LIFE SCIENCES AND NATURAL RESOURCES

CLIMATE STUDIES

WAGENINGEN UNIVERSITY

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This report was finalized on 26 March 2019.

REPORT ON THE MASTER'S PROGRAMME CLIMATE STUDIES OF WAGENINGEN UNIVERSITY

This report takes the NVAO's Assessment Framework for Limited Programme Assessments as a starting point (September 2016).

ADMINISTRATIVE DATA REGARDING THE PROGRAMME

Master's programme Climate Studies

Name of the programme:	Climate Studies
CROHO number:	60107
Level of the programme:	Master
Orientation of the programme:	Academic
Number of credits:	120 EC
Specializations or tracks:	The Physical Climate System Biogeochemical Cycles Ecological and Agro-ecological Systems Human-Environment Interactions Climate, Society and Economics
Location:	Wageningen
Mode(s) of study:	fulltime
Language of instruction:	English
Expiration of accreditation:	31-12-2019

The visit of the assessment panel Climate Studies to Wageningen University took place on 17 and 18 January 2019.

ADMINISTRATIVE DATA REGARDING THE INSTITUTION

Name of the institution:	Wageningen University
Status of the institution:	publicly funded
Result institutional quality assurance assessment:	positive

COMPOSITION OF THE ASSESSMENT PANEL

The NVAO approved the composition of the panel on March 7th 2018. The panel that assessed the Master's programme Climate Studies consisted of:

- Prof. S. (Stanley) Brul, Professor Molecular Biology and Microbial Food Safety at the University of Amsterdam (UvA) and chair of the Dutch institute for Biology (NIBI) (Chair);
- Dr A.A.J. (Annik) Van Keer, educational policy advisor at the Faculty of Science at Utrecht University (UU);
- Prof. M. (Martin) Claussen, Professor of Meteorology at the Meteorological Institute of the University of Hamburg and head of the International Max Planck Research School on Earth System Modelling in Hamburg, Germany;
- Prof. ir. M. (Max) Rietkerk, Professor of Environmental Sciences specialised in Spatial Ecology and Global Change at Utrecht University (UU);
- Dr W.J.V (Walter) Vermeulen, Associate Professor of Governance of Sustainable Production & Consumption in the Environmental Governance group of the Copernicus Institute of Sustainable Development, Utrecht University (UU) / Extraordinary Associate Professor at the School of Public Leadership, Stellenbosch University, South Africa;

- S. (Sietske) Gadella BSc, master's student Infection and Immunity at Utrecht University (student member).

The panel was supported by dr. F. (Floor) Meijer, who acted as secretary.

WORKING METHOD OF THE ASSESSMENT PANEL

Preparation
In preparation of the site visit, the panel studied several documents, amongst others: the NVAO assessment framework (2016), the institutional audit of WU and the previous programme assessments (of 2012). The accreditation system has entered its third phase (concurrently with a second round of institutional audits). Wageningen University has recently passed its second institutional audit. The new NVAO assessment framework is 'geared to a quality assurance system that is based on trust in the existing, high quality of Dutch higher education'.

The most recent assessment of the programme took place in 2012. The outcome of this assessment was an overall score of 'good' and partial scores of 'satisfactory' for Standard 1 and 'good' for standard 2 and 3. While the panel considered the profile of the programme as 'unique' within the Netherlands, it advised to clarify the positioning of the programme, more specifically its choice for either specialization or multidisciplinarity. Additionally, the panel encouraged the programme to adapt the rather general intended learning outcomes. The panel was generally pleased with the learning environment, with its balanced mix of teaching methods, good research capabilities of the staff and good quality of individual courses. It did remark that the overall coherency of the programme was difficult to assess. The panel was positive about the system of assessment and considered the theses to be of high quality. Nonetheless, it stressed the necessity of providing qualitative feedback on the thesis forms and more closely involving the programme management in the choice of an appropriate thesis topic.

With the new philosophy of the framework and the last assessment of these specific programmes in mind, the panel does not want to elaborate too long on the different criteria of the four standards of the limited framework. The overall evaluation of the programmes by this panel is, as it was in 2012, positive. In this report, therefore, the panel will concentrate specifically on developments since 2012 and on providing suggestions that might help to make the programmes even better than they already are.

QANU received the self-evaluation report of the Climate Studies programme on 28 November 2018 and made it available to the panel. The panel members read the self-evaluation and prepared questions, comments and remarks prior to the site visit. The secretary collected these questions in a document and arranged them according to panel conversation and subject.

In addition, panel members read a selection of recent theses. In consultation with the chair, fifteen theses were selected from the academic years 2015-2016 and 2016-2017, covering the full range of marks given and all specialisations. The panel members also received the grades and the assessment forms filled out by the examiners and supervisors. An overview of all documents and theses reviewed by the panel is included in Appendix 4.

The programme management drafted a programme for the site visit. This was discussed with the secretary and chair of the panel. As requested by QANU, the programme management carefully selected discussion partners. A schedule of the programme for the site visit is included in Appendix 3.

Site visit
The site visit took place on 17 and 18 January 2019 at Wageningen University (WU). In a preparatory meeting on the first day of the site visit, the panel members discussed their findings based on the

self-evaluation and the theses and formulated the questions and issues to be raised in the interviews with representatives of the programme and other stakeholders.

During the site visit, the panel studied a selection of documents provided by the programme management. This included course descriptions, course materials, written exams, assignments and other assessments.

The panel interviewed the programme management, students, alumni, staff members, members of the Programme Committee and members of the Examining Board.

Report
After the visit, the secretary produced a draft version of the report. She submitted the report to the panel members for comments. The secretary processed corrections, remarks and suggestions for improvement provided by the panel members to produce the revised draft report. This was then sent to WU to check for factual errors. The comments and suggestions provided by the programme management were discussed with the chair of the assessment panel and, where necessary, with the other panel members. After incorporating the panel's comments, the secretary compiled the final version of the report.

Definition of judgements standards
In accordance with the NVAO's Assessment framework for limited programme assessments, the panel used the following definitions for the assessment of both the standards and the programme as a whole.

Generic quality
The quality that, in an international perspective, may reasonably be expected from a higher education Associate Degree, Bachelor's or Master's programme.

Unsatisfactory
The programme does not meet the generic quality standard and shows shortcomings with respect to multiple aspects of the standard.

Satisfactory
The programme meets the generic quality standard across its entire spectrum.

Good
The programme systematically surpasses the generic quality standard.

Excellent
The programme systematically well surpasses the generic quality standard and is regarded as an international example.

SUMMARY JUDGEMENT

Intended learning outcomes
The master's programme Climate Studies (MCL) has been designed for students who wish to focus on the scientific insights in climate change and its interactions with society and the economy. As such, it combines knowledge and expertise from three domains: earth sciences, life sciences and social sciences. The panel is pleased with the broad interdisciplinary profile of the master's programme in Climate Studies, which is appropriate for the complex and highly topical subject matter that the programme deals with. The ILOs of the programme broadly match this profile and are suitable for an academic master's programme. However, they would benefit from more specificity and vision. The programme is aware of this and will shortly start the process of revision of the ILOs. Finally, the panel established that the requirements of the professional field, as brought forward by the External Advisory Committee, are sufficiently taken into consideration.

Teaching-learning environment
The panel concludes that the curriculum, teaching-learning environment and staff enable students to achieve the ILOs. The level and content of the curriculum is appropriate for an academic master's programme and strongly linked to the research of the WU Chair Groups. The approach of the courses ranges from distinctly interdisciplinary in the broad initial courses to more disciplinary in the specialised courses. Relevant topics are adequately covered. The panel is positive about the considerable level of flexibility in the curriculum, but concludes that it does pose certain challenges with respect to overall cohesion and community building. It appreciates that the programme has recently taken steps to improve the coherence, for example by introducing five learning trajectories and increasing the frequency of Chair Group visits. Further steps, such as making more courses exclusive to MCL, are currently being considered. This should also help to heighten the distinctiveness and visibility of the programme as well as its attraction to prospective students. The panel is of the opinion that some well-planned further growth could potentially benefit the programme.

MCL offers students a stimulating learning environment, which includes high quality facilities, a diverse range of suitable teaching methods, a good system of study guidance and close relations between staff and students. The programme is working towards optimizing international classroom teaching and the use of group work. Another important opportunity for improvement is to equalize student experiences across Chair Groups. The teaching staff of the programmes is qualified, both in terms of content knowledge and didactics, but it would be appropriate to further improve the diversity of the staff. The increasing workload of staff members, caused by an overall increase in WU student numbers, requires intensive monitoring.

Assessment
The programme has developed a solid system of assessment, which is based on the WU-wide assessment policy. Sufficient attention is paid to the validity, reliability and transparency of examinations. The design of sample tests studied by the panel is adequate: the examinations sufficiently match the course specific learning goals and teaching methods. The level and content of the examinations are appropriate. A point of attention is that assessment practices vary across Chair Groups, particularly with respect to the thesis. To further increase the transparency and comparability of thesis assessment, the panel recommends streamlining procedures at programme level and introducing separate assessment forms for both assessors. Furthermore, the panel advocates the university-wide implementation of a digital assessment system in which the subsequent steps in the thesis process are fully automated.

Finally, the panel established that the Examining Board safeguards the overall level of assessment in the programmes to the best of its abilities. Increasing the capacity of the EB, as is the intention of the Executive Board, could help to strengthen its agency in relation to the rather autonomous Chair Groups. Nonetheless, the panel feels that the central university should also critically reconsider whether the design of the current quality assurance system optimally suits its purposes.
Achieved learning outcomes

Both the sample theses that were studied by the panel and the position of graduates indicate that students achieve the intended learning outcomes of the programmes. In their (partly very specialised) final projects students reach a high academic level. Graduates find employment in relevant positions at companies, non-profit organisations and research institutes/universities. Alumni generally feel that the programme has provided them with a solid foundation for their prospective careers.

The panel assesses the standards from the *Assessment framework for limited programme assessments* in the following way:

Master's programme Climate Studies

Standard 1: Intended learning outcomes	Satisfactory
Standard 2: Teaching-learning environment	Satisfactory
Standard 3: Student assessment	Satisfactory
Standard 4: Achieved learning outcomes	Good
General conclusion	Satisfactory

The chair prof. dr. Stanley Brul and the secretary dr. Floor Meijer of the panel hereby declare that all panel members have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 26 March 2019.

DESCRIPTION OF THE STANDARDS FROM THE ASSESSMENT FRAMEWORK FOR LIMITED PROGRAMME ASSESSMENTS

Governance structure of Wageningen University (WU)
In contrast to many other Dutch Universities, WU has just one faculty: the Faculty of Agricultural and Environmental Sciences. Therefore the governance structure of WU differs from most other universities. The Rector Magnificus of the University is also the Dean of the Faculty. The Dean of the Faculty appoints the Programme Board, which consists of four professors and four students. The Programme Board is the legal governing body of the university's 18 bachelor's and 28 master's programmes. It is responsible for the design, content, quality and financing of the programmes. Each programme has its own Programme Committee, which consists of an equal number of students and staff members who are appointed by the Programme Board. Programme Committees advise the Programme Board on the design and content of their degree programmes. The Programme Board does not employ the lecturers; these are employed by the 94 Chair Groups, which generally include a Chair Holder (full professor), academic and support staff, postdocs and PhD students. The Programme Board, the Programme Committees and the Chair Groups together form the WU education matrix organization.

The Executive Board of WU has appointed four Examining Boards (EBs), each responsible for a group of related degree programmes (domain) and Chair Groups. Examining Boards are independent from the Programme Board and include staff members from the domain. The Examining Boards assess the individual study programmes of students and award student degrees. The Examining Boards also appoint the course examiners and monitor changes to the assessment strategy of interim examinations in the annual education modification cycle. The Examining Boards assure the quality of the interim examinations, and for that reason periodically visit Chair Groups to discuss the validity and reliability of the assessments.

Standard 1: Intended learning outcomes
The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

Profile
The master's programme Climate Studies (MCL) has been designed for students who wish to focus on the scientific insights in climate change and its interactions with society and the economy. As such, it combines knowledge and expertise from three domains: earth sciences, life sciences and social sciences. Students study the geophysical and biogeochemical processes involved in climate change (the mechanisms), the impacts on landscape and ecosystems as wel as the socio-economic aspects of causes and effects. A total of twelve WU Chair Groups in associated fields are involved in the programme. Students are offered a choice between five specializations: (1) The Physical Climate System, (2) Biogeochemical Cycles, (3) Ecological and Agro-ecological Systems; (4) Human-Environment Interactions and (5) Climate, Society and Economics. The overall goal of the programme is to deliver graduates who are able to contribute to sustainable solutions to climate change all over the world and who take their social, personal and ethical responsibilities seriously.

The panel is pleased with MCL's ambitious interdisciplinary profile. Combining different scientific perspectives is clearly a sensible approach to the complex issues surrounding climate change. From its interview with students the panel established that the interdisciplinarity of the programme, combined with WU's reputation in the field, was for many a main reason for choosing the programme. The panel feels that the recent introduction of five specializations has helped to clarify the balance between generalism and specialization, which was a topic of discussion during the previous assessment. In the current setup, students gain a broad foundation in the various sub-disciplines of

Climate Studies, while they are simultaneously provided with the opportunity to obtain more in-depth knowledge in a specific subfield.

Intended learning outcomes
The profile and objectives of the programme have been translated into a set of twelve intended learning outcomes (ILOs). An overview of the ILOs can be found in appendix 1. The panel concludes that the ILOs sufficiently reflect the broad focus, the interdisciplinary orientation and academic character of the programme. Furthermore, the ILOs are linked to the Dublin descriptors, which ensures that their level and orientation are suitable. On the whole, the ILOs are rather generic. The panel feels that they would benefit from more specificity and vision. During the site visit it became clear that the programme intends to revise its ILOs, as was already recommended by the previous panel in 2012. Recently, the programme has put together a vision document that will form the basis for a new set of ILO's that will be introduced in 2020-2021. This set will contain sub-categories of ILOs for the five specializations. The panel is pleased with the principles as laid out in the vision document, but does wish to stress the importance of gaining the shared support of the Chair Groups for this new vision and the proposed changes to the ILO's. Also, the panel feels that the changes to the ILOs could have been made sooner after the 2012 assessment. Particular aspects of the ILOs that could, in the panel's opinion, be sharpened are, first, the rather broad reference to ethical aspects (ILO 11): the panel recommends to clearly distinguish between general ethical aspects and awareness of responsible research practices ('research integrity') in particular. Second, the panel appreciates the reference to critically reflecting on opinions on the causes and effects of climate change (ILO 9), but feels that the ILOs should also incorporate the critical assessment of uncertainties, which is an important aspect of Climate Studies.

Link with the professional field
The panel established that the programme regularly discusses its profile and curriculum with the professional field, as represented in its External Advisory Committee (EAC). The panel appreciates that the composition of the EAC was recently revised, which effectively constituted a renewal of the committee. A recent consultation pointed out that the EAC is generally content with the profile of the programme. The panel feels that the current level of dialogue between the MCL and the professional field is helpful and it is confident that the EAC's opinion will be taken on board in the new set of ILOs and in the curriculum itself. An opportunity for further improvement is to add an international member to the EAC, which now solely consists of national experts. This would reflect the increasingly international outlook of the programme.

Considerations
The panel is pleased with the broad interdisciplinary profile of the master's programme in Climate Studies, which is appropriate for the complex and highly topical subject matter that the programme deals with. The ILOs of the programmes broadly match this profile and are suitable for an academic master's programme. However, they would benefit from more specificity and vision. The programme is aware of this and will shortly start the process of revision of the ILOs. Finally, the panel established that the requirements of the professional field, as brought forward by the External Advisory Committee, are sufficiently taken into consideration.

Conclusion
Master's programme Climate Studies: the panel assesses Standard 1 as satisfactory.

Standard 2: Teaching-learning environment
The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Curriculum
Climate Studies is a modest-sized programme with an average annual intake of 27 students, with a recent peak to 39 students in 2017. Students come from a wide range of bachelor's programmes in earth sciences, ecology, economy, policy or related fields. Roughly a third of the students is international. Particularly within this group it is not uncommon that students already have several years of working experience. During the site visit it was explained that applications are assessed on a case by case basis. Sometimes a tailor-made linkage programme is proposed to students with deficiencies.

The panel established that the design of the two-year master's curriculum (120 EC) is highly flexible in order to accommodate students with different backgrounds. It starts with a common introduction course (*Introduction to Global Change*, 6 EC) and a parallel course that depends on the student's prior education; students with a background in the natural sciences follow *Principles of Climate Change Economics and Policy* (6 EC), while students with a social science background take *Policy or Principles of Earth and Ecosystem Science* (6 EC). In these two initial courses students acquire knowledge about the functioning of the Earth system, human systems, and their interactions. Subsequently, students follow courses in the specialization of their choice (12-18 EC), which help them to prepare for the thesis. Additionally, they choose a number of elective courses (18-24 EC) and complete the so-called WU-wide Academic Master Cluster (AMC, 12 EC). In the second year of the programme, students write a thesis (36 EC), and do an academic internship (24 EC).

To improve the coherency of the MCL curriculum, the programme has recently (2018) introduced four learning pathways: (1) integrating, boundary crossing, (2) disciplinary or specialisation, (3) generic skills, and (4) self-development and career development. Elements of these pathways are addressed at various levels throughout the programme. In the panel's opinion, this is a very helpful initiative that will, however, require some more time and attention to reach its full potential. In particular, the programme could aim for a better embedding of learning path 3 and 4. A central element to further improve the cohesion of the programme is to communicate regularly with the Chair Groups and lectures involved in the teaching. The panel established that the programme is aware of this necessity. The recently appointed programme director and the chair of the programme committee intend to increase the number of visits to the Chair Groups in order to raise awareness of the central philosophy and objectives of the programme.

The panel appreciates that students are actively encouraged to design their individual programme. To help them choose a specialization and a combination of electives that suit their interests and enable them to achieve the ILOs, the programme's study advisers offer close individual guidance. Also, the Chair Groups typically introduce themselves to the students early on in the programme. Individual programmes need to be approved by the Board of Examiners. From the interviews the panel concludes that students appreciate the adaptability of the programme and the support offered in making choices. They listed the many options for personal development as a particular strength of the programme. The panel notes that it is not very common for students with a social science background to cross over to a natural science-oriented specialization or vice versa, as students generally lack the required preexisting knowledge. For some of the most talented and motivated students, however, crossing over is an interesting option.

Students are generally positive about the contents of the curriculum, which in their opinion delivers on the promise of providing them with an interdisciplinary perspective on a highly topical field. They also mentioned a number of opportunities for further improvement. Some students feel that the content of the programme is predominantly oriented on the Western world and could include more

global views. Also, it was mentioned that the curriculum holds little space for alternative scientific views that are not part of the current paradigm. The panel encourages the programme to look into these suggestions. Regular updates of the teaching content and a commitment to staff diversity should help to more closely align the programme to students' expectations.

A particular issue that was discussed during the site visit, is the attention for providing solutions to cope with climate change ('adaptation') and for developing strategies to limit climate change in the long run ('mitigation'). In a recent consultation, the EAC indicated that it would like to see more emphasis on providing solutions to cope with climate change, as well as on developing mitigation strategies that center around energy systems. Students, in their turn, indicated to the panel that the balance between attention for adaptation and mitigation could be improved. In their perception the curriculum is more focused on adaptation than on mitigation. From the interviews with the programme management and staff, the panel established that the programme recognises the need to rethink the balance between the two perspectives in the curriculum as a whole. The panel is pleased that this will be given proper attention in the coming period.

During the site visit, the panel studied materials from a number of sample courses. These included the compulsory introduction course (*Introduction to Global Change),* the Academic Master Cluster course that was specifically designed for MCL (*Design of Climate Change Mitigation and Adaptation Strategies*) and two prominent specialization courses (*Biogeochemical Cycles and Climate Change Mitigation; Climate Governance*), both of which cater to students of various specializations. The panel is pleased with the content and level of these courses, which are appropriate for the domain of Climate Studies and for an academic master's programme. Notwithstanding the abovementioned comments of the EAC and students, the panel is satisfied with the attention for adaptation and mitigation in the sample courses. Overall, the courses are well-balanced and address relevant topics. The learning goals for the courses are clear and match the teaching methods that are used. The course literature is appropriate and up-to-date. The panel further notes that the general distribution of inter-, multi- and monodisciplinarity across the curriculum seems appropriate. Where necessary, courses are distinctly inter- or multidisciplinary. However, rather specialised, disciplinary courses also have a rightful place in the curriculum.

The final dedicated piece of work in the programme is the thesis, for which students conduct a scientific research project that is usually part of ongoing research of the WU Chair Groups or research institutes. The panel observes that the subject of the thesis can be rather specialised, as multi-/interdisciplinarity is not necessarily a goal for the thesis work. In its opinion, the presence of some very monodisciplinary theses contrasts with the interdisciplinary ambition of the programme, and it would therefore encourage some reflection on the wider context of the thesis subject. The training of academic skills particularly takes place in the thesis preparatory courses at the level of the specialization. Students appear to be generally satisfied with the thesis preparation, but some would like to stay more informed on current research that staff members are involved in. In the student chapter they proposed to create regular opportunities for staff and students to present their research results to each other. This is a suggestion that the panel endorses to further facilitate the interdisciplinary ambition of the programme.

The programme also contains a number of elements that help students to prepare for a non-academic career, notably the internship, which can be done at organisations, research institutes and companies all over the world, and the Academic Master Cluster, which is partly oriented on professional skills. The panel notes that most of the students choose the programme-specific course *Design of Climate Change Mitigation and Adaptation Strategies*, in which interdisciplinary groups of students prepare and execute a climate-related research or consultancy project commissioned by a real client. Students clearly appreciate this opportunity to work on a real-life case, but indicated to the panel that the course setup could be expanded and professionalized, by creating more projects with a substantial impact. On the whole, students feel that the curriculum could be more practice-oriented, by increasing the interaction with stakeholders and involving them in the teaching, and by putting

more emphasis on practical problem-solving. The panel established that the programme recognizes this critique and is working on improvement.

Teaching-learning environment
The programme offers its students a good teaching-learning environment, with high-quality facilities (laboratories, high-performance computing system measurement sites) and close connections between staff and students. A major strength, according to students, are the cordial relations with the staff members, who are approachable and encourage students to ask questions. A challenge are the increasing student numbers at WU. While at the programme level some further growth is possible, and even advisable, some of the programmes that MCL shares courses with have reached a critical size, with considerable pressure on facilities and staff as a result. According to MCL students, this already translates into courses which are over capacity with a decline of individual feedback as a result. The panel was pleased to learn that the Executive Board of the university is well aware of the potentially negative side effects of growth and is currently expanding the teaching capacity and splitting up larger courses.

An important topic of discussion during the site visit, was the fact that the current curriculum setup does not optimally supports cohort building. Students choose a specialisation early on and courses are shared with other programmes. According to students, the programme could do more to facilitate an interdisciplinary dialogue between specializations and between students with different backgrounds. There is just one course that all MCL students take: the introduction course *Introduction to Global Change* in the first period. The student association, *Aktief Slip*, which caters to MCL students as well as to those of three other programmes, organizes social and educational events, but its main focus is -understandably- on the larger programmes, particularly the bachelor's programme Environmental Sciences (BES). The panel would like to encourage MCL to look into providing its students with additional opportunities to come together and exchange insights and experiences, for example by making the programme-specific Academic Master's Cluster course *Design of Climate Change Mitigation and Adaptation Strategies* mandatory for all students, by excluding non-MCL students from the introduction course *Introduction to Global Change* or by scheduling a regular series of masterclasses specifically designed for MCL students. The panel was pleased to learn that the programme management is already looking into ways of making MCL courses more exclusive to the programme.

The programme uses various teaching methods, with an emphasis on lectures, (lab)practicals and tutorials. Additionally, there are also field practicals and excursions. Usually, lecturers choose a blend of different teaching methods, including interactive and innovative methods such as role play or negotiation games. The panel would like to encourage the programme to even further explore the possibilities of digital teaching methods. It was pleased to find that the programme also includes group assignments, in which groups of students jointly work on (real-life) cases. The panel agrees with students that this is particularly effective in the course *Design of Climate Change Mitigation and Adaptation Strategies*, where groups are composed of students with different disciplinary backgrounds. In the panel's opinion, this particular course should be labelled a best practice in the sense that much attention is paid to the team process in group work, as well as to project planning, written and oral presentation and individual reflection (e.g. on ethics). Moreover, many projects lead to publications. The panel notes that *Design of Climate Change Mitigation and Adaptation Strategies* could offer inspiration to some other courses, where group work is not necessarily organised in the most effective way. The panel recommends to always set clear learning goals with respect to group processes and to carefully monitor and guide these dynamics. In general, it observes that the programme could make better use of its increasingly international classroom, for example by actively promoting the acquisition of intercultural skills.

Notwithstanding some scheduling issues (especially around important electives courses on topics such as modeling), students indicated that the programme is sufficiently feasible. Nonetheless, as is common elsewhere at WU, a large part of the student population does not complete the programme within the appropriate time frame, for example because they wish to extend the internship or thesis.

Students are generally pleased with the quality of guidance by study advisers and supervision by staff. The panel established that the programme has laid down guidelines for guidance and supervision during the internship and thesis in a course guide. However, as these general standards are adaptable at Chair Group level, daily practices vary quite a bit. The panel would prefer it if all MCL students are offered the same general conditions. Preferably, thesis supervision also includes the use of so-called 'thesis rings', which function as intervision groups for students who are working on their thesis.

Teaching staff
The panel positively assesses the quality of the teaching staff. Lecturers are experts in their fields, who actively participate in WU research projects and are part of relevant international networks. Many staff members are members of a research graduate school. Almost all (95%) lecturers have obtained a PhD. Students described their lecturers as highly knowledgeable. The panel notes that didactic skills are considered important and lecturers are given sufficient opportunities to obtain a University Teaching Qualification (UTQ) and/or other qualifications that benefit their teaching. Currently, 60% of lecturers have a UTQ, while some of the other staff members are in the proces of obtaining such a qualification. According to the Board of Examiners the increasing professionalization of the staff already has a noticeable effect on the quality of the teaching and assessment practices. The panel therefore supports a further increase of the percentage of staff with a UTQ. A further opportunity for improvement is to further diversify the staff. The current composition of the staff does not yet reflect the increasingly diverse student population.

The student-staff ratio (17:1) is adequate. Nonetheless, staff members report an increasing workload. Growing numbers of students at WU mean that staff members experience a high teaching burden that comes at the expense of their dedicated research time. Thesis supervision in particular takes up more and more time. The panel established that the issue of teaching-load increases has the attention of the programme management and Executive Board of the university.

Considerations
The panel concludes that the curriculum, teaching-learning environment and staff enable students to achieve the ILOs. The level and content of the curriculum are appropriate for an academic master's programme and strongly linked to the research of the WU Chair Groups. The approach of the courses ranges from distinctly interdisciplinary in the broad initial courses to more disciplinary in the specialised courses. Relevant topics are adequately covered. The panel is positive about the considerable level of flexibility in the curriculum, but concludes that it does pose certain challenges with respect to overall cohesion and community building. It appreciates that the programme has recently taken steps to improve the coherence, for example by introducing five learning trajectories and increasing the frequency of Chair Group visits. Further steps, such as making more courses exclusive to MCL, are currently being considered. This should also help to heighten the distinctiveness and visibility of the programme as well as its attraction to prospective students. The panel is of the opinion that some well-planned further growth could potentially benefit the programme.

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Conclusion
Master's programme Climate Studies: the panel assesses Standard 2 as 'satisfactory'.

Standard 3: Student assessment
The programme has an adequate system of student assessment in place.

Findings

System of assessment
The panel established that WU has a sound assessment policy. In 2017, WU renewed its vision on education alongside its education assessment policy. This assessment policy defines why and how WU assesses and how the roles and responsibilities are distributed. Its goal is to generalise assessment rules and policies and to make them transparent to both lecturers and students.

The system of assessment that is in use within MCL takes the WU-wide policy as a starting point. To ensure that tests are valid, a course assessment strategy (CAS) is drawn up for each course, linking the course specific learning outcomes to assessment methods. The CAS makes clear how and when a learning outcome is assessed, who is involved in assessing students and how the final grade is determined. By publishing the assessment strategies on the digital learning environment and in the Study Handbook, the programme ensures that students are well aware of what is expected of them. Course examiners are responsible for test design and checking test results. As far as the panel was able to establish, not all tests are peer reviewed by a second staff member. It recommends to expand the use of the four-eye principle in test design. A positive aspect is that model answers and rubrics are often used. In some cases a second assessor is involved in grading written assignments, thereby further enhancing the reliability of the assessment. Following grading, students are enabled to inspect their exam results and receive individual feedback, which helps them learn from mistakes. Overall, the panel finds that there is sufficient attention for the validity, reliability and transparency of assessment.

The panel is sufficiently convinced that the combined assessment of all courses covers the full range of intended learning outcomes, although it has not seen a detailed assessment plan. Designing such a plan, which includes course specific learning goals and assessment methods, would be a welcome next step. It is common that courses use a range of assessment methods. In the case of the course *Design of Climate Change Mitigation and Adaptation Strategies* this includes as much as seven different components. Common assessment methods are written exams and (individual or group) writing assignments. Participation in class is also regularly assessed. During the site visit, the panel studied assessments and answering models of a number of sample courses. It found that these tests are generally well aligned with the learning goals and teaching methods. The overall level of the exams is adequate. The assessment reflects the content that was discussed during the course and sufficiently addresses all of the relevant cognitive levels. From its interviews with stakeholders, the panel concludes that all parties involved are generally pleased with the assessment procedures and quality of examination.

Thesis assessment
The programme is concluded with both an internship and a thesis. The thesis (rather than the internship) is seen as central to the successful completion of the programme. It is assessed by the supervisor(s) involved, in deliberation with an independent examiner (second reader), and in accordance with the thesis rubric. The different components that are scored on the standardised assessment form are the research competence (30-60% of the final grade), the thesis report (30-60% of the final grade), the colloquium (5% of the final grade) and the final oral examination (5% of the final grade). The panel concludes that the weight given to the different components is determined at Chair Group level and varies significantly. Some Chair Groups attach (much) more weight to the 'research competence' or thesis process (which includes aspects such as attitude and time management) than to the thesis report itself. This may need to be reconsidered.

Apart from the weight attached to thesis components, there are other variations in thesis assessment procedures across the WU Chair Groups. While the general outlines of the assessment are standardized, details can be filled out at Chair Group level. A concern, particularly for a relatively

small programme such as MCL, is that these variations could come at the cost of the programme's identity and create inequalities for students. From its interview with the teaching staff, the panel concluded that many Chair Groups are well aware of the particular programme that their thesis students come from and the associated ILOs that they should achieve in their thesis. Even so, there also seem to be Chair Groups that apply the same guidelines and expectations to all students, irrespective of their programme background. The panel feels that it is preferable if, at programme level, all Chair Groups conform to the same supervision and assessment mechanisms.

A general issue that needs to be addressed is the fact that the assessments of both assessors are recorded on a single assessment form. To enable external reviewers to establish that both readers have independently phrased their assessment, it is preferable to have each assessor fill out a separate form and administrate both forms. A general recommendation that the panel would like to offer is to further streamline the thesis process by digitalisation of the subsequent steps, from start to finish.

After studying a sample of master's theses and the associated assessment forms, the panel concludes that it largely agrees with the assessments and grades given by the supervisors. A point for improvement is that not all grades are (sufficiently) substantiated by qualitative comments. Apparently not all Chair Groups require their staff to motivate the final grade. This is something that should be addressed to guarantee the transparency of the assessment. Also, the programme needs to ensure that comments on the forms are in English, not Dutch. A final recommendation is to sharpen the Chair Groups' policies regarding the assessment of theses that are later published in the form of an article. It should be avoided that supervisors, who are usually the second author of such articles, assess their own work. Therefore, the panel strongly recommends a strict separation between the thesis and the article that later results from this work.

Examining Board

At WU there are four Examining Boards (EBs), each responsible for the assurance of the quality of examination of a group of related degree programmes. Part of the responsibilities of the EB is to check whether the individual study programmes of students cover all of the ILOs, thereby assuring that students have achieved the intended end level upon graduation. The panel is convinced that the EB does this to its best ability. To ensure the quality of assessment, the EB has from 2013 onwards periodically visited the Chair Groups that are involved in the teaching. Currently, a third round of Chair Group visits is ongoing. Also part of the EB's assignment is to annually review samples of final products in order to safeguard the end level of the programmes under its responsibility. The panel was surprised to find that there are no written records of the outcomes of Chair Group visits and thesis reviews. It strongly encourages the EB to start recording results and to publish the general outlines thereof in its annual report.

Although the panel has no particular reasons for concern with respect to the quality of assessment in this programme, it does note that the current university-wide system of quality assurance poses some challenges. To start with, there is considerable distance between the EB and the Chair Groups, which operate with a large measure of autonomy. The limited means that were available to the EBs over the reporting period meant that these may have lacked agency in properly streamlining procedures across Chair Groups and following up on prior recommendations. An additional issue for WU to consider is that the current system does not seem to allow for taking a snapshot of the assessment quality in a certain programme at a certain moment. Programmes such as MCL rely on a substantial number of Chair Groups, which are all visited at different times and (even) by different Examining Boards. The panel was very pleased to learn that the Executive Board of WU is doubling the resources for Examining Boards as of 2019. Even so, it does advise the university to carefully consider how these resources can be used to their optimal effect.

Considerations

The programme has developed a solid system of assessment, which is based on the WU-wide assessment policy. Sufficient attention is paid to the validity, reliability and transparency of

examinations. The design of sample tests studied by the panel is adequate: the examinations sufficiently match the course specific learning goals and teaching methods. The level and content of the examinations is appropriate.
A point of attention is that assessment practices vary across Chair Groups, particularly with respect to the thesis. To further increase the transparency and comparability of thesis assessment the panel recommends streamlining procedures at programme level and introducing separate assessment forms for both assessors. Furthermore, the panel advocates the university-wide implementation of a digital assessment system in which the subsequent steps in the thesis process are fully automated.

Finally, the panel established that the Examining Board safeguards the overall level of assessment in the programmes to the best of its abilities. Increasing the capacity of the EB, as is the intention of the Executive Board, could help to strengthen its agency in relation to the rather autonomous Chair Groups. Nonetheless, the panel feels that the central university should also critically reconsider whether the design of the current quality assurance system optimally suits its purposes.

Conclusion
Master's programme Climate Studies: the panel assesses Standard 3 as 'satisfactory'.

Standard 4: Achieved learning outcomes
The programme demonstrates that the intended learning outcomes are achieved.

Findings

Theses
Prior to the site visit, the panel studied a sample of fifteen recently completed theses. The panel was generally very satisfied with the high level of scientific depth achieved in the theses. Students deal with relevant climate change-related subjects, pose interesting research questions and apply appropriate methodologies. Their analyses and conclusions often demonstrate a good understanding of the issues at hand. In terms of format, topic and discipline theses tend to vary widely, thus reflecting the scope of the different Chair Groups that supervised them. A significant part of the theses is monodisciplinary, which reflects that multi- or interdisciplinarity is not a specific goal for the thesis. The panel notes that students usually do frame their thesis topic in an interdisciplinary manner in the introduction to the work. Something that should be adjusted is that the theses are expected to cover ILOs 11 and 12, but in practice rarely demonstrate reflection on ethical issues and/or the individual learning process of the student. As ILO 11 and 12 are also addressed elsewhere in the curriculum, this is not a major issue, but the programme should monitor that ILOs 11 and 12 continue to receive sufficient attention. Overall, the panel is convinced that all of the theses in the sample meet the basic quality requirements and some clearly surpass these.

Position of graduates
The panel established that graduates of the programme have a good job perspective. They commonly find employment in relevant positions in both the public sector (e.g. in education and research, governmental and non-governmental organisations) and the private sector (e.g. in consultancy agencies), within and outside of the Netherlands. A relevant part of the graduates pursues an academic career by applying for a PhD position. While students may feel that the programme could do more in terms of labour market preparation, alumni are generally positive on the degree to which the programme connects to the labour market. Recent graduates indicated to the panel that the programme has taught them very important skills and knowledge from which they benefit in their day-to-day professional practice. Overall, they feel that they have internalised the integrated beta-gamma perspective of the programme. A point for improvement is that alumni indicated that they would like to stay more involved in the programme. In order to make consistent use of the expertise of alumni, the panel recommends the programme to formalize alumni relations.

Considerations
Both the sample theses that were studied by the panel and the position of graduates indicate that students achieve the intended learning outcomes of the programmes. In their (partly very specialised) final projects students reach a high academic level. Graduates find employment in relevant positions at companies, non-profit organisations and research institutes/universities. Alumni generally feel that the programme has provided them with a solid foundation for their prospective careers.

Conclusion
Master's programme Climate Studies: the panel assesses Standard 4 as 'good'.

GENERAL CONCLUSION

The panel is convinced that the programme meets the criteria for a positive assessment on all four standards. Especially during the last years of the evaluation period, MCL initiated some welcome improvements to its profile and teaching-learning environment. These developments underscore the programme's continuous relevance and renewed vitality. The panel is confident that this upward trend can be continued in the coming period. A crucial aspect in this respect is that the programme management is already working towards expanding its contacts with the Chair Groups and ensuring their support for the upcoming changes.

Conclusion
The panel assesses the *master's programme Climate Studies* as 'satisfactory'.

APPENDICES

APPENDIX 1: INTENDED LEARNING OUTCOMES

Appendix 1: Learning Outcomes Climate Studies and Dublin Descriptors

Learning outcomes MSc Climate Studies *After successful completion of the programme, students are expected to be able to:*	**Dublin Descriptors** (description of master level)
1. explain the natural scientific concepts of the Earth's climate system and its regulating mechanisms, and classify the major processes that result in global change;	• Knowledge and understanding • Applying knowledge and understanding
2. explain the social-scientific concepts that are relevant to understanding the interactions between climate and society;	• Knowledge and understanding • Applying knowledge and understanding
3. distinguish between natural and anthropogenic driving forces and their effects on biogeochemical cycles and the climate system;	• Knowledge and understanding • Applying knowledge and understanding
4. apply the basic techniques of studying global change and climate variability such as statistics and modelling tools;	• Applying knowledge and understanding
5. use various methodological approaches to studying climate-related physical, socio-political and economic issues, including the prospects of mitigation of, and adaptation to climate change;	• Applying knowledge and understanding
6. independently design and execute research plans in accordance with academic standards, thus contributing to the development of the body of knowledge in the field;	• Applying knowledge and understanding • Making judgments
7. cooperate within a multidisciplinary team by contributing to the development of policy and management measures dealing with climate change and its effects on society;	• Communication • Applying knowledge and understanding • Making judgments
8. integrate scientific information and research results, and convincingly communicate the results to specialist and non-specialist audiences, both verbally and in writing, with due attention to the uncertainties involved in scientific insights;	• Communication • Applying knowledge and understanding • Making judgments
9. critically reflect on opinions on the causes and effects of climate change, and the validity of arguments brought forward;	• Making judgments
10. appreciate the widely divergent economic and cultural situations in which people live in different parts of the world, the varying effects that climate change and mitigating or adaptive measures may have on their well-being, and the different perceptions of climate risks they may have;	• Making judgments
11. reflect on the ethical aspects of their research and their recommendations of measures and interventions;	• Making judgments
12. design and plan their own learning processes by virtue of continuous reflection on personal knowledge, skills, attitudes and performance.	• Learning skills

APPENDIX 2: OVERVIEW OF THE CURRICULUM

Common Part

RO1: Depending on your preparatory education, choose 1 course in consultation and agreement with your study adviser. At the study adviser's discretion, the selected course may be exchanged for an advanced course of similar orientation.

RO2: Choose A, B or C in consultation and agreement with your study adviser.
YMC-60300 is an 'umbrella' code that cannot be selected. Instead, choose 3 credits of modular skills courses from the list published in the Study Handbook under YMC-60300.

RO3: Select 1 internship in consultation with your study adviser. You may exchange the internship for a second thesis if you have (supervised) work experience at an academic level.

Notes:

1. You may apply for the Climate-KIC certificate issued by the European Institute of Technology. This certificate is awarded if you meet specific admission requirements, complete extra-curricular study activities (including a summer school and a series of seminars), and meet specific requirements regarding your major thesis and internship.
2. There is a selective Sustainable Development Diplomacy track linked to the Environmental Policy major (Specialisation Climate, Society and Economics).
3. There is a selective research-oriented track.

Ask your study adviser for information.

Course		Ects	CS/RO	Phase	Period
ESA-23306	Introduction to Global Change	6.00	CS	M1	1MO
ENR-22806	Principles of Climate Change Economics and Policy	6.00	RO1	M1	1AF
SOQ-23306	Principles of Earth and Ecosystem Science	6.00	RO1	M1	1AF
WSG-60812	Design of Climate Change Mitigation and Adaptation Strategies	12.00	RO2A	M1	5AF+6WD
YMC-60300	Modular Skills Training	3.00	RO2B	M1	2AF, 3AF, 5AF, 6AF
YMC-60809	Academic Consultancy Training	9.00	RO2B	M1	2WD, 3MO+4WD, 5WD, 6WD
ENP-60312	International Environmental Policy Consultancy	12.00	RO2C	M1	2WD
CSA-70424	MSc Internship Crop and Weed Ecology	24.00	RO3	M2	1,2,3,4,5,6
ENP-70424	MSc Internship Environmental Policy	24.00	RO3	M2	1,2,3,4,5,6
ENR-70424	MSc Internship Environmental Economics and Natural Resources	24.00	RO3	M2	1,2,3,4,5,6
ESA-70424	MSc Internship Environmental Systems Analysis	24.00	RO3	M2	1,2,3,4,5,6
HWM-70424	MSc Internship Hydrology and Quantitative Water Management	24.00	RO3	M2	1,2,3,4,5,6
MAQ-70824	MSc Internship Meteorology	24.00	RO3	M2	1,2,3,4,5,6
MAQ-71324	MSc Internship Air Quality and Atmospheric Chemistry	24.00	RO3	M2	1,2,3,4,5,6
PEN-70424	MSc Internship Plant Ecology and Nature Conservation	24.00	RO3	M2	1,2,3,4,5,6
SOQ-70424	MSc Internship Soil Quality	24.00	RO3	M2	1,2,3,4,5,6
WSG-70424	MSc Internship Water Systems and Global Change	24.00	RO3	M2	1,2,3,4,5,6

Five Specialisations

A - The Physical Climate System

B - Biogeochemical Cycles

C - Ecological and Agro-ecological Systems

D - Human-Environment Interactions

E - Climate, Society and Economics

A - The Physical Climate System

Limited choice:

RO1: In consultation with your study adviser, choose 2 courses in preparation for the selected thesis subject.

RO2: Select 1 thesis.

Course		Ects	CS/RO	Phase	Period
SOQ-36306	Biogeochemical Cycles and Climate Change Mitigation	6.00	CS	M1	2MO
HWM-23806	Geophysical Fluid Mechanics	6.00	RO1	M1	2AF
MAQ-32806	Atmospheric Dynamics	6.00	RO1	M1	2AF
MAQ-34806	Atmospheric Composition and Air Quality	6.00	RO1	M1	2AF
MAQ-21806	Meteorology and Climate	6.00	RO1	M1	3WD
SLM-33806	Water and Air Flow Numerical Techniques	6.00	RO1	M1	3WD
MAQ-35806	Earth System Modelling	6.00	RO1	M1	4WD
HWM-32806	Catchment Hydrology	6.00	RO1	M1	5MO
MAQ-31806	Atmospheric Modelling	6.00	RO1	M1	5MO
SOQ-35806	Field Training Soil-Vegetation-Atmosphere Interactions	6.00	RO1	M1	6WD
HWM-80436	MSc Thesis Hydrology and Quantitative Water Management	36.00	RO2	M2	1,2,3,4,5,6
MAQ-80836	MSc Thesis Meteorology	36.00	RO2	M2	1,2,3,4,5,6
MAQ-81336	MSc Thesis Air Quality and Atmospheric Chemistry	36.00	RO2	M2	1,2,3,4,5,6

B - Biogeochemical Cycles

Limited choice:

RO1: In consultation with your study adviser, choose 2 courses in preparation for the selected thesis subject.

RO2: Select 1 thesis.

Course		Ects	CS/RO	Phase	Period
SOQ-36306	Biogeochemical Cycles and Climate Change Mitigation	6.00	CS	M1	2MO
MAQ-34806	Atmospheric Composition and Air Quality	6.00	RO1	M1	2AF
MAQ-21806	Meteorology and Climate	6.00	RO1	M1	3WD
WSG-35806	Climate Smart Agriculture	6.00	RO1	M1	3WD
MAQ-35806	Earth System Modelling	6.00	RO1	M1	4WD
SOQ-35306	The Carbon Dilemma	6.00	RO1	M1	5MO
SOQ-35806	Field Training Soil-Vegetation-Atmosphere Interactions	6.00	RO1	M1	6WD
MAQ-81336	MSc Thesis Air Quality and Atmospheric Chemistry	36.00	RO2	M2	1,2,3,4,5,6
SOQ-81336	MSc Thesis Soil Chemistry and Chemical Soil Quality	36.00	RO2	M2	1,2,3,4,5,6
WSG-80436	MSc Thesis Water Systems and Global Change	36.00	RO2	M2	1,2,3,4,5,6

C - Ecological and Agroecological Systems

Limited choice:

RO1: In consultation with your study adviser, choose 2 courses in preparation for the selected thesis subject.

RO2: Select 1 thesis.

Course		Ects	CS/RO	Phase	Period
SOQ-36306	Biogeochemical Cycles and Climate Change Mitigation	6.00	CS	M1	2MO
SOQ-32806	Biological Interactions in Soils	6.00	RO1	M1	2AF
INF-31806	Models for Ecological Systems	6.00	RO1	M1	3WD
WSG-35806	Climate Smart Agriculture	6.00	RO1	M1	3WD
CSA-32806	Functional Diversity for Sustainable Crop Production	6.00	RO1	M1	4WD
SOQ-35306	The Carbon Dilemma	6.00	RO1	M1	5MO
PEN-30306	Plant, Vegetation and Systems Ecology	6.00	RO1	M1	6WD
CSA-80436	MSc Thesis Crop and Weed Ecology	36.00	RO2	M2	1,2,3,4,5,6
PEN-80436	MSc Thesis Plant Ecology and Nature Conservation	36.00	RO2	M2	1,2,3,4,5,6
SOQ-81836	MSc Thesis Soil Biology and Biological Soil Quality	36.00	RO2	M2	1,2,3,4,5,6
WSG-80436	MSc Thesis Water Systems and Global Change	36.00	RO2	M2	1,2,3,4,5,6

D - Human-Environment Interactions

Limited choice:

RO1: Choose 1 course in consultation with your study adviser.

RO2: In consultation with your study adviser, choose 2 courses in preparation for the selected thesis subject.

RO3: Select 1 thesis.

Course		Ects	CS/RO	Phase	Period
SOQ-36306	Biogeochemical Cycles and Climate Change Mitigation	6.00	RO1	M1	2MO
ENP-36306	Climate Governance	6.00	RO1	M1	5MO
WSG-33806	Integrated Water Management	6.00	RO2	M1	2AF
WSG-35306	Modelling Future Water Stress	6.00	RO2	M1	2MO
ESA-31806	Environmental Assessments for Pollution Management	6.00	RO2	M1	3WD
WSG-34806	Climate Change Adaptation in Water Management	6.00	RO2	M1	4WD
ESA-31306	Integrated Ecosystem Assessment in Regional Management	6.00	RO2	M1	5MO
ESA-80436	MSc Thesis Environmental Systems Analysis	36.00	RO3	M2	1,2,3,4,5,6
WSG-80436	MSc Thesis Water Systems and Global Change	36.00	RO3	M2	1,2,3,4,5,6

E - Climate, Society and Economics

Limited choice:

RO1: In consultation with your study adviser, choose 12 credits in preparation for the selected thesis subject.
Choose RO1A too if your study adviser deems it necessary.

RO2: Select 1 thesis.

Course		Ects	CS/RO	Phase	Period
ENP-36306	Climate Governance	6.00	CS	M1	5MO
ENP-34306	Environmental Policy: Analysis and Evaluation	6.00	RO1	M1	2MO
ENR-21306	Environmental Economics for Environmental Sciences	6.00	RO1	M1	2MO
ENP-37306	Water Governance: Concepts and Practices	6.00	RO1	M1	3WD
MAT-22306	Quantitative Research Methodology and Statistics	6.00	RO1A	M1	3WD, 4WD
ENP-38303	Sustainable Technology Development: Design Assignment	3.00	RO1	M1	4AF
ENP-37803	Sustainable Technology Development	3.00	RO1	M1	4MO
ENP-30306	International Environmental Policy	6.00	RO1	M1	4WD
YSS-35306	Theories and Models in Economics	6.00	RO1	M1	4WD
AEP-32306	Cost-Benefit Analysis and Environmental Valuation	6.00	RO1	M1	6WD
ENP-39306	Advanced International Environmental Politics	6.00	RO1	M1	6WD
ENP-80436	MSc Thesis Environmental Policy	36.00	RO2	M2	1,2,3,4,5,6
ENR-80436	MSc Thesis Environmental Economics and Natural Resources	36.00	RO2	M2	1,2,3,4,5,6

Examples of the first year of a Climate Studies' student for two different specialisations

Specialisation B. Biogeochemical Cycles

Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
ESA-23306 Introduction to Global Change	**SOQ-36306** Biogeochemical Cycles and Climate Change Mitigation	**WSG-35806** Climate Smart Agriculture (B)	**MAQ-35806** Earth System Modelling (B)	**SOQ-35306** The Carbon Dilemma (B)	**SOQ-35806** Field Training Land-Atmosphere Interactions (B)
ENR-22806 Principles of Climate Change Economics and Policy (A) or **SOQ 23306** Principles of Earth and Ecosystem Science (A)	**MAQ-34806** Atmospheric Composition and Air Quality (B)	**MAQ-21806** Meteorology and Climate (B)		**WSG-60812** Design of Climate Change Mitigation and Adaptation Strategies	

Choose 1 course (A) in consultation and agreement with your study advisor

Choose at least 2 courses (B) in consultation and agreement with your supervisor and in preparation to your thesis subject.

Choose 1 thesis from:

MAQ-81336 MSc Thesis Air Quality and Atmospheric Chemistry

SOQ-81336 MSc Thesis Soil Chemistry and Chemical Soil Quality

WSG-80436 MSc Thesis Water Systems and Global Change

Specialisation D. Human-Environment Interactions

Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
ESA-23306 Introduction to Global Change	**SOQ-36306** Biogeochemical Cycles and Climate Change Mitigation (B) **WSG 35306** Modelling Future Water Stress (C)	**ESA-31806** Environmental Assessments for Pollution Management (C)	**WSG-34806** Climate Change Adaptation in Water Management (C)	**ENP-36306** Climate Gov ernance (B) **ESA-31306** Integrated Ecosystem Assessment in Regional Management (C)	
ENR-22806 Principles of Climate Change Economics and Policy (A) or **SOQ 23306** Principles of Earth and Ecosystem Science (A)	**WSG-33806** Integrated Water Management (C)			**WSG-60812** Design of Climate Change Mitigation and Adaptation Strategies	

Choose 1 course (A) and 1 course (B) in consultation and agreement with your study advisor

Choose at least 2 courses (C) in consultation and agreement with your study adviser and in preparation to your thesis subject.

Choose 1 thesis from:

ESA-80436 MSc Thesis Environmental Systems Analysis

WSG-80436 MSc Thesis Water Systems and Global Change

APPENDIX 3: PROGRAMME OF THE SITE VISIT

MSc Climate Studies

17 January 2019		
14.00	15.15	Arrival of the panel, internal meeting and documentation review
15.15	16.00	Interview with management (including Programme Committee)
16.00	16.30	Internal deliberation panel, short recap day 1

18 January 2019		
8.45	10.00	Arrival of the panel internal meeting and documentation review
10.00	10.45	Students
10.45	10.50	Mini break
10.50	11.35	Teaching staff
11.35	11.45	Break
11.45	12.15	Examining Board and Study Advisor(s)
12.15	12.20	Mini break
12.20	12.50	Alumni
12.50	14.15	Lunch and deliberations panel
14.15	15.00	Final interview with management
15.00	16.15	Deliberations panel and formulating preliminary findings and conclusions
16.15	16.45	Feedback of preliminary findings and conclusions

APPENDIX 4: THESES AND DOCUMENTS STUDIED BY THE PANEL

Prior to the site visit, the panel studied fifteen theses. Information on the selected theses is available from QANU upon request.

During the site visit, the panel studied, among other things, materials on the following courses (partly as hard copies, partly via the institute's electronic learning environment):

- ESA-23306 Introduction to Global Change;
- WSG-60812 Design of Climate Change Mitigation and Adaptation Strategies;
- SOQ-36306 Biogeochemical Cycles and Climate Change Mitigation;
- ENP-36306 Climate Governance.