis report. On average, the thesis report **has a size around 60 to 80 pages** (without possible annexes). It should be written according to scientific standards and using the possibilities of modern text software in the layout (Font size 10-12; multiple line spacing 1,3 to 1,5; 2,5 cm margins on the upper, right and bottom side of the page; on one sided white pages).

In general, the thesis report is structured into the following parts:

- **Outline / Table of content:** Providing the overview on the chapter structure with the respective page numbers.

- **Overview of tables, figures and annexes:** The outline is followed by an overview of the tables and figures in the text, including the respective page numbers.

- **Summary or abstract:** Providing a short, but comprehensive summary of all chapters. The length should not exceed one A4 page.

- **Introduction:** This part includes the problem statement, the scientific objectives as well as the research questions (see also Section 3.2 on the research proposal). It can be completed by a characterization of the type of work (referring to the first question in the methodology part of the research proposal – explorative, comparative or historical study), a short outline of the chain of arguments and the structure of the thesis, including subsequent chapters.

- **Theoretical Framework:** In this section, the review of the theoretical and empirical literature and the reconstruction of the used theoretical concepts will be provided (see also section “research proposal”). The theoretical framework is very often completed by a conceptual model, in which the relations of the relevant concepts (e.g., behavior, action, values or community) of the applied theories are presented (see also Section 3.2 on the preparation of a research proposal).

- **Methods** (not methodology, as in the proposal, but research design in the case of empirical studies)**:** This part reports on the used information sources, as well as the applied methods and instruments for data collection and data analysis (see also Section 3.2). In contrast to the research proposal, where this section is presenting the ambitions or a plan, in the final thesis report students present the research process as it has actually worked (e.g., also problems which occurred) should be presented. This chapter should also contain a detailed step-by-step description of the data collection and analysis processes. If the research has been a case study, circumstances as well as the case should be described here.

- **Results:** In this section, the results should be presented in the most objective and comprehensive manner. Mixing results presentation with subjective interpretation and discussion should in any case be avoided. The challenge is to structure the results chapter in such a way that the research questions are addressed in a convincing and effective fashion. When writing, it is useful to go back to a research problem, objectives and questions and compare the results to the questions in order to make sure students actually provide answers to their questions. Where appropriate the findings should be illustrated or summarized with tables and figures. ‘Appropriateness’ means that they add a value to the text. In any case tables and figures must thereby be drawn in such a way, that they can stand on their own independent from the surrounding text. Do not forget to include measurements and an explanation of abbreviations. Color figures should be avoided, using gray scales or textures instead. References to tables and figures should be made in the text (e.g., see Table 1 or cf. Figure 2). Note that table captions are given above the table, whereas figure captions are placed below the figure.

- **Discussion:** The discussion sections links students' findings, as presented in the result section, with those of others. The challenge here is to argue for and against the findings and the related theoretical concepts. Literature references are, therefore, again a requisite in this section. Furthermore, the findings should be discussed in the background of the scientific objective and the research question, as well as in the light of the chosen theoretical framework. It might therefore be helpful to structure the discussion section accordingly. Last but not least, it should also not be forgotten to discuss the extent in which the findings might have been influenced by the chosen methods (e.g., possible shortcomings, special circumstances, or limitations of methods and data).

- **Conclusions:** This section brings together the most important consequences in the student's perspective of his or her research. These conclusions normally touch on three aspects: a) the scientific objective and the research questions (results); b) hints for future research on this topic (theoretical framework and methods); and c) practical application of the results (consequences for environmental management and policy).

- **Bibliography:** In this section a list of *all* cited literature should be given and sorted in alphabetical order with the last name of the author. Only cited works are included in the bibliography. The bibliography section (like the theoretical framework) again can be seen as a sort of "business card" of the researcher. Information given in the bibliography should be complete and accurate. The style for the different types of publications (articles in journals, books, chapters in books etc.) should be consistent. Some researchers prefer to mention information sources, such as policy documents and internet sources separately. If reference is made to information on the internet, the complete web-address should be given, as well as the date on which the information has been last accessed (*e.g., Ministry of LNV (2002): Dutch Forest Policy. Public brochure downloadable at http://www.lnv.nl/brochure.pdf. Retrieved on June 15, 2012*).

  The references should include the following information and might be formatted as follows:

  - **Monographs:**
    Last name, first name (year of publishing). *Title and subtitle*, edition. Place: Publisher.
    e.g., Hollis, M. (1994). *The philosophy of social science: an introduction*. Cambridge: Cambridge University Press.
  - **Journal Articles:**
    Last name, first name (year of publishing). Title and subtitle of the article. *Name of Journal*, *Volume*(Issue), pages.
    e.g., Nair, P.K.R. (2005). How (not) to write research papers in agroforestry. *Agroforestry Systems, 64,* pp. v-xvi.
  - **Article or chapters in edited books:**

Last name, first name (year of publishing). Title and subtitle of the article. In First name, Last name of Editor(s) (Eds.), *Title and subtitle of edited book,* (pages). Place: Publisher.
e.g., Norman, D. A. (1983). Some observations on mental models. In D. Gentner & A. L. Stevens (Eds.), *Mental models* (pp. 7-14). Hilsdale, NJ: Lawrence Erlbaum Associates.

– **Websites and Internet resources:**
Last name, first name (year of publishing). Title and subtitle of the article. In First name, Last name of Editor(s) (Eds.), *Title and subtitle of edited book,* (pages). Place: Publisher.
e.g., MySQL AB. (2008). MySQL. The world's most popular open source database. Retrieved 11.02.2008, from http://www.mysql.com/

Students using reference software, such as Citavi, Zotero or Endnote, to manage references can use a different style supported by the software. It should be as similar as possible to the citation style described above

- **Annex/Appendix:** The annex should include information, which can be missed in the direct text body, which, however, is relevant for the understanding of the research or of important steps of it. This could mean for example the inclusion of the original data, the list of interviewed persons, background information on the study area, the questionnaire, further detailed statistical analysis, etc. Note that also the annex pages should be numbered consistently with the general text.

The presented structure of the different parts at the same time also reflects the standard chapter structure of a scientific report, with the ‘Introduction’-section forming chapter 1, the ‘Theoretical framework’ forming chapter 2, and so on. However, different types of research (e.g., historical research or development of methods) might require a slightly different chapter structure.

3.5 Colloquium requirements

Colloquium requirements depend on the individual supervisor. A presentation in a research colloquium or seminar is not mandatory, but we strongly recommend that the student presents at least once his/her research to a broader audience (such as other students, researchers from within and outside the university, and other interested persons). For training purposes it is useful for the student to hold a start colloquium (presenting the research proposal) and a final colloquium (presenting the research findings).

The presentation should follow the standards for oral presentations, such as clearly addressing the audience with a comprehensive, consistent and logical structure. It is highly recommended to support the presentation by visual tools, such as handouts or Powerpoint presentations. The student has to inform the organizer about the technical requirements timely enough in advance of the colloquium.

4 Good scientific practice

4.1 What is good scientific practice?

In 1997, in response to a case of a serious scientific misconduct at one of German universities, the German Research Foundation – Deutsche Forschungsgemeinschaft DFG – appointed a commission that elaborated a set of recommendations to German universities on the development of safeguards of good scientific practice. According to the revised edition of the recommendations (DFG 2013, p. 67), good scientific practice is the conduct of science resting on honesty as its most basic principle "valid in all countries and in all scientific disciplines." Honesty as the most basic principle of science as practice and as a social system translates into a set of more specific rules of good scientific practice. Regardless of the discipline, the most common fundamental rules of scientific work include "observing professional standards, documenting results, consistently questioning one's own findings, and practicing strict honesty with regards to contributions of partners, competitors and predecessors" (DFG 2013, p. 69). Other rules also include storing and securing primary data and establishing procedures for dealing with scientific misconduct, such as falsification and fabrication of data and results, and plagiarism (see DFG (2013): *Safeguarding Good Scientific Practice. Memorandum*. Retrieved on November 4, 2015 from http://www.dfg.de/en/research_funding/principles_dfg_funding/good_scientific_practice/index.html)

Based on these recommendations, all German universities have developed their own institutional codes and guidelines of good scientific conduct and set up institutions for safeguarding good scientific practice.

The **Regulations of the University of Freiburg on Safeguarding Academic Integrity** and further information on safeguarding academic integrity in Freiburg, including a contact of the representative for academic self-regulation to whom scientific misconduct can be reported: http://www.uni-freiburg.de/forschung-en/redlichkeit_in_der_wissenschaft/redlichkeit_in_der_wissenschaft-en?set_language=en.

Disciplinary scientific associations develop professional standards, codes of conducts and ethical guidelines that aim at specific disciplines. For instance, the British Sociological Association BSA developed a Statement of Ethical Practice (BSA 2002) that documents principles of good scientific practice in sociology (http://www.britsoc.co.uk/about/equality/statement-of-ethical-practice.aspx). Most other disciplines and national associations have similar guidelines (see Flick 2015, p. 32).

Professional standards for social research include among others (see Flick 2014, Ch., 3):

a. Informed consent: "Studies should generally involve only people who (a) have been informed about being studied and (b) are participating voluntarily" (p. 32).

b. Confidentiality, anonymity and data protection: researchers should guarantee confidentiality, anonymity and data protection to people being studied (p. 34)
c. Non-maleficence: researchers should take precaution to avoid harming participants of a study (p. 32)

We encourage master students to read the DFG guidelines on safeguarding good scientific practice, the Regulations of the University of Freiburg on Safeguarding Academic Integrity and a code of ethics of one of professional scientific associations in their disciplines. A good overview of ethical issues in social research is provided by Uwe Flick (2015, Ch. 3).

4.2 Plagiarism

In this subsection, we focus specifically on plagiarism as one specific form of scientific misconduct, unfortunately more common to master's theses:

Plagiarism is commonly defined as follows: "The practice of taking someone else's work or ideas and passing them off as one's own" (Oxford American Dictionary, Digital Version 1.0.1, 2005). Plagiarism is generally (thus also in essays or course assignments, and not only in theses) punished severely in academic institutions. Students being caught in plagiarism not only fail courses or the thesis assignment but also harm their own reputation.

According to the 'MCC Guide to Writing Research Papers' (Revised version August 2006, Monroe Community College), "work can be labeled plagiarized if one of the following occurs:

a. A passage is copied word-for-word (or, in music, note-for-note, or, in art, line-by-line) from someone else's work, whether the source is printed, recorded, visual, or electronic, and that source is not given credit in the required ways.

b. A passage paraphrases a source (rewords or restates the content and ideas without using the author's words) without giving credit to the source in the required ways.

c. The work is based on sources but does not give credit to any of them.

d. The work closely follows the organization of ideas or concepts in someone else's work without giving credit to that source.

e. The work has been composed, wholly or in part, by someone other than the person who submits it. This includes collaborative efforts: if a project was generated by several people, all of them must be given credit.

f. The work is "patched together" from one or more electronic sources, none of which are credited. These sources may be downloaded or printed out, or purchased wholly from a "research paper retailer."

As the 'MCC Guide to Writing Research Papers' (ibid.) continues, any suspicion of plagiarism can be avoided by documentation:

- **Quotation Marks:** When using words (three or more consecutively) copied from the source, put them in quotation marks, which means, “this is exactly what someone else said." Be sure to copy accurately and do whatever is needed to make the quotation grammatically correct. A quoted passage should generally not be longer than one paragraph.

- **Paraphrase:** It is a restatement of a passage from a source in the research paper writer's own words. Unlike summaries, which are shorter than the passage summarized, paraphrases are about as long as the passages on which they are based. Like quotations, paraphrases are used to support a point a writer makes in his research paper. They have to be documented.

- **Citation:** It documents both direct quotations and paraphrases. The exact place the material comes from is stated or “cited” for the reader, in shortened form, in parentheses right after the material, like this: (Katz 18). Most contemporary forms of documentation use parenthetical citations in the text, but a few specialty forms will require notes at the bottom of the page or at the end of the paper. Ask your professor or publisher what form is required.

- **In-text Reference:** The author's name or title is mentioned in the text, either because you're using only one source or because you want the reader to know where a paraphrase begins.

- **Source List/Reference List:** A list of sources is placed at the end of the paper. “Bibliography” is the older term, meaning a list of books; most writers now prefer “Sources” or “References," or some phrase using one of those words, to include both print and non-print materials.

- **Common Knowledge:** Paraphrased statements of facts, such as statistics culled from a government research report, need to be given credit also. When in doubt, cite it.

5 Administrative issues and grading

Important Note: All formal administrative aspects of the master’s thesis, including eligibility for a master’s thesis, registration of a thesis and its submission, are regulated by the official exam regulations (‘Prüfungsordnung’).

If you have any questions concerning the formalities, you should consult University of Freiburg legally binding exam regulations for master programs in general and specifically for the MEG Programme:
https://www.jsl.uni-freiburg.de/studiengaenge/fachinfo/index.html?id_stud=174; http://www.meg.uni-freiburg.de/studying/FormsDownload. Please keep in mind that the official, legally binding version is the German one.

You can also use MEG administrative guidelines available at the MEG webpage http://www.meg.uni-

frei-
burg.de/Filelist/Current%20Students/guidelines_master_thesis__2015_neu.pdf.

See also Annex 6.5 for a non-binding checklist of actions and responsibilities.

5.1 Registration of a thesis project with the examination office

The earliest point at which a student may register the master's thesis is during the 3rd semester after the student has collected at least 70 ECTS credits.

Before submitting a registration application form to the examination office, the student must first choose an acceptable topic and find an appropriate supervisor (see Section 3.1). The student and the supervisor must then agree upon the second examiner. The second examiner evaluates the final master's thesis next to the supervisor ('first examiner'), but is usually not involved in the supervision process itself.

The student must fill out a master's thesis registration form and send it to the examination office for an approval of a master's project before he or she begins writing the thesis. The form must be signed by the student and the supervisor. The student submits the completed form to the examination office. From there it will be forwarded to the chair of the examination committee for approval. The registration form can be downloaded from the MEG homepage: http://www.unr.uni-freiburg.de/studium-lehre/master/pruefungsamt-msc/1msc-vergabe-masterarbeit-dt.engl-neu-nach-okt.-2012-neu.pdf; see also Annex 6.6). It is the sole responsibility of the student to choose a topic for an MSc-thesis, to find an appropriate supervisor and register the thesis. The name of the second examiner must be included in the application form.

Although students may start developing their first ideas for a thesis, including a research problem and research objectives and questions, before the thesis registration, the actual work on the thesis, including data collection and analysis, cannot begin prior to the chosen starting date, which is recorded in the registration form.

Once the chair of the examination committee has approved the thesis application, the examination office will send the student a confirmation letter and **determine the individual submission deadline.** The student may start doing their research project for the thesis upon the receipt of the letter of confirmation. You have exactly **six months** to complete the thesis.

Students are allowed to change their topic and thus **suspend their work on the thesis only once and only during the first two months after approval**. Students should immediately inform the examination office and the supervisors about their decision to suspend their research and to select a new topic. A new topic must be submitted within to the examination office four weeks after the suspension.

5.2 Costs associated with carrying out the master's research

All research activities should be planned in such a manner, that no project finances or external funding has to be acquired. In any case students should try to rely on existing administrative and logistic support as much as possible. If despites all efforts, costs are unavoidable to carry out the master's research (e.g., for traveling to interview partners) the student has to provide a financial plan in advance, which has to be approved by the supervisor. All costs made without a prior agreement with the supervisor have to be carried by the student her- or himself.

Acquiring funding for carrying out thesis research (if necessary) is the responsibility of the student. The Faculty of Environment and Natural Resources does not have funds to support thesis research. Some (limited) funding may be available through the foundations at the University of Freiburg (for more information check the homepages of the University and of the MEG-program).

The printing cost of draft versions as well as the three copies of the final thesis has to be covered by the student. This arrangement *does* include color prints (for example of figures, photos, title page). It is therefore highly recommended to use gray scales or textures with figures and photos from the very beginning.

5.3 Qualifying for an extension: Illness and other exceptional situations

An extension of a maximum of four weeks is possible only in exceptional cases. This requires the submission of a written application. Requests for extensions must be submitted to the examination office immediately when they occur (thus not at the end of the thesis time, when the student realizes that he/she is running out of time due to this exceptional situations) and no later than the original submission deadline of the thesis. The request must include a written approval and justification by the supervisor.

Should the student fall ill during the writing of the master's thesis, he/she must submit a doctor's certificate to the examination office immediately. The doctor also has to attest to the student's illness by filling in the '*Bescheinigung der Prüfungsunfähigkeit*' form, which can be downloaded from the examinations office website (http://www.unr.uni-freiburg.de/studium-lehre/master/pruefungsamt-msc/1formblatt-prufungsunfahigkeit-merkblatt-fun.pdf). If you hand in the certificate after your illness, it will not be considered.

An extension can only be granted for the duration of your illness (maximum of six weeks) and only for illnesses that clearly prevent you from working on your thesis.

5.4 Dissemination of final thesis report

The master's thesis is seen as an official examination document. For privacy reasons the University Law **does not allow, just as with other examination**

types, that the results of examinations are made public. This is also why master's theses at the University of Freiburg are not made available in libraries or online.

If additional copies of the final thesis report are required (e.g. for organizations which co-operated in the research), students are required to obtain their supervisor's approval.

Students are also **not permitted to publish their original theses online**. They can publish their results in a revised form as journal articles, book chapters and books based on their theses (i.e. publications cannot be identical to theses).

5.5 Submitting the thesis to the examination office ('Prüfungsamt')

The thesis must be submitted **directly to the examination office** by the submission deadline stated in the letter of registration confirmation at the latest. It can also be submitted earlier. It is the sole responsibility of the student – and not the supervisor - to stick to the deadline. If the master's thesis is submitted after the date stated in the letter of confirmation sent to the student by the examination office, the master thesis will automatically be graded as 'unsatisfactory' (5.0/fail).

The student must submit three hard copies of the thesis and a CD with an electronic copy of the thesis. Each copy (one sided white pages) must be bound. Spiral binding is not an accepted format for the submission of the thesis.

The title page should contain 1) the title as stated in the confirmation letter from the examination office (slight changes are acceptable – see below), 2) the name and 3) ID-(Matrikel) number of the student; 4) the name of the master's program (MEG) as well as 5) the names of the supervisor (who is also the first examiner) and the second examiner, and 6) the date of submission (The title page template can be downloaded from http://www.meg.uni-freiburg.de/studying/thesis; see Annex 6.8).

The thesis title written on the registration form is a provisional title. You can keep it, but you can also to change the title slightly, as long as it is obvious from the title that you did not change the topic of your thesis. The key words should be maintained. You do not need to apply for slight changes of the title, just submit the thesis with the final title. If you are not sure, contact your supervisor or the examination office.

The master's thesis must include a testimony on a separate page, in which the student attests that he/she has completed the thesis without external aid, has used only the sources and materials indicated in the thesis and that he/she has not previously submitted the document in question as a master's thesis elsewhere. The testimony is placed at the end of the thesis, usually as the last page, and must be signed by the student. Please sign three copies.

5.6 Thesis evaluation

The thesis will be evaluated by the supervisor and the second examiner. Feedback on the student's performance during the 'training' process of preparing the master's thesis will be provided in written form. The thesis evaluation usually touches upon the following criteria for judging on the quality of a scientific work, namely (see also Annex 6.7):

- **Content** focusing on a) problem statement; b) objectives/research questions; c) theoretical/analytical framework; d) methods; e) results; f) discussion; g) conclusions; h) logic of chapter structure; i) comprehensiveness of literature review;

- **Formal aspects** focusing on a) scientific text style; b) accuracy of citations; c) quality and appropriateness of tables and figures; d) quality of layout according to modern text processing standards; e) completeness and consistency of the bibliography;

- **Working process** focusing on a) specific difficulties (e.g., thesis report in an other than the mother language) and unforeseeable problems (e.g., illness of interview partners); b) degree of independence, with which the research has been carried out as well student's ability to integrate comments; c) work progress within the given time frame of (usually) 6 months;

- **Remarks** allowing for additional comments of the supervisor about the training process of the student

5.7 Grading

The final grade awarded the master's thesis is the average of the two grades awarded by the two examiners. The grading will be based on the standard grading scale at the University of Freiburg ranging from 1 (excellent) to 5 (insufficient). To pass, the master's thesis must be graded as sufficient (4.0) or better.

The grading will take into account all elements and steps in the preparation of the master's thesis, possibly including the oral presentations. However, main emphasis will be given to the final thesis report.

6 Literature and supplementary materials

6.1 Finding literature for the thesis research

Beside the catalogue of the Library of the University of Freiburg (https://www.ub.uni-freiburg.de), we encourage you to use other search engines and databanks, including (but not limited to):

- ScienceDirect (full-text scientific database offering journal articles and book chapters from nearly 2,500 journals and 26,000 books): http://www.sciencedirect.com/

- ISI Web of Knowledge/Web of Science/Social Science Citation Index (a vast collection of journal articles): www.webofknowlege.com
- Karlsruhe Virtual Catalog (a search engine for more than 500 million books and periodicals in library catalogs worldwide, including all German libraries): http://www.ubka.uni-karlsruhe.de/kvk_en.html

Visit the University Library webpage to search their collection of databanks: http://rzblx10.uni-regensburg.de/dbinfo/fachliste.php?bib_id=ubfre&lett=l&colors=&ocolors=

Please attend a library tour or a literature search and management workshop to make the most of the opportunities offered by the University Library. Do not hesitate to contact librarians if you have questions or need help.

Google Scholar: http://scholar.google.com/

"Google Scholar provides a simple way to broadly search for scholarly literature. From one place, you can search across many disciplines and sources: peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, preprint repositories, universities and other scholarly organizations. Google Scholar helps you identify the most relevant research across the world of scholarly research" (https://scholar.google.com/intl/en/scholar/about.html)

6.2 Further readings: Introduction to the social science

The following literature lists does not intend to provide a complete nor exhaustive overview on helpful and interesting further readings when starting to write a master's thesis. It mainly focuses on standard publications which are easily accessible at the libraries in Freiburg and from which the student can start on to search for more detailed literature relevant for his or her specific topic:

- Flick, U. 2015. *Introducing Research Methodology. A Beginner's Guide to Doing a Research Project*. 2nd edition. Los Angeles, London: SAGE (a book required for the Research Skills module)
- Fuller, S. 1997: *Science*. Open University Press, Buckingham: 159 p.
- Stevenson, L.; Byerly, H. 1995: *The many faces of science: an introduction to scientists, values, and society*. Westview Press, Boulder: 257 p.
- Hollis, M. 1994: *The philosophy of social science: an introduction*. Cambridge University Press, Cambridge: 268 p.
- Trigg, R. 1985: *Understanding social science: a philosophical introduction to the social sciences*. Blackwell, Oxford: 224 p.

6.3 Further readings: methodology and methods in the social sciences

- Aron, A. & Aron, E. 2007: *Statistics for the behavioral and social sciences*. Upper Saddle River, NJ: Prentice Hall.
- Berg, B.L. 2001: Qualitative research methods for the social sciences. - 4th ed. Allyn and Bacon, Boston: XV, 304 p.

- Bohrnstedt, G.W.; Knoke, D. 1994: Statistics for social data analysis. - 3rd ed. Peacock, Itasca: 574 p.
- Booth, W., Colomb, G.G., & Willimas, J.M. 2003: *The craft of research* (2^{nd} ed.). Chicago, IL: The University of Chicago Press.
- Bryman, A.; Cramer, D. 2001: Quantitative data analysis with SPSS Release 10 for Windows – a guide for social scientists. Routledge, Hove
- Cohen, B. H. & Lea, R. B. 2003: *Essentials of statistics for the social and behavioral sciences*. New York: John Wiley.
- Cohen, L. & Holliday, M. 1996: *Practical statistics for students*. Thousand Oaks, CA: SAGE Publications.
- Creswell, J.W. 2005: *Educational research. Planning, conducting, and evaluating quantitative and qualitative research* (2^{nd} ed.). Upper Saddle River, NJ: Pearson.
- Dale, A.; Davies, R.B. 1994: Analyzing social and political change - a casebook of methods. Sage, London: 229 p.
- Denzin, N.K.; Lincoln, Y.S. 2005: Sage handbook of qualitative research. - 3nd ed. Sage, Thousand Oaks.
- Dunn-Rankin, P., Knezek, G. A., Wallace, S., & Zhang, S. 2004: *Scaling methods*. Mahwah, NJ: Lawrence Erlbaum Associates, 2nd edition.
- Hair, J.F.; Anderson, R.E.; Tatham, R.L.; Black, W.C. 1995: Multivariate data analysis – 5th ed. Prentice Hall, Englewood cliffs, New Jersey: XX, 730 p
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6.4 Additional internet resources

Learning for sustainability:
http://learningforsustainability.net/research/phd_research.php

- “This page lists some on-line resources for both research students and their supervisors. Topics covered include developing your supervisory team as well as structuring and writing your thesis or dissertation. The links here pay particular attention to students doing integrative research, although they will be of interest to many students from a range of disciplines. Special attention is paid to using action research for theses. Some resources are also included to help thesis supervisors, examiners, and students who want to see what examiners may be looking for.”

6.5 Annex A: Checklist of actions and responsibilities

Action	*Who*
1. Obligatory: Fixing thesis topic with supervisor	*Student*
2. Obligatory: Contacting 2nd supervisor	*Student, supervisor*
3. Obligatory: (**in the 3rd or 4th semester, after the student completed courses for 70 ECTS**) Registration of thesis at the examination office ("Prüfungsamt") contract, signing by student and supervisor	*Student*
4. Obligatory: Examination office will send confirmation letter and determine the submission deadline	*Examination office*
5. Obligatory: Start working on your thesis only upon receipt of the letter of confirmation	*Student*
6. Optional (according to individual agreements with supervisor): Preparation of research proposal	*Student (supervisor)*
7. Optional (according to individual agreements with supervisor): Arranging date for colloquium presentations	*Student, colloquium coordinator*
8. Optional (according to individual agreements with supervisor; we recommend: **no later than six weeks after official start**): Approval of research proposal	*Supervisor, student*
9. Obligatory: Thesis work	*Student (supervisor)*
10. Obligatory: (**no later than individual deadline as mentioned in the official letter from examination office**) Submitting three copies of final thesis to examination office	*Student*
11. Obligatory: Distributing copies to supervisor and second examiner for evaluation	*Examination office*
12. Obligatory: Writing evaluation report, grading of thesis	*Supervisor, 2nd examiner,*
13. Obligatory: Administrative finalization: ▪ grades to examination office, ▪ evaluation report to examination office ▪ copy of evaluation report to student	*Supervisor, 2nd examiner,*

6.6 Annex B: Master's thesis registration form

Source: http://www.unr.uni-freiburg.de/studium-lehre/master/pruefungsamt-msc/1msc-vergabe-masterarbeit-dt.engl-neu-nach-okt.-2012-neu.pdf

An den Vorsitzenden des Fachprüfungsausschusses
für die Masterstudiengänge (M.Sc.) der Fakultät für
Umwelt und Natürliche Ressourcen

– Hauspost –

Professur (Stempel)

1. **Erklärung zur Betreuung einer Masterarbeit (Studium nach der Prüfungsordnung 2012 oder 2013; nur vollständig in Verbindung mit der Erklärung auf Seite 2)**
Declaration to supervise a M.Sc. thesis (for students who started their program in the regulations 2012 or 2013); only complete in conjunction with the declaration on page 2)

Hiermit erkläre ich mich gemäß § 20 Abs. 3, allg. Teil der Prüfungsordnung für den Studiengang Master of Science (M.Sc.) vom 18.08.2005 (kurz MPO), zuletzt geändert Juli 2012, bereit Frau / Herrn:
In accordance with article 20, paragraph 3, general section of the examination regulations for the M.Sc. degree course, 18.08.2005 (MPO), last amended July 2012, I agree to supervise the writing of the M.Sc. thesis of Mr/Ms:

Vorname, Name / *First Name, Surname* — Matrikelnr. / *Student No.*

Straße / *Street*

PLZ, Ort / *Postal Code, Town*

bei der Anfertigung der Masterarbeit in folgendem Masterstudiengang zu betreuen:
The candidate is enrolled in the following M.Sc. degree course:

[ ] Environmental Governance — [ ] Hydrologie — [ ] Geographie des Globalen Wandels

[ ] Forstwissenschaften / Forest Sciences — [ ] Umweltwissenschaften / Environmental Sciences

[ ] Crystalline Materials — [ ] Geology

Das Thema der Masterarbeit lautet:

Betreuer *supervisor*: ____________________

KorreferentIn *second examiner*: ____________________

Die Ausgabe des Themas über den Vorsitzenden des Fachprüfungsausschusses gemäß § 20 Abs. 4 MPO, allg. Teil soll im Einvernehmen mit der Kandidatin /dem Kandidaten zum _________ (**Datum**) erfolgen.
*According to article 20, paragraph 4, general section of the MPO, in agreement with the candidate the topic of the thesis will be assigned by the chairperson of the examination committee on _________ (**date**).*

Ort, Datum
Place, Date

Unterschrift BetreuerIn
Signature of the Supervisor

ggfs. Name DienstvorgesetzteR von BetreuerIn/ KorreferentIn

ggfs. Unterschrift DienstvorgesetzteR

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Page 1 of 2

2. Erklärung der / des Studierenden
Declaration of the student

Mir ist bekannt, dass
It is known to me that

- vor Ausgabe des Themas durch den Vorsitzenden des Fachprüfungsausschusses zu o.a. Termin nicht mit der Bearbeitung der Masterarbeit begonnen werden darf,
  it is not permitted to begin with the masters thesis prior to the date the topic is approved by the chairperson of the examination committee (see above)
- gemäß § 20 Abs. 7 MPO, allg. Teil eine nicht fristgerecht abgelieferte Masterarbeit mit „nicht ausreichend" (5,0) bewertet wird,
  according to article 20, paragraph 7, general section of the MPO, the masters thesis will be graded as 'unsatisfactory' (5.0) if it is submitted after the deadline.
- gemäß § 20 Abs. 6 MPO, allg. Teil die Masterarbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit (nach Ausgabe des Themas durch den Vorsitzenden des Fachprüfungsausschusses) zurückgegeben werden kann.
  according to article 20, paragraph 6, general section of the MPO, the student can withdraw the masters thesis only once and only within the first two months after it was assigned (after the topic was approved by the chairperson of the examination committee).
- gemäß § 9 Abs. 4 (Geology, Crystalline Materials), § 10 Abs. 4 (Hydrologie, Environmental Governance, Geographie des Globalen Wandels) bzw. § 11 Abs. 5 (Forst- und Umweltwissenschaften) die Masterarbeit in gebundener Form in dreifacher Ausfertigung sowie zusätzlich in elektronischer Form (z.B. CD oder DVD) beim Prüfungsamt einzureichen ist.
  according to article 10, paragraph 4 (Hydrology, Environmental Governance, Geography of Global Change) respectively article 11, paragraph 5 (Forest Sciences and Environmental Sciences) the master thesis has to be submitted in bounded form and in three copies. In addition an electronic version (e.g. CD or DVD) must be handed in.

Ort, Datum *Place, Date*	Unterschrift der /des Studierenden *Signature of the student*

3. Hinweis gem. § 20 Abs. 8 MPO:
With reference to article 20, paragraph 8 MPO:

Bei der Einreichung hat der Kandidat/die Kandidatin schriftlich zu versichern, dass
When submitting the thesis, the candidate must attest in writing, that

- die eingereichte Masterarbeit beziehungsweise bei einer Gruppenarbeit seinen/ihren entsprechend gekennzeichneten Anteil der Arbeit selbständig verfasst hat,
  he/she has completed the submitted master thesis - or in case of a group work, his/her or part which is marked accordingly – on his/her own.
- er/sie keine anderen als die angegebenen Quellen und Hilfsmittel benutzt und alle wörtlich oder sinngemäß aus anderen Werken übernommenen Inhalte als solche kenntlich gemacht hat,
  he/she has not used other sources and materials then the ones indicated and that all contents which have been adopted literally or analogous from other works have been marked as such.
- die eingereichte Masterarbeit weder vollständig noch in wesentlichen Teilen Gegenstand eines anderen Prüfungsverfahrens war oder ist und
  the submitted master thesis, either as a whole or relevant parts of it, has not been or is not part of another examination procedure.
- die elektronische Version der eingereichten Masterarbeit in Inhalt und Formatierung mit den auf Papier ausgedruckten Exemplaren übereinstimmt.
  the electronic version of the submitted master thesis corresponds in content and format to the copies printed on paper.

Ort, Datum *Place, Date*	Unterschrift der /des Studierenden *Signature of the student*

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Page 2 of 2

6.7 Annex C: Optional structure of thesis evaluation sheet (subject to individual preferences of supervisors)

Student	
Thesis Title	
Credits	
Supervisor	
2nd Examiner	

Content	
Problem statement	
Objectives/ Research question	
Theor. / analytical framework	
Method	
Results	
Discussion	
Conclusion	
Chapter structure	
Literature	

Formal Aspects	
Text style	
Citations	
Table and Figures	
Layout	
Bibliography	

Working Process	
Difficulty/Problems	
Independence	

Progress

Remarks

-

Overall Grade

Summarizing the given arguments the work is graded with

Freiburg, - Date

(Signature Supervisor)

6.8 Annex D: Master's thesis title page

Source: http://www.meg.uni-freiburg.de/studying/thesis

Albert-Ludwig-University Freiburg
Faculty of Environment and Natural Resources

> Full title as stated in the confirmation letter from examination office <

Master-thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science Environmental Governance

by

> Name of the Student <

> Student-ID <

First supervisor: > Name, Affiliation <
Second supervisor: > Name, Affiliation <

Freiburg i.Br. / Germany

Date of submission:
> Date <