



M Environmental Sciences
Wageningen University

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Project code P2304

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Summary

Standard 1. Intended learning outcomes

The panel highly appreciates the master's programme's broad interdisciplinary profile, effectively integrating insights from both natural and social sciences to address environmental challenges. The strong research orientation provides students with invaluable opportunities for tailored research endeavours through their thesis work. The programme's interdisciplinary and flexible approach allows students to specialize in environmental fields while also offering a diverse range of career paths to explore. The programme's interdisciplinary focus is underscored by twelve intended learning outcomes (ILOs) that align with the Dublin descriptors for master's programmes and meet professional field expectations. The panel suggests beginning the process of updating the MES programme's ILOs promptly, employing a thorough approach similar to that used for the bachelor's programme.

Standard 2. Teaching-learning environment

The panel confirmed that the curriculum enables students to achieve the intended learning outcomes. It offers a comprehensive study of environmental and sustainability topics, balancing academic rigour with professional skill development to equip students with essential competencies. The diverse range of courses caters to students' varied needs, providing a tailored programme. The programme is feasible, and students receive adequate support and guidance to create their own study path.

The teaching staff of the programmes are motivated and qualified and are experts in their fields. Teachers implement proactive measures to enable students of various backgrounds to comprehend and engage with the course content fully. Nevertheless, certain students perceive some courses as challenging, while others find them superficial, depending on their backgrounds. The panel recommends that programme management persist in addressing potential overlaps or deficiencies.

The programme effectively employs diverse teaching methods, fostering personalized learning and allowing for meaningful interactions between students and teachers. Access to exceptional research facilities enhances classroom activities and thesis projects, providing direct real-world applicability. The panel advises exploring options to fulfil students' desire to generate more opportunities for fieldwork and lab work within specific specializations.

Students perceive variations in the approaches of supervisors, particularly noticeable in the Environmental Policy specialization where workload challenges exist. The autonomy granted to chair groups in their scientific development that is reflected in their teaching poses difficulties for programme management in fully overseeing the practices of all teachers and keep them aligned with the priorities of the programme. Nonetheless, the panel advises making efforts to address perceived discrepancies and resulting feelings of inequality within the programme.

Standard 3. Student assessment

The panel established that the programme benefits from clear university-wide assessment policies, based on the principle of constructive alignment. The assessment methods are adequately diverse and aligned with the final qualifications they are intended to evaluate. Sufficient attention is paid to the validity, reliability and transparency of tests and examinations.

The Examining Board (EB) plays a crucial role in approving individual student study programmes and ensuring the quality of course assessments within the programme. The regular meetings with both chair

groups and Programme Committees further enhance its oversight of assessment quality at the programme level. While the panel is confident in the effectiveness of the EB, it recommends closely monitoring the EB's workload and implementing necessary measures if needed.

The assessment forms and grading templates for the master's thesis provide clear assessment criteria but not always include adequate written feedback and transparent grade justification. While the panel acknowledges the value of the substantial oral feedback students receive on their final thesis, it emphasises the importance of ensuring that all students receive substantial written feedback. The panel views the mandatory inclusion of written feedback in Osiris as a positive step and recommends engaging all chair groups in further enhancing the integration of feedback into the digitized assessment process.

Standard 4. Achieved learning outcomes

The panel concludes that the master theses show that the intended learning outcomes of the programme are achieved. The programme prepares students for relevant positions in the professional field and graduates reflect positively on the programme.

Score table

The panel assesses the programme as follows:

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive
Em. prof. dr. J.T.A. (Hans) Bressers, panel chair Date: 13 June 2024	Drs. E. (Esther) Poort, panel secretary

Introduction

Procedure

Assessment

On 18 and 19 March 2024, the master's programme Environmental Sciences of Wageningen University was assessed by an independent peer review panel as part of the cluster assessment Environmental Sciences. The assessment cluster consisted of 17 programmes, offered by the institutions Open University, University of Amsterdam, Wageningen University, Radboud University, Vrije Universiteit Amsterdam, University of Groningen, Maastricht University, Leiden University, Utrecht University and the Amsterdam Institute for Advanced Metropolitan Solutions (of Delft University of Technology and Wageningen University). The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

Quality assurance agency Academion coordinated the assessment upon request of the cluster Environmental Sciences. Peter Hilderling and Jessica van Rossum acted as coordinators and panel secretaries. Annemarie Venemans, Esther Poort, Anne-Lise Kamphuis, Linda te Marvelde and Carlijn Braam also acted as secretaries in the cluster assessment. They have been certified and registered by the NVAO. Esther Poort acted as panel secretary in the assessment of the programmes of Wageningen University.

Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members as well as consistency within the cluster. On 15 December 2023, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on his role in the site visit on 19 December 2023 according to the Panel chair profile (NVAO 2016).

The programme composed a site visit schedule in consultation with the coordinator (see appendix 3). The programme selected representative partners for the various interviews. It also determined that the development dialogue would be made part of the site visit. A separate development report was made based on this dialogue.

The programme provided the secretary with a list of graduates over the period 2021-2023. In consultation with the secretary, the panel chair selected 15 theses per programme. They took the diversity of final grades and examiners into account, as well as the various tracks. Prior to the site visit, the programme provided the panel with the theses and the accompanying assessment forms. It also provided the panel with the self-evaluation report and additional materials (see appendix 4).

The panel members studied the information and sent their findings to the secretary. The secretary collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary meeting, the panel discussed the initial findings on the self-evaluation report and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment framework, the working method and the planning of the site visits and reports.

Site visit

During the site visit, the panel interviewed various programme representatives (see appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation

hour. No consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

Report

The secretary wrote a draft report based on the panel's findings and submitted it to the coordinator for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the programme director in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalised the report, and the coordinator sent it to the programme director and Wageningen University.

Panel

The following panel members were involved in the cluster assessment Environmental Sciences:

- Em. prof. dr. J.T.A. (Hans) Bressers, emeritus professor in Policy Studies and Environmental Policy at the University of Twente (chair);
- Prof. dr. A.C. (Arthur) Petersen, professor in Science, Technology and Public Policy at the University College London (United Kingdom);
- Dr. A.R. (Ana) Vasques, senior lecturer at the Erasmus University College of Erasmus University Rotterdam;
- Dr. S.E. (Sarah) Cornell, associate professor at the Stockholm Resilience Centre of Stockholm University (Sweden);
- Em. prof. dr. M.C. E. (Rietje) van Dam-Mieras, emeritus professor in Sustainable Development and Innovation of Education at Leiden University, and member of the Top Consortium for Knowledge and Innovation (TKI) Biobased Circular (focus Human Capacity Agenda);
- Dr. ir. T. (Thijs) Bosker, associate professor in Environmental Sciences at Leiden University;
- Prof. dr. ir. S.E. (Siegfried) Vlaeminck, professor in Microbial Cleantech and Environmental Systems Analyses at the Universiteit of Antwerpen (Belgium);
- Prof. dr. M.P.J. (Maarten) Loopmans, professor in Human Geography and Political Ecology at the KU Leuven (Belgium);
- Dr. ir. S.G. (Gerd) Weitkamp, associate professor in Health Geography, Mobility, and Geospatial Technologies at the University of Groningen;
- Prof. dr. P. (Paquita) Perez Salgado, professor in Natural Sciences at the Open University;
- Prof. dr. E. (Esther) Turnhout, professor in Science, Technology and Society at the University of Twente;
- Em. prof. dr. ir. J.T. (Hans) Mommaas, emeritus professor in Regional Sustainability Governance at Tilburg University, and chair of the Ecological Authority;
- Dr. P. (Patricia) de Cocq, director Living Environment and Nature at HAS Green Academy;
- Prof. dr. ir. Z. (Zofia) Lukszo, professor in Smart Energy Systems at the Delft University of Technology;
- M. M. (Marisa) Beunk MSc., alumn (March 2023) of the master's programme Environmental Sciences (Policy Track) of Wageningen University (student member);
- F.O. (Fenna) Oostrum, alumn (September 2023) of the master's programme Environment and Society Studies of Radboud University (student member).

The panel assessing the master's programme Environmental Sciences at Wageningen University consisted of the following members:

- Em. prof. dr. J.T.A. (Hans) Bressers, emeritus professor in Policy Studies and Environmental Policy at the University of Twente (chair);

- Dr. S.E. (Sarah) Cornell, associate professor at the Stockholm Resilience Centre of Stockholm University (Sweden);
- Dr. A.R. (Ana) Vasques, senior lecturer at the Erasmus University College of Erasmus University Rotterdam;
- Prof. dr. ir. S.E. (Siegfried) Vlaeminck, professor in Microbial Cleantech and Environmental Systems Analyses at the Universiteit of Antwerpen (Belgium);
- F.O. (Fenna) Oostrum, alumni (September 2023) of the master's programme Environment and Society Studies of Radboud University (student member).

Information on the programme

Name of the institution:	Wageningen University
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive
Programme name:	Environmental Sciences
CROHO number:	60810
Level:	Master
Orientation:	Academic
Number of credits:	120 EC
Specialisations or tracks:	Environmental Quality Environmental Policy and Economics Environmental Technology Human-Environmental Systems
Location:	Wageningen
Mode(s) of study:	Fulltime
Language of instruction:	English
Submission date NVAO:	1 November 2024

Description of the assessment

Organization

Wageningen University & Research (WUR) is made up of Wageningen University (WU) and 9 research institutes of the Stichting Wageningen Research (WR). Wageningen University (WU) consists of one faculty of Agricultural and Environmental Sciences. Within WUR there are five science groups: Agrotechnology & Food Sciences, Animal Sciences, Environmental Sciences, Plant Sciences and Social Sciences. Within these science groups, one or more university departments and research institutes within the same research field are combined. Each university department contains between eleven and twenty chair groups, each managed by a professor, the so-called chair holder. The chair holder manages the members of the chair groups and distributes research and education activities among them in collaboration with other chair holders of other chair groups. Wageningen University has 20 bachelor's and 31 master's programmes.

The Rector Magnificus of WU is also the Dean of the Faculty and a member of the Executive Board of WUR. The rector appoints the Board of Education, which consists of four professors and four students. The Board of Education is the legal governing body of all degree programmes; it is responsible for their design, content, quality, and financing. The Master's Environmental Sciences (MES) collaborates with the Master's Urban Environmental Management (MUE) and the Bachelor's Environmental Sciences (BES) in a joint Programme Committee overseen by one Programme Director. This Programme Director implements the Board of Education's directions and is in close contact with the Chair Groups regarding the design, content and quality of the courses provided. The Programme Committee advises the Board of Education on the content and quality of the degree programmes. These three programmes have their own Curriculum Committee.

Recommendations previous accreditation panel

The self-evaluation report outlined the measures undertaken to address the recommendations provided by the previous accreditation panel in 2018. Also, several recommendations and their follow-up actions were discussed with the programme during the site visit. The panel concludes that the programme management demonstrates an impressive commitment to continuous improvement across all levels, effectively addressing previous external review recommendations. Overall, the panel expresses satisfaction with the implemented improvement strategies, acknowledging their significant contribution to elevating the quality of the programme. However, the panel underlines the ongoing importance of one of the previous panel's recommendations: offering more detailed written feedback on the theses. While acknowledging the progress already achieved, the panel believes there's still some room for enhancement in this area. This aspect is further explored under standard 3.

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

The two-year Master's of Environmental Sciences (MES) addresses planetary boundaries and equips students to contribute to the transformation towards a more sustainable society. The programme provides profound insights into the socio-economic causes, characteristics, and the environmental and societal impacts of pollution and degradation of the natural environment. Students learn how to integrate knowledge and skills

in dealing with environmental issues, such as climate change, environmental quality and pollution, biodiversity loss, and resource depletion.

The programme aims to cultivate interdisciplinary researchers by equipping them with the skills to comprehend, develop, and implement analytical tools and models, and environmental technologies, as well as the socio-political arrangements or economic instruments to address these issues. Throughout their training, students learn how to integrate the different sciences and views, apply a systems approach, and develop their environmental awareness.

The programme emphasizes the development of a critical attitude, boundary-crossing competencies, and analytical and problem-solving skills. It offers a comprehensive exploration of various environmental disciplines, enriching students' knowledge base. The programme is thesis-oriented with an individual research project as its core.

By keeping compulsory elements to a minimum, the programme offers flexibility to tailor the curriculum to meet the specific preferences and needs of each student. There are opportunities for thesis research across eleven different Chair groups, spanning four specializations: Environmental Quality, Environmental Policy and Economics, Environmental Technology, and Human-Environmental Systems. Within these specialized scientific disciplinary thesis tracks, students are being prepared for various career paths, including consultancy, education and capacity building, entrepreneurship, sustainable development diplomacy, or research.

The panel highly values the interdisciplinary nature of the programme, integrating and applying insights from both natural and social sciences to address environmental challenges with effectiveness. Additionally, it appreciates the programme's robust research focus and thesis-centred approach, offering students invaluable chances for customized research endeavours. Furthermore, the panel appreciates the programme's flexibility, as it not only allows students to tailor their curriculum to concentrate on a specific environmental field and develop relevant research skills but also offers a diverse range of career paths to explore.

Intended learning outcomes

The programme has translated its aims into a set of twelve intended learning outcomes (ILOs). An overview of the ILOs can be found in Appendix 1. The programme has linked these ILOs to both the Dublin descriptors and the Domain-Specific Reference Framework for academic programmes in Environment and Sustainability in the Netherlands.

The panel has reviewed these ILOs and determined that they accurately represent the master's level and academic orientation and align well with the Dutch Reference Framework. According to the panel, the programme's ILOs reflect the interdisciplinary focus of the programme and cover a wide range of competencies. Additionally, the panel observed a clear distinction between the ILOs of the MES and those of the Bachelor of Environmental Sciences (BES), with the former being more advanced.

The previous assessment panel proposed to phrase the academic skills and self-development learning competencies more explicitly. As outlined in the self-evaluation report, this recommendation is still in the process of being addressed, as the revision of the learning outcomes is slated for completion after the restructuring of the BES. As part of this restructuring, the Programme Committee is revising the ILOs of the BES. The panel reviewed these updated ILOs and is very pleased with the intensified focus on the key skills that are crucial for students to effectively address environmental challenges, also referred to as resilient

skills by the panel. The panel was pleased to learn that MES will soon commence the process of updating its ILOs, leveraging the revised ILOs of the BES programme as a foundation. While the panel acknowledges the reasoning behind prioritizing the revision of the bachelor's ILOs, it encourages the Programme Committee to initiate this process promptly and to employ a similarly thorough procedure as was done for the bachelor's programme.

Professional field

The panel found the connection to the professional field to be commendable. The External Advisory Committee (EAC) plays a vital role, actively engaging not only in discussions about the curriculum but also contributing to the programme's development. As outlined in the self-evaluation report, the EAC confirms that the programme is up-to-date and linked to the needs of the professional practice.

Considerations

The panel highly appreciates the master's programme's broad interdisciplinary profile, effectively integrating insights from both natural and social sciences to address environmental challenges. The strong research orientation provides students with invaluable opportunities for tailored research endeavours through their thesis work. The programme's interdisciplinary and flexible approach allows students to specialize in environmental fields while also offering a diverse range of career paths to explore. The programme's interdisciplinary focus is underscored by twelve intended learning outcomes (ILOs) that align with the Dublin descriptors for master's programmes and meet professional field expectations. The panel suggests beginning the process of updating the MES programme's ILOs promptly, employing a thorough approach similar to that used for the bachelor's programme.

Conclusion

The panel concludes that the master's programme Environmental Sciences meets standard 1.

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

The curriculum comprises three primary components: the common part (18 -30 EC), specializations (72-84 EC), and free space (6-30 EC). The programme is thesis-oriented and tailor-made allowing students to develop an individual focus depending on their specific research interests, work experience and/or career planning. Appendix 2 provides a schematic overview of the programme.

The number of credits for these three components varies per student, depending on their prior education. The individual study programme of each student is submitted to the Examining Board for approval. The approved programme must comply with the intended learning outcomes of the programme as a whole. For instance, students who lack prior training in research methodology pertinent to designing and conceptualizing environmental research must take the course 'Research Methodology in Environmental Sciences' as part of the common curriculum.

The common part comprises various courses that focus on comprehensive analysis of environmental issues, integration of socio-political and scientific knowledge, and adept navigation of uncertainty in complex

decision-making. The common courses also focus on increasing skills to deal with and making use of diversity by developing boundary-crossing competencies. Finally, the common part includes a cluster of (restricted) elective courses on research methodologies and data sciences relevant to the individual thesis and internship.

Students can choose from four specializations, which collectively offer eleven thesis tracks. In their specialization and selection of a thesis track, students focus and conduct research within a particular disciplinary field of environmental sciences. As part of their thesis track, they enrol in two to four compulsory or restricted elective preparatory courses before embarking on their research project during the thesis phase, as well as an academic internship. The thesis contributes to the development of a student's research skills, but also to several important learning outcomes, including communication, self- and group reflection, and project management. The internship allows students to participate in projects at external institutions and provides the opportunity to build up a profession-oriented network.

Within the programme's free space, students can deepen their specialization in their thesis topic or track, enhance additional research skills, or broaden their horizons, such as by delving deeper into a secondary discipline. The extent of this flexibility depends on the alignment between the student's background and the programme's objectives.

After reviewing the documents and engaging in discussions during the site visit, the panel concludes that the ILOs found a consistent and balanced translation into a rich, varied, and flexible curriculum. The self-evaluation report provides a clear explanation of how ILOs are accomplished in the programme and how the learning outcomes of individual courses contribute to the overall learning outcomes of the programme. The curriculum's design enables a comprehensive exploration of environmental and sustainability issues. The panel commends the exceptional variety of courses offered in the programme, resulting in a tailor-made programme that accommodates the diverse needs of the students enrolling in the programme. The well-balanced emphasis on both academic rigour and professional skill development ensures the acquisition of core competencies essential for academic professionals.

The panel observed that programme management acknowledges the challenge faced by both teachers and students related to the diverse academic discipline backgrounds within the student body. Most teachers proactively take measures to enable students of various backgrounds to comprehend and engage with the course content fully. These measures include reviewing basic principles at the beginning of a course, managing student expectations, clarifying required background knowledge, suggesting additional resources for catching up or administering self-assessment tests to assess their understanding of background material. The students interviewed by the panel confirmed that most courses effectively consider the diversity among students. However, they indicated that despite these measures, students may still perceive the same course too challenging or too easy, depending on their disciplinary background. The panel advises the programme management to maintain focus on this issue and support students in navigating learning with and from each other, to reap the educational benefits of the diverse intake in the programme.

Name and language of instruction

The name of the programme and the language of instruction are English. The programme management supports this decision by emphasizing the global nature of environmental sciences and the need to prepare students for a career in an international job market. Furthermore, the programme wants to attract international students because an international classroom enriches the students' perspective.

The panel recognizes the reasoning behind the decision to use English and is pleased to observe the programme's achievement in attracting international students. Over the period 2018-2023, between 57-74% of the students were international, with the COVID years experiencing a lower proportion. The panel fully acknowledges the significance of an international classroom, as it prepares students to navigate diversity in nationalities, cultures, and perspectives. This equips them with the essential skills and viewpoints needed to tackle complex environmental challenges.

In the eyes of the panel, sufficient attention is paid to the language proficiency of the teaching staff. All lecturers are asked to test and, if necessary, improve their level of English language proficiency. Additionally, during the recruitment and selection process for new lecturers, careful consideration is given to their language proficiency.

Teaching approach

The programme utilizes various teaching methods, including lectures (which may incorporate knowledge clips), tutorials, hands-on practical training (such as laboratory work or computer-based exercises), field excursions (including single or multi-day trips), group projects, individual paper assignments, and independent study. COVID greatly enhanced the rapid development of online teaching, of which the most successful tools have been kept, such as the utilization of knowledge clips and the implementation of online short 'help-desk' approaches for group work assistance.

Individual programmes and courses use a diversity of the teaching methods employed, tailored to facilitate education across the diverse fields within environmental sciences. In many courses, students are encouraged to shape their own learning experiences. For instance, they may choose the topic of a case study or individual paper to apply the course content, allowing them to pursue their interests. In some courses, like the 'European Workshop Environmental Science and Management', students establish their own specific learning objectives at the outset and reflect on their achievements at the end. Sometimes, lecturers partly adjust their course to students' interests and needs.

The university has state-of-the-art facilities available for use by MSc students engaging in experimental lab or field research. Examples include the expansive Modular Biobased and Environmental Sciences and Technology Facility (ModuTech), catering to experimental technological setups for students, PhDs, and postdocs. Additionally, there is the Sinderhoeve, an experimental field station featuring experimental ditches, ponds, laboratories, and seven hectares of arable land. Several other departments within the programme offer up-to-date in vitro, in vivo, and in silico facilities. These resources support aquatic and terrestrial research projects as well as environmental risk assessments.

The students with whom the panel spoke indicated that the programme strikes a good balance, commencing with large-scale lectures at the outset and progressing to smaller tutorials and group discussions later. In the student chapter, students express their appreciation for the integration of real-life situations into the courses. They particularly value courses such as Academic Consultancy Training and the European Workshop, as well as internships in the second year. However, both the students interviewed by the panel and those who contributed to the student chapter expressed a desire for additional practical courses, fieldwork, and laboratory work in certain specializations.

Based on the documents and the conversations with the students and teaching staff, the panel concludes that the programme effectively utilizes well-suited teaching methods, enabling personalized learning through a balanced approach that integrates large-scale lectures and small-group tutorials. Through the

varied teaching methods, students are encouraged to actively engage and develop their skills and knowledge to obtain the intended learning outcomes of the programme. The panel appreciates the access to excellent research facilities, as they enhance the relevance of classroom activities and thesis projects by providing direct real-world applicability. The panel advises investigating whether it is possible to meet the students' desire to create more opportunities for fieldwork and lab work within certain specializations.

Study support and guidance

Considering the diversity among student backgrounds, the programme places significant emphasis on supporting students to design and plan their own study programme and their own learning processes. Study support and guidance are essential in ensuring that students maintain a high-quality and coherent programme structure.

Study advice begins before the academic year starts. Prospective students receive an email between June and August (or January for February intake) to confirm enrolment. If they proceed, they're given instructions to draft their preliminary programme and motivation statement. Following submission, candidates meet with a study adviser to discuss preferences and course requirements.

Early in the academic year, chair groups offering thesis opportunities inform students about available courses, thesis topics, internships, and career prospects. The setup of this meeting has been revised to align with the improved intake process. Chair groups present themselves at a 'market' event, facilitating early contact between students and their intended thesis chair groups. Students can then consult their study adviser to discuss insights and adjust plans if needed.

Throughout their studies, students maintain contact with their study adviser (via e-mail or in person) and shape their final programme gradually. Advisers assist in selecting elective courses within Examining Board guidelines and organize meetings on thesis, internship planning, and career readiness. They also serve as central points of contact, connecting students with lecturers, the Examining Board, counsellors, and various support services.

Together with the study association 'Aktief Slip', the Programme Team offers a mentor programme to help new students adapt to their new environment and to develop a network of peers. Aktief Slip organizes a variety of activities including general meetings, dinners, parties, field trips, symposia, career days, and an annual Environmental Week.

The panel considers the offered support of good quality. This impression is confirmed by students, who feel equipped and supported to create their own study path. They consider the programmes feasible and did not mention any hindrances to the feasibility of their studies. Delays are more likely to result from students' individual choices and challenges rather than stumbling blocks in the thesis process.

Teaching staff

The courses are taught by a diverse group of teachers including full professors, scientific personnel on tenure tracks, and other academics. This team is supported by technicians, research assistants, and PhD students. Teachers are experts in their field and are involved in research. Almost all teachers involved in MES have obtained a PhD and most have earned a University Teaching Quality (UTQ) or are in the process of getting qualified. Some teachers take part in the recently developed Senior Teaching Qualification training (SUTQ).

The core teaching chair groups within the programme are actively engaged in the oversight of the programme's organization, structure, and quality. They are represented in the Programme Committee either as full members or as agenda participants. Moreover, they play integral roles within the Curriculum Committee for the MES, ensuring close involvement in all aspects of programme management and development.

The panel has engaged with highly qualified and dedicated teachers who are part of the core group of teachers within MES. These individuals are experts in their fields, actively involved in research, yet remain approachable and concerned about 'their' students. The panel was impressed by the strong commitment of this core teaching group to MES.

Students the panel met spoke positively about the teaching staff. They value the active engagement of teaching staff and indicate that especially in the later courses of the programme, there is sufficient room for meaningful interaction. However, in the student chapter, students notice to perceive different approaches in the way supervisors take up their roles. The specialization Environmental Policy (ENP) faces a shortage of available supervisors due to both the high number of students and the inclusion of environmental topics in numerous WU programmes. Consequently, supervisors may not always be able to provide the same personal attention and guidance as in other specializations due to their heavy workload. On the flipside of this, some tracks are only chosen by very few students. Here it is important that sufficient attention is paid to the specific character of the MES student experience.

The panel believes that this observation by the students underscores an adverse effect of the programme being taught by a broad group of teachers from various chair groups who teach courses across multiple programmes. This inconsistency among chair groups was also observed by the previous panel. The previous panel recommended aligning study methods and teaching approaches across chair groups in instances of inconsistency. The current panel acknowledges that this is inherent to the organizational structure of WU, where the autonomy granted to chair groups in their scientific development that is reflected in their teaching poses difficulties for programme management in fully overseeing the practices of all teachers and keep them aligned with the priorities of the programme. Nevertheless, the panel advises that the concerns raised by students be taken seriously and that efforts be made to address perceived discrepancies and resultant feelings of inequality within the programme. The panel underscores the importance of maintaining continuous dialogue with the chair groups regarding available capacity and the minimal expectations for their contributions to an MES track.

Considerations

The panel confirmed that the curriculum enables students to achieve the intended learning outcomes. It offers a comprehensive study of environmental and sustainability topics, balancing academic rigour with professional skill development to equip students with essential competencies. The diverse range of courses caters to students' varied needs, providing a tailored programme. The programme is feasible, and students receive adequate support and guidance to create their own study path.

The teaching staff of the programmes are motivated and qualified and are experts in their fields. Teachers implement proactive measures to enable students of various backgrounds to fully comprehend and engage with the course content. Nevertheless, certain students perceive some courses as challenging, while others find them superficial, depending on their backgrounds. The panel recommends that programme management persist in addressing potential overlaps or deficiencies.

The programme effectively employs diverse teaching methods, fostering personalized learning and allowing for meaningful interactions between students and teachers. Access to exceptional research facilities enhances classroom activities and thesis projects, providing direct real-world applicability. The panel advises exploring options to fulfil students' desire to generate more opportunities for fieldwork and lab work within specific specializations.

Students perceive variations in the approaches of supervisors, particularly noticeable in the Environmental Policy specialization where workload challenges exist. The autonomy granted to chair groups in their scientific development that is reflected in their teaching poses difficulties for programme management in fully overseeing the practices of all teachers and keep them aligned with the priorities of the programme. Nonetheless, the panel advises making efforts to address perceived discrepancies and resulting feelings of inequality within the programme.

Conclusion

The panel concludes that the master's programme Environmental Sciences meets standard 2.

Standard 3. Student assessment

The programme has an adequate system of student assessment in place.

Findings

To ensure the quality of assessment, WU has developed an institution-wide assessment policy. One key principle of this policy is the alignment of assessment with education, following the concept of constructive alignment.

The programme employs various assessment methods ensuring that each course includes an assessment of students' knowledge, understanding, and skills that are aligned with the course learning outcomes. The assessment methods include written exams, individual or group assignments, (computer)practical reports, papers/essays, presentations, and participation in course work. The assessment matrix, included in the self-evaluation report, offers a comprehensive overview of the assessment methods employed in each course of the program, while also indicating which specific ILOs are being assessed.

All courses have a course guide that includes a transparent assessment strategy. These guides are available for students at the start of their course. The Examining Board (EB) checks and approves the description of these assessment strategies. To enhance exam transparency, the EB ensures that the relative contribution and minimum grades for partial exams are explicitly specified, and the type of exam is specified in the study handbook. For written exams, courses typically provide example exams to students and/or discuss previous exam questions in class. In the case of papers, students are informed in advance about the assessment criteria, often through a rubric or grading form.

For internships, both an external (local) and an internal Wageningen University supervisor are assigned. Before the start, students and supervisors agree on the internship's learning outcomes. A mid-term evaluation involving the student, host supervisor, and university supervisor occurs halfway through the internship, with the evaluation report uploaded to Osiris. Towards the end, the student reports on the project work, orally presents the outcomes of the internship and writes a reflection report on the learning outcomes. The internship report and the reflection report are both assessed by the university supervisor, who considers the external supervisor's input on the student's work and performance, particularly regarding

professional skills. The university supervisor then evaluates the internship using a standardized university assessment form and rubric.

The panel concludes that the assessment methods are adequately diverse and aligned with the final qualifications they are intended to evaluate. The assessment matrix ensures that course assessments encompass all knowledge and skills outlined in the programme's ILOs.

Examination Board

MES falls under the Examining Board Environment and Landscape (EBEL), one of the four Examining Boards (EB) of WU. The EB formally appoints examiners who are nominated by chair holders. The EB also safeguard the transparency, validity and reliability of examinations or intermediate examinations in all programmes. It monitors compliance with the assessment policy and can give instructions to the examiners – in line with the assessment policy – relating to the examination.

The individual study programme of each student is submitted to the EBEL for approval through the student information system Osiris. The approved programme must align with the intended learning outcomes of the overall programme. The EBEL assesses the level and content of courses in the electives. Any individual deviations from the described study programme (such as exemptions or substitutions) require approval from the Examining Board. The graduation process is initiated by Osiris when a student completes all compulsory and restricted optional courses and earns the required number of credits, including electives approved by the EBEL.

EBEL conducts regular and follow-up visits to each of the chair groups contributing to the MES programme every three to five years. During a regular visit, EBEL reviews the assessment procedures of the group, focusing particularly on the validity, reliability, and transparency of the interim examinations. An important task of EB is reviewing theses, regarding the quality of the assessment as well as on the fit with the programme's learning outcomes. EBEL combined thesis reviews with chair group visits. Since the academic year 2021-2022, the EB has increased its interaction with programme committees and programme directors by attending one Programme Committee meeting per year. Evaluation of the programme's assessment strategies and alignment of learning outcomes at both course and programme levels are on the agenda of these meetings.

Based on the documentation and the interview during the site visit, the panel concludes that the EB functions effectively. The panel appreciates that the EB not only visits chair groups but also Programme Committees, which enhances their role in ensuring the quality of assessments at the programme level. However, the panel observed that this additional responsibility adds to the already high workload of the EB, particularly in approving each student's study programme. Therefore, the panel recommends closely monitoring the workload of the EB and taking necessary measures if needed.

Assessment of the master's thesis

The thesis project is finalised with a written report, a presentation ('colloquium'), and a final defence of the thesis with the student, supervisor(s) and examiner. Chair groups use the WU assessment form to evaluate the thesis on different aspects: the performance (40%), the research report (50%), the oral presentation (5%) and the oral defence (5%). A rubric has been developed for each component of the assessment form describing the relation between the level of performance and the grades. Thesis work is always assessed by at least two assessors: the supervisor and a second assessor/ examiner.

Students who began their thesis after November 2022 utilize Osiris as the administrative system. This system outlines necessary steps and responsible parties (e.g., planning progress evaluations), promoting consistency and transparency within the university. The thesis's end date is documented in the learning agreement, with the possibility for an additional two-month extension granted by the examiner if needed to achieve a passing level. If the thesis remains unsatisfactory after this extension, the student must initiate a new thesis. The panel appreciates the effective use of monitoring and guidance provided through the Osiris platform. Moreover, the early inclusion of progress evaluation in the master thesis process is regarded as a commendable practice.

The previous assessment panel considered the assessment processes to be up to standard, involving two examiners and being conducted using elaborate scoring forms. However, the previous panel advised to add more extensive written comments to the assessment forms to substantiate the grades. The current panel also found that the assessment forms and grading templates are transparent in their design, incorporating clear assessment criteria that ensure that consistent information is gathered and provided to the student. However, many of the assessment forms still demonstrated rather limited constructive written feedback or a qualitative grade justification. Through interviews with students and teachers, the panel learned that feedback and grade justification is usually given to students in the form of oral feedback in addition to these forms. Although the panel appreciates the extensive effort put into providing students with substantial feedback, it recommends further enhancing the integration of written feedback into the digitized assessment process. This will not only improve assessment transparency for external stakeholders such as the EB but also enhance students' learning trajectories. The programme might even consider exploring the possibility of recording the oral feedback (perhaps automatically transferred into written text) and providing it to students this way to prevent introducing an extra administrative task.

The panel discussed the absence of written feedback on some of the thesis assessment forms with the EB. The EB members noted that this issue has garnered significant attention since the previous visitation. Within the new student system Osiris, teachers must offer narrative feedback. They acknowledged that although there has been progress since six years ago, there is still room for improvement. They mentioned that they consistently bring up this issue during their visits to the chair groups. Additionally, they pointed out the cultural differences among chair groups regarding this issue, highlighting that some chair groups are more hesitant to document specific feedback in writing due to concerns about increased workload. The panel advises EB to continue prioritizing this matter in the upcoming period, especially emphasizing the importance of written feedback to chair groups that are less inclined to acknowledge it.

Considerations

The panel established that the programme benefits from clear university-wide assessment policies, based on the principle of constructive alignment. The assessment methods are adequately diverse and aligned with the final qualifications they are intended to evaluate. Sufficient attention is paid to the validity, reliability and transparency of tests and examinations.

The Examining Board (EB) plays a crucial role in approving individual student study programmes and ensuring the quality of course assessments within the programme. The regular meetings with both chair groups and Programme Committees further enhance its oversight of assessment quality at the programme level. While the panel is confident in the effectiveness of the EB, it recommends closely monitoring the EB's workload and implementing necessary measures if needed.

The assessment forms and grading templates for the master's thesis provide clear assessment criteria but lack adequate written feedback and transparent grade justification. While the panel acknowledges the value

of the substantial oral feedback students receive on their final thesis, it emphasises the importance of ensuring that all students receive substantial written feedback. The panel views the mandatory inclusion of written feedback in Osiris as a positive step and recommends engaging all chair groups in further enhancing the integration of feedback into the digitized assessment process.

Conclusion

The panel concludes that the master's programme Environmental Sciences meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Master thesis

Before the site visit, the panel studied the theses of 15 master graduates, ensuring coverage across all eight tracks. Overall, the panel was satisfied with the quality of the theses and agreed with the assigned grades. The theses demonstrate a robust emphasis on methodological aspects, showcasing adept training in real-world relevant techniques and competencies, along with evidence of proficiency in research design and academic writing standards. Overall, the theses convincingly showed that the intended learning outcomes for the programme is achieved by its graduates. The distribution of marks is fair and well-aligned with the substantive content of the work.

Alumni

During the interview, alumni unanimously expressed that they secured positions closely aligned with the domain and level of the programme. They were very satisfied with their education, noting that the programme's emphasis on cultivating a diverse skill set effectively prepared them for their future careers. Additionally, they regarded the wide diversity within the student cohort, coupled with the emphasis on group work, as a key asset of the programme. Therefore, the panel concludes that the programme effectively prepares students for relevant positions in the professional field. In reviewing the data presented in the self-evaluation report, the panel noted that graduates pursue careers in various sectors including education and research, government, business and consultancy, as well as social-cultural organizations such as NGOs.

Furthermore, the self-evaluation report highlights the commendation from the External Advisory Board for MES graduates. Notable strengths include their ability to deal with complex systems and integrate natural and social sciences. Furthermore, graduates demonstrate ease in adapting to their roles, effectively identifying and engaging with stakeholders. They possess a clear understanding of how their expertise complements that of others and recognize the collaborative efforts required to address the often-wicked contemporary problems.

Considerations

The panel concludes that the master theses show that the intended learning outcomes of the programme are achieved. The programme prepares students for relevant positions in the professional field and graduates reflect positively on the programme.

Conclusion

The panel concludes that the master's programme Environmental Sciences meets standard 4.

General conclusion

The panel's assessment of the master's programme Environmental Sciences is positive.

Development points

1. Continue addressing potential overlaps or deficiencies in course content to ensure equitable comprehension and engagement for students from diverse backgrounds.
2. Explore options to fulfil students' desire to generate more opportunities for fieldwork and lab work within specific specializations.
3. Address inconsistencies among chair groups in their supervision approach during the thesis track.
4. Strengthen the incorporation of written feedback on the thesis into the digitized assessment process to enhance transparency and learning.

Appendix 1. Intended learning outcomes

	After successful completion of the programme graduates are expected to be able to:	Dublin descriptors*
1	draw up an integrated analysis of perceived or potential environmental and sustainability issues, based on insight in the environmental causality chain, linking driving forces in society, pressure on the environment, changes in environmental quality, effects on nature and public health, and societal response;	1, 2
2	take multiple perspectives and pursue interdisciplinary approaches to environmental problem solving and sustainable resource management;	1, 2
3	interact with stakeholders of different cultural backgrounds or nationalities and with specialists from other disciplines so as to arrive at a common identification, analysis, and solution strategy of the issues involved;	2, 4
4	define the scientific issues ensuing from an integrated analysis, taking account of relevant spatial scales (from local to global) and adopting a long-term perspective;	2, 3
5	independently design and execute environmental research in accordance with academic standards, thus contributing to the development of the body of knowledge in the field, or to the development of creative and innovative solutions to environmental and sustainability issues;	2
6	design strategies to deal with environmental and sustainability issues in the practice of policy development and management;	2, 3
7	act as a consultant, researcher or trainer, advising (non-)governmental organisations, research institutes or commercial corporations on how best to improve current and future activities with regard to the environment.	2, 4
8	clearly present, both orally and in writing, research proposals and results, as well as plans for measures and interventions, taking into account the nature of the target group;	4
9	formulate and manage projects in the fields of research, consultancy or management;	3, 4
10	support working parties and committees, negotiate, and act as a mediator, effectively and appropriately dealing with cultural diversity;	3, 4
11	reflect on the ethical aspects of their research and plans for measures and interventions;	3
12	design and plan their own learning processes by virtue of continuous reflection on personal knowledge, skills, attitudes and performance.	2, 3, 5

Appendix 2. Programme curriculum

	Year 1	Year 2																																											
	<table border="1"> <thead> <tr> <th>Period 1</th> <th>Period 2</th> <th>Period 3</th> <th>Period 4</th> <th>Period 5</th> <th>Period 6</th> </tr> </thead> <tbody> <tr> <td> Period 1 YRM20306 Research Methodology in Environmental Science </td> <td> Period 2 Thesis preparatory course </td> <td> Period 3 Free choice course </td> <td> Period 4 Thesis preparatory course </td> <td> Period 5 Free choice course </td> <td> Period 6 one of the academic master cluster options </td> </tr> <tr> <td> Afternoon ESA20806 Principles of Environmental Sciences </td> <td> ENP35806 Environmental Quality and Governance </td> <td></td> <td></td> <td> Thesis preparatory course </td> <td></td> </tr> </tbody> </table>	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 1 YRM20306 Research Methodology in Environmental Science	Period 2 Thesis preparatory course	Period 3 Free choice course	Period 4 Thesis preparatory course	Period 5 Free choice course	Period 6 one of the academic master cluster options	Afternoon ESA20806 Principles of Environmental Sciences	ENP35806 Environmental Quality and Governance			Thesis preparatory course		<table border="1"> <thead> <tr> <th>Period 1</th> <th>Period 2</th> <th>Period 3</th> <th>Period 4</th> <th>Period 5</th> <th>Period 6</th> </tr> </thead> <tbody> <tr> <td> Period 1 </td> <td> Period 2 </td> <td> Period 3 </td> <td> Period 4 </td> <td> Period 5 </td> <td> Period 6 </td> </tr> <tr> <td> Morning </td> <td colspan="5" rowspan="2"> Thesis </td> </tr> <tr> <td> Afternoon </td> </tr> <tr> <td colspan="6" style="text-align: center;"> Internship </td> </tr> </tbody> </table>	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Morning	Thesis					Afternoon	Internship					
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■ Common part
 ■ Specialisation
 ■ Free choice

Programme consists of:

1. Common part (18-30 EC)
2. Specialisation and thesis track (72-84 EC)
3. Free space (6-30 EC)

Students select an academic master cluster course from the options offered in the programme:

- The European Workshop Environmental Sciences and Management (ESA60312); a consultancy project specifically developed for environmental MSc programmes;
- The regular Academic Consultancy Training course combined with one or two modules in which specific skills (e.g. scientific writing, negotiation) are trained (YMC60809 plus YMC60303);
- The Entrepreneurial-Academic Consultancy Training combined with the skills course Pursuing and Realising Entrepreneurial Projects for those who prefer an entrepreneurial orientation (YMC60809 plus ELS67700);
- International Environmental Policy Consultancy for those who are selected for the Sustainable Development Diplomacy track (ENP60312);
- The Capacity Building for Sustainable Development for those who prefer to focus on education or communication (ELS69312);
- The Research Master Cluster for those who aim to continue working in an academic research environment (YWU60312).

Appendix 3. Programme of the site visit

BES Bachelor Environmental Sciences

MES Master Environmental Sciences

MUE Master Urban Environmental Management

Monday 18 March 2024

8.45-9.15	Arrival and preparation panel
9.15-10.30	Management BES/MES/MUE
10.45-11.30	BES students (specialisation, start year)
11.45-12.30	BES core lectures
12.30-13.30	Lunch
13.30-14.15	MES students
14.15-15.00	MES core Lecturers
15:00-15.30	Break
15.30-16.15	MUE students
16.30-17.15	MUE core lecturers
17.15-17.30	Wrap up panel

Tuesday 19 March 2024

8.45-9.15	Preparation panel
09.15-09.45	Alumni MES and MUE
10.00-10.30	Examining Board and Study Advisers
10.30-11.30	Internal deliberations panel
11.30-12.00	Final meeting management
12.00-12.45	Development meeting
12.45-14.45	Drafting Findings panel (including lunch)
14.45-15.30	Oral feedback/report of findings and closure

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses of the master's programme Environmental Sciences. Information on the theses is available from Academion upon request.

The panel also studied other materials, which included:

- Report previous accreditation
- Learning outcomes
- Schematic. overview of the programme
- Assessment Matrix
- Assessment policy Wageningen University
- Overview teaching staff
- Wageningen environmental experts in the labour market (situation in 2022)
- Dutch referential framework for academic programmes in Environment and Sustainability
- Selection of course material (five courses)
- Annual reports examining board (2019-2020; 2002-2021; 2022-2023)
- Annual programme committee (2019-2020; 2002-2021; 2022-2023)