

Assessment report
Limited Framework Programme Assessment

Bachelor Soil, Water, Atmosphere

Wageningen University

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1. Executive summary

In this executive summary, the panel presents the main considerations which led to the assessment of the quality of the Bachelor Soil, Water, Atmosphere programme of Wageningen University, which has been assessed according to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, as published on 20 December 2016 (Staatscourant nr. 69458).

The panel is positive about the objectives of the programme to study the structures and patterns at the Earth's surface and the physical, chemical and biological processes in the hydrosphere, atmosphere and biosphere parts of the Earth Sciences field, and to offer students quantitative methods and techniques to investigate and analyse these processes.

The objectives correspond to domain-specific reference framework for the Earth Sciences programmes. The panel welcomes the efforts by the joint Earth Sciences programmes in the Netherlands to draft this framework and regards this to be the sound and up-to-date description of the domain.

The panel is positive about students being prepared for the master programmes in this domain, be it that some students may enter the labour market. The panel approves of the programme maintaining regular contacts with the professional field and with international experts in this domain.

The programme intended learning outcomes correspond to the programme objectives, are complete and conform to the bachelor level.

The panel is positive about the strict entry requirements adopted by the programme and welcomes the elaborate and well-organised admission procedures. The panel advises to specifically pay attention to the prior education of foreign students.

The curriculum meets the programme intended learning outcomes. The courses are up to standard. The panel appreciates the curriculum covering fundamental subjects in the programme domain broadly and going in-depth into soil, water or atmosphere subjects. Students are taught thoroughly in mathematics, statistics, physics and chemistry. The research-base of the curriculum is very much up to standard. The curriculum offers students ample opportunities to acquire research knowledge and skills and academic skills. The curriculum coherence is strongly promoted by learning pathways and by the scheduling of integration courses.

The panel regards the lecturers in the programme to be very motivated and to work together effectively. The panel notes the lecturers to be capable researchers, some of whom have world-class status. Their educational capabilities are up to standard. Lecturers' workload is appropriately managed.

The students-to-staff ratio is very favourable, leading to small-scale education. The educational concept and study methods are very adequate. The panel welcomes the sizeable proportions of practical classes.

The number of hours of face-to-face education are favourable as well. The panel is positive about study guidance in the programme. The drop-out rates and the student success rates are up to standard.

The panel considers the assessment system of the programme to be well-thought-through and up-to-date. Although the position and authority of the Examining Board are adequate, the panel advises the Board to be more pro-active and to supervise examinations and assessments in a more direct way.

The examination methods adopted in the programme are adequate, being consistent with the goals and contents of the courses and aligned with cognitive levels. The measures taken to counter free riding are appropriate.

The supervision and assessment procedures of the Bachelor thesis project are up to standard. Students are offered appropriate supervision. The assessment processes are up to standard, involving two examiners and the thesis coordinators and being conducted using elaborate rubrics scoring forms. The panel advises to better monitor outlier grades for projects and to invite third examiners in case of low or high grades.

The measures taken by the programme to ensure the validity and transparency of examinations and the reliability of assessments are adequate. The panel appreciates the Chair Groups inviting external experts to review courses and examinations and the Examining Board inspecting the quality of the examinations and assessments of the Chair Groups. Students are informed well about examinations and assessments. The fraud and plagiarism formalities are up to standard.

The Bachelor thesis projects are regarded by the panel to be very much up to standard. The theses the panel studied certainly match the intended learning outcomes of the programme. The panel supports the grades given by the programme examiners. The panel regards the Bachelor thesis projects to be of high quality, to be based upon well-elaborated literature studies, to exhibit solid and to-the-point methodology, to demonstrate extensive analyses and to display focussed discussion of findings and results.

The panel considers the programme graduates to have reached the intended learning outcomes and to be qualified to enrol in master programmes in this domain. The panel appreciates graduates being admitted to a wide range of master programmes.

The panel which conducted the assessment of the Bachelor Soil, Water, Atmosphere programme of Wageningen University assesses this programme to meet the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, judging the programme to be good. Therefore, the panel advises NVAO to accredit the programme.

Rotterdam, 25 March 2019

Prof. dr. ir. A. Veldkamp
(panel chair)

drs. W. Vercouteren
(panel secretary)

2. Assessment process

The evaluation agency Certiked VBI received the request by Wageningen University to organise the limited framework programme assessment process for the Bachelor Soil, Water, Atmosphere programme of this University. The objective of the programme assessment process was to assess whether the programme would conform to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, published on 20 December 2016 (Staatscourant nr. 69458).

Having conferred with management of the Wageningen University programme, Certiked invited candidate panel members to sit on the assessment panel. The panel members agreed to do so.

The panel composition was as follows:

- Prof. dr. ir. A. Veldkamp, dean ITC Faculty of Geo-Information and Earth Observation, University of Twente, the Netherlands (panel chair);
- Drs. T.M. van Daalen, director Geological Survey of the Netherlands, Netherlands Organisation for Applied Scientific Research, the Netherlands (panel member);
- Prof. dr. ir. N.E.C. Verhoest, associate professor, Department of Environment, Ghent University, Belgium (panel member);
- L. Roelofs BSc, student Master Earth Surface and Water, Faculty of Geosciences, Utrecht University, the Netherlands (student member).

On behalf of Certiked, drs. W. Vercouteren served as the process coordinator and secretary in the assessment process.

All panel members and the secretary confirmed in writing being impartial with regard to the programme to be assessed and observing the rules of confidentiality. Having obtained the authorisation by the University, Certiked requested the approval of NVAO of the proposed panel to conduct the assessment. NVAO has given its approval.

To prepare the assessment process, the process coordinator convened with management of the programme to discuss the outline of the self-assessment report, the subjects to be addressed in this report and the site visit schedule. In addition, the planning of the activities in preparation of the site visit were discussed. In the course of the process preparing for the site visit, programme management and the Certiked process coordinator regularly had contact to fine-tune the process. The activities prior to the site visit have been performed as planned. Programme management approved of the site visit schedule.

Well in advance of the site visit date, programme management sent the list of final projects of graduates of the programme of the last two years. Acting on behalf of the assessment panel, the process coordinator selected the theses of fifteen graduates from the last few years. The grade distribution in the selection was ensured to conform to the grade distribution in the list, sent by programme management.

The panel chair and the panel members were sent the self-assessment report of the programme, including appendices. In the self-assessment report, the student chapter was included. In addition, the expert panel members were forwarded a number of theses of the programme graduates, these theses being part of the selection made by the process coordinator.

Well before the site visit date, the assessment panel chair and the process coordinator met to discuss the self-assessment report provided by programme management, the procedures regarding the assessment process and the site visit schedule. In this meeting, the profile of panel chairs of NVAO was discussed as well. The panel chair was informed about the competencies, listed in the profile. Documents pertaining to a number of these competencies were presented to the panel chair. The meeting between the panel chair and the process coordinator served as the briefing for panel chairs, as meant in the NVAO profile of panel chairs.

Prior to the date of the site visit, all panel members sent in their preliminary findings, based on the self-assessment report and the final projects studied, and a number of questions to be put to the programme representatives on the day of the site visit. The panel secretary summarised this information, compiling a list of questions, which served as a starting point for the discussions with the programme representatives during the site visit.

Shortly before the site visit date, the complete panel met to go over the preliminary findings concerning the quality of the programme. During this meeting, the preliminary findings of the panel members, including those about the theses were discussed. The procedures to be adopted during the site visit, including the questions to be put to the programme representatives on the basis of the list compiled, were discussed as well.

On 15 January 2019, the panel conducted the site visit on the Wageningen University campus. The site visit schedule was as planned. In a number of separate sessions, the panel was given the opportunity to meet with Faculty Board representatives, programme management, Examining Board members, lecturers and final projects examiners, and students and alumni.

In a closed session at the end of the site visit, the panel considered every one of the findings, weighed the considerations and arrived at conclusions with regard to the quality of the programme. At the end of the site visit, the panel chair presented a broad outline of the considerations and conclusions to programme representatives.

Clearly separated from the process of the programme assessment, assessment panel members and programme representatives met to conduct the development dialogue, with the objective to discuss future developments of the programme.

The assessment draft report was finalised by the secretary, having taken into account the findings and considerations of the panel. The draft report was sent to the panel members, who studied it and made a number of changes. Thereupon, the secretary edited the final report. This report was presented to programme management to be corrected for factual inaccuracies. Programme management were given two weeks to respond. Having been corrected for these factual inaccuracies, the Certiked bureau sent the report to the Board of Wageningen University, to accompany their request for re-accreditation of this programme.

3. Programme administrative information

Name programme in CROHO: B Soil, Water, Atmosphere
Orientation, level programme: Academic Bachelor
Grade: BSc
Number of credits: 180 EC
Specialisations: None
Location: Wageningen
Mode of study: Full-time (language of instruction English)
Registration in CROHO: 21PI-56968

Name of institution: Wageningen University
Status of institution: Government-funded University
Institution's quality assurance: Approved

4. Findings, considerations and assessments per standard

4.1 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 Bachelor Soil, Water, Atmosphere programme is one of the programmes of Wageningen University. Wageningen University is a one-faculty University. The Rector is assisted by the Dean of Research and the Dean of Education. The Dean of Education is the technical chair of the Board of Education. This Board, being composed of four professors and four students, is responsible for all programmes of the Faculty. The Dean of Education is also head of the Department of Education and Student Affairs, being in this capacity responsible for facilitating education within the University. For this programme as for all other programmes of the Faculty, the Programme Committee is responsible for the contents and quality of the programme. The Programme Committee is composed of equal numbers of staff members and students. The director of this programme is responsible for the day-to-day management and support activities of the programme. Courses within the programme are part of the programme curriculum, but all of the courses are taught by Chair Groups within the University. Chair Groups are part of one of the five Science Groups of the University. In Chair Groups, expertise on specific subjects is clustered. The programme director maintains contacts with Chair Groups regarding design, contents and quality of the courses they deliver. The learning goals, contents, teaching methods and assessment methods are subject to the approval of the Programme Committee and the Board of Education. Each year, in the Education Modification Cycle, these are discussed. For all of the programmes of the University, four Examining Boards are in place. For this programme, the Examining Board Environment and Landscape has the authority to ensure the quality of examinations and assessments.

The Bachelor Soil, Water, Atmosphere programme of Wageningen University is a three-year, research-based, academic bachelor programme in the multi-disciplinary Earth Sciences domain. In the programme, the effects of the Earth system and processes on life on Earth are studied. The programme aims to study the structures and patterns at the Earth's surface and the physical, chemical and biological processes operating in and between especially the hydrosphere, atmosphere, pedosphere and biosphere, at different temporal and spatial scales. Students are educated to understand Earth Sciences phenomena with respect to soil, water and atmosphere and to know and apply disciplinary and multi-disciplinary methods, techniques and approaches to study these. Students are taught research methods and techniques in measurements, data sampling and data analysis. Students are acquainted with fieldwork, laboratory work, computer programming and modelling. In addition, students are trained in academic skills.

The programme has been benchmarked against the Earth Sciences domain-specific reference framework, which has been drafted by the joint Earth Sciences programmes in the Netherlands. The objectives of the programme conform to this framework.

The programme has been compared to Earth Sciences programmes over the world. This programme distinguishes itself from most programmes by studying the atmosphere, by including chemical and biological processes at Earth's surface, by emphasising mathematics, statistics, physics, chemistry and biology, and by covering the breadth of these disciplines from the beginning of the programme onwards.

The programme primarily prepares students to continue their studies and to enrol in master programmes in Earth Sciences or related domains. Students may, however, enter the labour market as second-grade physics or geography teachers in secondary education or in junior positions in this field. Students do not often take the latter route.

The programme regularly meets with the External Advisory Committee, being composed of professional field representatives, to discuss the programme objectives from the professional field perspective. Experts from foreign institutes on a regular basis review the programme comparing it to international standards.

The programme objectives have been translated into the intended learning outcomes of the programme. The intended learning outcomes include, as main points, understanding major terrestrial and atmospheric processes, applying physical, chemical, biological and spatial concepts and approaches to describe and interpret phenomena at or near Earth's surface, analysing problems in the programme domain by doing research, including the main phases of scientific research, under supervision, applying laboratory and fieldwork techniques and mathematical, computational and statistical methods, collaboration skills, societal and ethical awareness, and self-directed learning competencies.

Programme management presented the comparison of the intended learning outcomes to the Dublin descriptors for the bachelor level.

Considerations

The panel considers the programme objectives to be relevant and sound. The panel is positive about the objectives of the programme to study the structures and patterns at the Earth's surface and the physical, chemical and biological processes in the hydrosphere, atmosphere and biosphere parts of the Earth Sciences field, and to offer students quantitative methods and techniques to investigate and analyse these processes.

The programme objectives correspond to domain-specific reference framework for the Earth Sciences programmes. The panel welcomes the efforts by the joint Earth Sciences programmes in the Netherlands to draft this framework and regards this to be the sound and up-to-date description of the domain.

The panel appreciates the comparison of the programme to other programmes across the globe and sees in this comparison the programme profile clearly reflected.

The panel is positive about students being prepared for the master programmes in this domain, be it that some students may enter the labour market.

The panel is positive about the programme maintaining regular contacts with the professional field and with international experts in this domain.

The programme intended learning outcomes correspond to the programme objectives, are complete and conform to the bachelor level.

Assessment of this standard

These considerations have led the assessment panel to assess standard 1, Intended learning outcomes, to be satisfactory.

4.2 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

The number of incoming students in the last years remained rather stable at about 70 students per year. Having changed to English as the language of instruction, the programme expects to attract more international students. The vast majority of the incoming students have Dutch secondary school diplomas with the profile Nature and Engineering or the profile Nature and Health, including Physics. Students with Mathematics A or B certificates are both admitted. Students with the Mathematics A certificate, who are about 10 % of the total influx, take Mathematics courses to remedy their deficiencies. Students with Mathematics B take Statistics courses. Applicants are obliged to take part in the programme matching, which is meant to inform them about the characteristics of the programme. The programme advises them on enrolment on the basis of matching outcomes.

The curriculum of the programme takes three years and carries 180 EC of study load. The programme presented a table, showing the mapping of the intended learning outcomes and the courses. The first two years of the curriculum contain compulsory courses. In the curriculum and especially in the first two years, learning pathways have been designed. The disciplinary learning pathway consists of courses in mathematics, statistics, physics and chemistry. The domain-specific pathway includes courses on soil-, water- or atmosphere-related subjects. The integration pathway is composed of courses, integrating one or more of the programme domains, soil, water or atmosphere with biology, physics, and chemistry. These courses allow students to study processes between the hydrosphere, atmosphere and biosphere. Part of the latter courses are site visits and fieldwork. Academic skills training is part of these courses, either to explicitly train them or to practice them. Academic skills include academic writing, information literacy, research methodology, presenting, working in groups, and ethics and philosophy of science. In the first semester or the second semester of the third year, students select one of the programme domains, soil, water or atmosphere to specialise in. In addition, they complete their Bachelor thesis project. In the first or second semester of the third year, students are offered free choice options. Many students take courses to deepen their knowledge and skills in one of the programme domains to prepare for master programmes or specialisations. About 15 % to 20 % of the students take courses at universities abroad. Students may also take the education minor. New trends, such as data science, are addressed in the curriculum. In cooperation with the University, the Environmental Sciences Group and the study association, the programme schedules career days to inform students about career perspectives. The programme has changed from being Dutch-taught to English-taught. The reasons for the change are that courses were previously partly already English-taught and that international subjects may be more easily addressed. Specific Dutch subjects will remain to be covered in the programme.

A total number of 72 lecturers are involved in the programme. The lecturers are active researchers in their fields. They are members of research institutes within the University. About 83 % of the staff members have PhD degrees. Some lecturers only lecture, have no PhD degrees and may not be involved in research. Of the total number of lecturers about 60 % are BKO-certified. Lecturers experience the workload as demanding. More staff is being recruited to alleviate the workload. Lecturers meet to discuss the programme. Students indicate to be very content about lecturers' performances and accessibility.

The students-to-staff ratio of the programme is 12/1. The ratio is very favourable on account of the many laboratory classes, computer classes and field trips. The number of hours of face-to-face education is about 24 hours per week across the three years. The educational concept of the programme is to encourage students to actively engage in the learning processes. To that end, activating study methods are used. Study methods adopted in the programme are lectures, tutorials, computer classes, laboratory classes, fieldwork, and site visits. The practical laboratory and computer classes and the fieldwork and site visits constitute 50 % of the curriculum. The programme is working on strengthening safety requirements for fieldwork. The programme is in the process of introducing new study methods, such as flipped classroom and e-learning tools. The programme study adviser informs students about procedures, guides them and assists them in selecting elective courses. Upon advice of the study adviser, the Examining Board approves of study packages. The study adviser monitors students' study progress and discusses with them study delays. The drop-out rates for the programme are 10 % to 15 % for the last years, most of these students leaving the programme in the first year. The student success rates are on average 47 % after three years and 82 % after four years (proportions of students re-entering in the second year, figures for last four to five cohorts).

Considerations

The panel is positive about the strict entry requirements applied by the programme and welcomes the elaborate and well-organised admission procedures. The panel advises to specifically pay attention to the prior education of foreign students.

The panel ascertained the curriculum to meet the intended learning outcomes of the programme. The courses are up to standard. The panel appreciates the curriculum covering both fundamental subjects in the programme domain broadly as well as going in-depth into soil, water or atmosphere subjects. The panel regards the courses on mathematics, statistics, physics and chemistry to teach students thoroughly in these disciplines. The research-base of the curriculum is very much up to standard. The curriculum offers students ample opportunities to acquire research knowledge and skills and academic skills. The curriculum coherence is strongly promoted by learning pathways and by the scheduling of integration courses.

The panel regards the lecturers in the programme to be very motivated to teach in the programme and to work together effectively. The panel notes the lecturers to be capable researchers, some of whom have world-class status. Their educational capabilities are up to standard. Lecturers' workload is appropriately managed.

The students-to-staff ratio is very favourable, leading to small-scale education. The panel regards the educational concept and study methods to be very adequate and especially welcomes the sizeable proportions of practical classes. The number of hours of face-to-face education are favourable as well. The panel is positive about study guidance in the programme, study advisers being very approachable. The drop-out rates and the student success rates are appropriate.

Assessment of this standard

These considerations have led the assessment panel to assess standard 2, Teaching-learning environment, to be good.

4.3 Standard 3: Student assessment

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

The examinations and assessments in the programme as well as the responsibilities of the Examining Board match the University assessment policy. As has been indicated, the Examining Board Environment and Landscape has the authority to ensure the quality of examinations and assessments of the programme. The responsibilities of the Board are outlined in the University assessment policy document as well.

Examination methods in the programme include written examinations, written individual or group reports or papers, oral presentations, and practical laboratory performance evaluation. Examination methods are selected to conform to the course goals and are in line with cognitive levels to be assessed. In all courses, multiple examinations are scheduled, to allow for different course goals to be adequately assessed. In case of group assignments, peer review among students is taken into account to counter free-riding effects. In courses, group assignments are complemented by individual examinations. Formative assessment are scheduled in courses to promote study progress.

The Bachelor thesis projects are individual scientific research projects. Students make use of existing data or use new data by doing experiments or developing or modifying computer models. Students are to submit their research proposal. Proposals have to be approved of by the examiners, before students may proceed to complete the Bachelor thesis project (go/no-go decision). Students are entitled to individual guidance by their supervisor, coming from one of the Chair Groups. The thesis coordinators for the programme domains soil, water and atmosphere oversee the thesis project processes. The thesis projects are assessed on the basis of research competencies (40 % of the grade), the thesis report (30 %), the symposium (20 %) and the ethics components (10 %). The Bachelor thesis projects are assessed by the supervisor, second examiner and thesis coordinator, using rubrics scoring forms. The ethics components are assessed by the ethics lecturer.

In the programme, measures are taken to ensure the validity, reliability and transparency of examinations and assessments. The Examining Board appoints the examiners, who should be involved in the courses as lecturers or coordinators, should have PhD degrees and should be BKO-certified. The Examining Board on a regular basis reviews examinations and assessments of each of the Chair Groups in the programme to see if these meet quality requirements. International experts in the programme domain review course goals, course contents and examinations of the Chair Groups. Recently, the Examining Board started regular meetings with the Programme Committee to discuss examinations and assessments at the programme level. Students are informed about the examinations and the grading schemes and are presented with test examinations. Theses and other written reports are checked for plagiarism. The Examining Board handles cases of fraud or plagiarism and imposes sanctions.

Considerations

The panel considers the examination and assessment policies for the programme to be appropriate, these being in line with the University rules and regulations. The panel considers the assessment system of the programme to be well-thought-through and up-to-date. Although the position and authority of the Examining Board for this programme are adequate, the panel advises the Board to be more pro-active and to supervise examinations and assessments in a more direct way.

The panel approves of the examination methods adopted in the programme, these being consistent with the goals and contents of the courses and being aligned with cognitive levels. The panel considers the measures taken to counter free riding to be adequate.

The supervision and assessment procedures of the Bachelor thesis projects are up to standard. Students are offered appropriate supervision. The assessment processes are up to standard, involving two examiners and the thesis coordinators and being conducted using elaborate rubrics scoring forms. The panel advises to better monitor outlier grades for projects and to invite third examiners in case of low or high grades.

The measures taken by the programme to ensure the validity and transparency of examinations and the reliability of assessments are adequate. The panel appreciates the Chair Groups inviting external experts to review courses and examinations and the Examining Board inspecting the quality of the examinations and assessments of the Chair Groups. Students are informed well about examinations and assessments. The fraud and plagiarism formalities are up to standard.

Assessment of this standard

The considerations have led the assessment panel to assess standard 3, Student assessment, to be satisfactory.

4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.
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Findings

The panel studied a total of fifteen Bachelor theses of graduates of the programme. The average grade for these projects is 7.5 both in 2015/2016 and 2016/2017.

The programme graduates are admitted to a range of academic master programmes in this field, both of Wageningen University or other universities. Students are admitted unconditionally to Master Earth and Environment, Climate Studies, Development and Rural Innovation or Geo-Information Science of this University. Graduates of the programme tend to perform well in the master programmes.

Considerations

The Bachelor thesis projects are regarded by the panel to be very much up to standard. The theses the panel studied certainly match the intended learning outcomes of the programme. The panel supports the grades given by the programme examiners. The panel regards the Bachelor thesis projects to be of high quality, to be based upon well-elaborated literature studies, to exhibit solid and to-the-point methodology, to demonstrate extensive analyses and to display focussed discussion of findings and results.

The panel considers the programme graduates to have reached the intended learning outcomes and to be qualified to enrol in master programmes in this domain. The panel appreciates graduates being admitted to a wide range of master programmes.

Assessment of this standard

The considerations have led the assessment panel to assess standard 4, Achieved learning outcomes, to be good.

5. Overview of assessments

Standard	Assessment
Standard 1. Intended learning outcomes	Satisfactory
Standard 2: Teaching-learning environment	Good
Standard 3: Student assessment	Satisfactory
Standard 4: Achieved learning outcomes	Good
Programme	Good

6. Recommendations

In this report, recommendations by the panel have been listed. For the sake of clarity, these have been brought together below. These panel recommendations are the following.

- To specifically pay attention to the prior education of incoming students from abroad.
- For the Examinations Board to be more pro-active and to supervise examinations and assessments in a more direct way.
- To better monitor outlier grades for Bachelor thesis projects.
- To invite third examiners in case of low or high grades for Bachelor thesis projects.