

WO-master Programme in
Water Management and
Governance
IHE-Delft Institute for Water
Education

11 February 2019

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1 Executive summary

The Master programme in Water Management and Governance (WGM) is an 18-month master's programme offered by IHE-Delft. Its overall mission is to strengthen the capacity of the water sector by training reflexive water professionals and experts who have the knowledge and capacity to develop, plan, implement and critically evaluate water management and governance policies and strategies in support of the ecologically wise and socially equitable use of water.

The programme primarily targets mid-career professionals from the Global South who already work in the water sector, either with governments, non-governmental organisations or the private sector. The panel subscribes to the mission of the programme. The social science orientation of the programme is valuable for mid-career professionals to develop better insight in how to establish implementation and development in society beyond designing a model. In fact, the panel finds the approach of the water management and governance group highly valuable for IHE-Delft as a whole as an addition to its technological orientation.

The panel concluded that the intended learning outcomes of the programme indicate that the programme has successfully met the level that has to be acquired for an academic master's programme. Specifically, the program clearly meets the Dutch qualifications framework and ties in with the international perspective of the requirements set by the professional field and the discipline.

The programme has a modular structure, with teaching organised into three-week blocks and a study load of 5 EC for each module. After a period of two blocks there is a week for examinations. Recently the programme committee decided to loosen the specialisations and focus at tailor-made study trajectories. The first five (foundation) modules provide the students with the required basic knowledge. The programme starts with a one week introduction for all IHE students. The introduction week is very much appreciated by the students. Students feel that the institute is making considerable efforts to make them feel welcome and include them in the IHE community.

All education at IHE-Delft follows the concept of aligned teaching and active learning within a framework of incremental learning. Each module therefore offers a balance of formal lectures, supervised and unsupervised workshops, case studies, field trips, field work, and self-study by the student.

The panel very much appreciates the intensive efforts IHE-Delft puts into tutoring and guidance of its students. The teaching and learning environment created by IHE-Delft is very inspiring and motivating. Students feel part of a community and are stimulated to achieve a high level. The panel particularly appreciates the introductory week with its focus on 'ways of knowing' and encourages IHE to maintain this element in the programme. The panel thinks that the interdisciplinary focus is an exciting element of the programme which should be deepened.

The academic and didactic qualities of the staff are good, although the percentage of teaching staff with a UTQ lags behind. The panel suggests that all academic staff should be encouraged to work towards earning UTQ. The panel noticed that diversity among academic staff is an issue in IHE-Delft which still needs consideration. It finds the representation of women in higher academic positions to be too low. In particular gender diversity related to leadership positions should be improved.

The panel established that the assessment and examination regulations are clearly described. The Examination Board has reliable procedures and the necessary level of independence. The panel finds the assessment policy coherent and transparent. The interim examinations and the thesis assessments are transparent, valid and reliable. The panel also established that there are proper forms in place for the assessment of the master's thesis.

The panel studied 15 theses to establish whether the graduates had achieved the intended learning outcomes of the programme and found that the theses are appropriate as the final product of an academic master's degree programme. The graduates are well prepared for enhancing their career in the water sector. The recommendation was made that to improve the logic and flow of theses for this particular programme, some flexibility should be given related to the form and outline of the thesis, as a scientific model and outline is not always appropriate for theses of this type.

The panel appreciates the information provided by the institute, particularly the student reflection report and is very positive about the quality culture in the institute, illustrated, among others, by the direct improvements the institute applied in reaction to the student's reflection.

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

Date: 11 February 2019

Grietje Zeeman
(chair)

Barbara van Balen
(secretary)

2 The procedure

IHE-Delft offers four 18-month Master of Science programmes (Environmental Science, Water Science and Engineering, Water Management and Governance, and Urban Water and Sanitation). IHE-Delft chose to invite an international panel of independent experts for the assessment of these four programmes. The NVAO approved of the proposed panel of experts on 30 August 2018.

The panel consisted of:

Chair:

Prof. dr. G. Zeeman, professor emeritus in New Sanitation at Wageningen University, the Netherlands;

Members:

- Dr. K. Rebel, assistant professor in Sustainable Development at Utrecht University, the Netherlands;
- Prof. A. Schleiss, professor emeritus in Hydraulic Constructions engineering at the Swiss Federal Institute of Technology in Lausanne, Switzerland;
- Prof. E. Manzungu, professor in Agricultural Landscapes, Waterscapes and Environmental Management at the University of Zimbabwe;
- Dr. Leila Harris, associate professor at the Institute for Resources Environment and Sustainability and at the Institute for Gender, Race, Sexuality and Social Justice at the University of British Columbia, Canada;
- E.L. Okoro, master's student in Law and Technology at Tilburg University, the Netherlands.

The panel was supported by dr. B.M. (Barbara) van Balen, who acted as secretary.

This composition reflects the expertise deemed necessary by NVAO. (Annex 1: Composition of the panel). All panel members signed a statement of independence and confidentiality.

The panel has based its assessment on the standards and procedures described in the NVAO Assessment framework for the higher education accreditation system of the Netherlands (Stcrt. 2016, nr 69458). Prior to the site visit, the NVAO developed a new assessment framework which is projected to come into effect on 1 February 2019. Anticipating this new framework, the panel (in consultation with the institute) decided to assess the programme using binary judgements. All standards are judged satisfactory, which means that the programme meets the requirements for re-accreditation.

After consultation with the chair and the secretary of the panel the institute prepared a site visit for the panel and scheduled interviews with representatives of all four degree programmes. The panel members prepared the assessments of the programmes by analysing the documents provided by the institution for each degree programme (Annex 3: Documents reviewed). The panel organised a preparatory meeting on 14 November 2018. During this meeting, the panel members shared their first impressions and formulated questions for the site visit.

The site visit took place on 14-16 November 2018 at IHE-Delft Institute for Water Education. During its visit, the panel was able to discuss the formulated questions and to gather additional information during several sessions (Annex 2: Schedule of the site visit). Afterwards, the panel discussed the

findings and considerations and pronounced its preliminary assessments per programme, per theme and per standard. At the end of the site visit, initial findings were presented to the institute.

Based on the findings, considerations and conclusions the secretary produced a draft advisory report for each programme that was first presented to the panel members. After the panel members had commented on the draft report, the chair endorsed the report. On 22 January 2019 the advisory report was sent to the institute, which was given the opportunity to respond to any factual inaccuracies in the report. The institute replied on 5 February 2019. All suggested corrections were adopted. Subsequently the final report was endorsed by the panel chair. The panel composed its advice fully independently and offered it to the institute on 11 February 2019.

3 Description of the programme

3.1 General

Country	: The Netherlands
Institution	: IHE-Delft Institute for Water Education
Status	: Not publicly funded, higher education institution
Result institutional quality assurance assessment	: Positive 12 th May 2015
Programme	: Programme in Water Management and Governance
Level	: master
Orientation	: academic (wo)
Specialisations	: Water Cooperation and Diplomacy (joint specialisation) Tailor-made study trajectories based on student portfolios
Degree	: Master of Science
Location(s)	: Delft
Study Load (EC)	: 106 EC
Croho	: 75008

3.2 Profile of the institute

IHE Delft Institute for Water Education (IHE-Delft) is the largest international graduate water education facility in the world. IHE-Delft envisions a world in which people manage their water and environmental resources in a sustainable manner, and in which all sectors of society, particularly the poor can enjoy the benefits of basic services. The mission of IHE-Delft is to contribute to the education and training of problem-oriented researchers and professionals, to expand the knowledge base through research, and to build the capacity of sector organizations, knowledge centres and other institutions active in the fields of water, the environment and infrastructure in developing countries and countries in transition.

IHE-Delft has three Academic Departments with academic staff responsible for education, training and research programmes. These are the Environmental Engineering and Water Technology, Water Science and Engineering, and Integrated Water Systems and Governance departments. Each Academic Department is composed of Chair Groups, each of which is based on a particular discipline or specialisation.

The institute's education activities include a PhD programme, several masters' programmes and an array of short and online courses, with a focus on practicing, mid-career professionals.

3.3 The master's degree programme Water Management and Governance

Water management and governance are central to the new 2030 Agenda for Sustainable Development of the United Nations. Water does not just matter for achieving the specific sustainable goal on access to clean water and sanitation, but also plays a role in helping achieve other goals, such as reducing poverty and hunger, achieving gender-equality and redressing inequities; sustaining natural resources and aquatic ecosystems; maintaining peace and fostering

cooperation; building resilient infrastructure; and responding to climate change. Because the different societal objectives associated with water are not always compatible, the ability to clearly articulate, measure and disentangle different (ways of achieving) water objectives becomes a key competence that students need to acquire. The Water Management and Governance (WGM) programme's overall mission is to strengthen the capacity of the water sector by training reflexive water professionals and experts who have the knowledge and capacity to develop, plan, implement and critically evaluate water management and governance policies and strategies.

The WGM programme is one of four 18 months Master programmes offered by the Institute, the other programmes being those in: Urban Water and Sanitation, Environmental Science, and Water Science and Engineering. These programmes consist of a 12 months modular taught part and a 6 months master thesis research phase. The total study load of the programme equals 106 EC. In recent years the number of specialisations within these programmes has grown, as a result of the Institute's participation in initiatives such as the Erasmus Mundus programme. As a result some specialisations are offered jointly with European and overseas partners. Generally, these joint specialisations have a somewhat different structure and duration than the fully based Delft specialisations; a number of them lead to a joint degree. One of such specialisations resides with the WGM master programme, i.e. the master programme in Water Cooperation and Diplomacy, which is offered jointly with the University for Peace (Costa Rica) and Oregon State University (USA). For this joint specialisation students are expected to obtain 35 EC at IHE-Delft. Upon graduation students receive degrees from each hosting organisation (respectively University for Peace and Oregon State University).

4 Assessment 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.

Outline of findings

The overall mission of the Master of Science in Water Management and Governance (WMG) is to strengthen the capacity of the water sector by training reflexive water professionals and experts who have the knowledge and capacity to develop, plan, implement and critically evaluate water management and governance policies and strategies in support of the ecologically wise and socially equitable use of water. It does so by adopting interdisciplinary approaches and reflexive methodologies in its teaching and by explicitly discussing prospects and tensions associated both with combining insights and languages from multiple disciplines, as with the often-contested nature of water.

The academic domain of the programme is relatively young and evolving. Attention to water management and governance originated from the ambition to train engineers in the 'soft' side of managing water, about how water is also about influencing people's behaviours in relation to water. The co-existing of different ways of knowing is explicitly thematised in the programme, linked to the recognition that all knowledges are situated. The constitutive relationship between power and knowledge is disentangled to shed light on why certain knowledges gain more authority.

There is growing recognition that water management and governance questions require interdisciplinary or transdisciplinary forms of analysis. An important focus in the WMG programme are the real-world challenges and governance of water as they are experienced and articulated by various actors. The term water governance also draws attention to the broader processes that determine how societal rule and order is established through and in water in highly heterogeneous societies. Furthermore, the theme of how to balance objectives of economic development with those of ecological integrity and social justice becomes ever more prominent in water management and governance debates. The field of study of the WMG programme therefore can be subdivided into four thematic profiles and focus areas:

- water quality
the impact of human activities on aquatic ecosystems
- water resources
matching water availability and use and developing alternative land use and water allocation models
- water services
the provision of water and sanitation services and the management of related infrastructure
- water conflict and cooperation
anticipating, preventing and managing conflicts

The programme primarily targets mid-career professionals from the Global South who already work in the water sector, either with governments, non-governmental organisations or the private sector. According to the programme management students need combined competencies to understand how water and society interact and co-shape each other. They need a sound understanding of water availability in terms of quantity and quality, and hence of key biophysical and hydrological processes. They also need to be able to quantify the uses, needs and requirements of water, of humans and of

the environment. Next to that they need to acquire a critical understanding of the social and political processes that shape access, allocation, treatment, use and discharge of water. The programme aims to equip the students with the knowledge, insight and skills that are required to research, develop, implement and critically evaluate water management approaches and governance processes in order to foster equitable and sustainable uses and distribution of water.

This general aim has been translated to intended learning outcomes that specify the knowledge and skills graduates of the WMG programme should acquire (Annex 2). The common intended learning outcomes for the programme have been completed with learning objectives of the thematic profiles on Water Quality, Water Resources, Water Service and Water Cooperation and Conflict Management. The intended learning outcomes include the newly defined final qualifications at Institute level that are applicable for all IHE's 18-month master's programmes.

Considerations

The panel subscribes to the mission of the programme. The social science orientation of the programme is valuable for mid-career professionals to get a better insight in how to getting things done in society, this orientation goes beyond designing a model, making sure the model is implemented and used. In fact, the panel finds the approach of the water management and governance group highly valuable for the whole IHE as an addition to the technological orientation.

The panel judges the final qualifications and learning objectives to be well-formulated. The programme fulfils the need to prepare students to address the issues and questions concerning water management and governance. The panel concluded that the intended learning outcomes of the programme indicate sufficiently the level that has to be acquired for an academic master's programme. They meet the Dutch qualifications framework and tie in with the international perspective of the requirements set by the professional field and the discipline.

The panel finds the profile of the master's programme attractive and very relevant. The intended learning outcomes of the master's programme are well connected to the needs in society and the requirements in the professional field.

Conclusion

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.

Outline of findings

The WMG programme brings together insights about (ways of knowing and assessing) water quality and quantity with understandings of the infrastructural, political and institutional arrangements to regulate its access, allocation, treatment, use and discharge. The content of the courses ranges from rather technical or natural science-oriented hydrology, ecology, engineering to more skills-oriented and interpretive social sciences.

The current programme has the following structure with four distinct phases:

- Foundation phase: common base at the start of the programme, during which students follow five common modules, which provides a broad and balanced state-of-the-art. The modules aim at strengthening academic and professional skills.

- Tailor-made phase: students choose five modules that will allow them to achieve their personal learning objectives.
- Integration phase: common part towards the end of the taught part of the programme.
- Research phase.

The programme has a modular structure, with teaching organised into three-week blocks and a study load of 5 EC for each module (Annex 3). After a period of two blocks there is a week for examinations. Recently the programme committee decided to loosen the specialisations and focus at tailor-made study trajectories. Students are only obliged to follow the foundation phase and an integration phase. During the foundation phase they will develop a portfolio based on their educational and professional background, their career ambitions and opportunities. The tailor-made study trajectory can -to a certain- extent include modules offered by other master's programmes. The programme is multidisciplinary/interdisciplinary in nature, it is therefore necessary to put an emphasis on integration.

The panel was informed that the student inflow changed in the last few years. Currently, there are more students with a non-water background. Most students have a strong affinity with water governance and management and practical experience. The programme committee therefore decided to offer preparation modules online for at home-study before entering the programme. Also, the first five (foundation) modules provide the students with basic knowledge. Students informed the panel that they particularly lacked knowledge of social sciences and would advise the programme to develop online courses in social science to address that deficiency. In response, the programme committee developed four courses and an extra reader.

The programme starts with a one-week introduction for all IHE students which is very much appreciated by the students. They feel that the institute is making considerable efforts to welcome and include them in the IHE community. During the site visit the students report positively about the field trip and field work (module 9). The goal of this field trip is to experience real-life water problems and to do a minor research project. Module 13 is the group work module, where students work together to apply the learned knowledge, techniques and skills in a multidisciplinary project. This module is considered as core in the programme and very much appreciated by the students. The panel concludes that this module is crucial for developing competences in cooperation and interdisciplinary studies/interdisciplinarity. This module could be further strengthened by organising the same module for students from all master degree programmes and its specialisations to ensure that they all learn to work with a variety of experts of different disciplinary backgrounds. At the start of the programme, the students find the study load very high, but they report that the programme is feasible. This requires ongoing attention of the staff to make sure it is not detracting from learning goals, or overall student life/well-being.

Didactic concept and policy

All education at IHE-Delft follows the concept of aligned teaching and active learning within a framework of incremental learning. Each module therefore comprises a balance of formal lectures, supervised and unsupervised workshops, case studies, field trips, field work, and self-study by the student. The knowledge and abilities of students are thereby gradually developed, so that both disciplinary knowledge and insights in problem analysis and problem solving, and general academic skills can be deployed to good effect in subsequent group work and research thesis studies. The master's research provides a vehicle through which integration of the programme material is achieved.

Right from the start students get assignments and feedback to develop their writing skills. The programme committee is developing the skills learning line, to incrementally build up those skills. All students have a coach with whom they generally have six meetings. Coaches help students with their personal study trajectory and give structure to the learning process. Coaching stimulates students to take more responsibility for their own learning process.

The master's thesis part is the culmination of the study, the part where independent thinking and problem-solving is further developed.

Teaching staff

The master's programme in Water Management and Governance is delivered by a team of 52 IHE staff members, taking into account the multidisciplinary aspects from all three academic departments, and 56 guest lecturers from industry and academia. Out of the 52 IHE staff 22 are more closely involved in developing and assessing the various modules as Module Coordinators. Actual staff input in the WMG programme for the taught part is 3,7 fte (student/staff ratio 11.6) and each student furthermore receives approximately 80 hrs supervision of the master thesis research phase. On average a student has 21 contact hours per week.

The IHE staff members are actively involved in academic research, mostly as part of research programmes that are funded by competitive grants. The staff is well qualified academically: all full professors have appointments at universities in the Netherlands, which testifies to their academic standing. All associate professors and lecturers hold PhD degrees or are in an advanced stage of obtaining their PhD degree. In addition, all staff members and the guest lecturers have extensive and relevant professional experience in developing countries and in countries in transition. This experience ensures that the educational programme is tailored to the professional and institutional context of the countries of origin of the students. 45% of the staff members involved in teaching have fulfilled the requirements of the UTQ (University Teacher Qualification, a certification set by the VSNU, the Dutch Association of Universities), 35% are in the process of obtaining their UTQ diploma. In addition IHE staff regularly participate in specific workshops organised by the Institute to update their didactical skills. The students are positive about the quality of the teaching and report that they had some very good guest lecturers.

Guidance and facilities

Much attention is paid to the tutoring and guidance of the students. In advance of their arrival they receive a Preparation Guide with practical information on travelling to and living in the Netherlands. Upon arrival they are given a Practical Guide about the services provided by IHE, about formal issues such as housing, immigration and health care, and about everyday life in the Netherlands. Information about the programme, its contents, rules and regulations and study-related facilities is provided in the Handbook that students receive at the start of the programme.

Non-academic support is given by the Student Affairs office. A student counsellor tries to help students in case of emotional problems such as homesickness or the effects of previous traumas. Students with study problems are in principle referred back to their Programme Coordinator or the Specialisation Coordinator.

Considerations

The panel has established that the WGM programme is well structured and aligned with the programme's mission, objectives and intended learning outcomes.

The panel very much appreciates the intensive efforts IHE-Delft puts into tutoring and guidance of the students. In the opinion of the panel the teaching and learning environment created by IHE is very inspiring and motivating. Students feel part of a community and are stimulated to achieve on a high level. Curriculum, staff, services and facilities constitute a coherent teaching-learning environment. The panel in particular appreciates the introductory week with its focus on 'ways of knowing' and encourages IHE-Delft to maintain this element in the programme.

Module 13, the group work module, is also considered as core in the programme and very much appreciated by the students. The panel thinks that this module is crucial for two reasons. In the first place for developing competences in cooperating and in the second place for developing interdisciplinary competences. This module could even be strengthened by organising the same module for students from all programmes, to establish that the students learn to cooperate with a variety of experts of different disciplinary backgrounds.

The panel thinks that the interdisciplinary focus is an exciting element of the programme. The existence of other programmes in the same institute and the various disciplinary backgrounds of the academic staff gives the opportunity to strengthen this element. In particular the Water Management and Governance modules can be very valuable for the students in the other programmes of IHE. The panel learnt that the WMG programme is allowing students already to select modules from other programmes and want to encourage this policy. The thesis development phase is another good opportunity to promote interdisciplinary engagement.

The academic and didactic quality of the staff are good, although the percentage of teaching staff with a UTQ lags behind expectations. The panel thinks that all academic staff should be encouraged to work towards earning UTQ. Perhaps it could be required that UTQ and PhD are required to supervise theses to encourage compliance on this. The panel also recommends to implement senior UTQ, in particular for those academic staff members who already have earned their credits in this regard by developing new programmes and implementing didactic innovations.

Conclusion

Satisfactory

4.3 Standard 3: Assessment

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

The critical reflection describes that Education and Examination Regulations is the backbone of the assessment policy. It provides a detailed overview of the nature, frequency and marking of assessments as well as the possibilities for re-examination and appeal procedures for both the taught and thesis part of the programme. The assessments are safeguarded by the Examination Board. All students are informed about the Education and Examination Regulations in the study guide.

In 2017 the IHE rectorate approved an institution-wide policy framework on assessments. It outlines four key areas of importance for developing and implementing assessments:

1. The content of assessments (formats, levels, criteria);
2. The organisation of assessments;
3. Strengthening competence for assessment among staff;
4. Quality assurance for assessment.

Programme committees bear the overall responsibility of the content of assessments and the alignment with the final qualifications of each programme and its specialisations.

The master's programme WGM uses a variety of assessment methods, such as written examinations, oral exams, assignments, oral presentations, and take-home examinations. Most modules include two or more methods of assessment to accommodate the multiple intended learning outcomes of the modules. Some assessments are carried out by small groups to facilitate team-working skills. To adequately assess individual performances within a group, student-peer assessments are introduced for extensive group assignments. All written examinations are compiled by the module coordinator and peer-reviewed by the programme and/or specialisation coordinators. The programme committee approves the module plans prior to the start of the academic year. The panel appreciates the IHE procedures to assure the quality of the examinations. Further improvement of these assurance procedures can be achieved by including external review of the module examinations.

Students are informed about the assessment methods and their relative weight for each module. They are listed in the module sheets and are explained in more detail by the module coordinator at the start of each module, including the evaluation criteria that will be used for marking the various assessments. Written hand-outs with instructions are provided for assignments. Sample questions are usually available for students during the module and tutorials are organised to practice the application of the knowledge in preparation for the examinations.

Examination Board

IHE-Delft has an Examination Board, which is autonomous and has the responsibility to safeguard the quality of examinations as well as the related quality of the organisation and procedures concerning. The Examination Board monitors the proper implementation of the regulations and planning of examinations, including the assessment of grading results. Recently IHE-Delft had an institutional audit in which was established that the quality assurance system of IHE-Delft met all the requirements. The Examination Board appoints examiners and ensures that quality assurance mechanisms are in place to monitor the appropriateness and quality of assessments. The quality of the examinations of the modules offered by other universities is safeguarded by the examination boards of the those universities. The panel concluded that the Examination Board performs all tasks expected from an Examination Board in Higher Education according to the WHW.

The panel had an interview with members of the Examination Board during the site visit. The panel studied the form used for the assessment of the master's theses and had some questions concerning the use of the rubric and the equal weighting of the criteria. The Examination Board mentioned that it reviewed the rubric last year and furthermore evaluated the whole process of the thesis assessment. The proposal to introduce weighting is still in discussion within the Institute. The panel believes that the Examination Board has a good overview of the quality of assessments and examinations. The panel, in particular, appreciates that the Board is pro-actively involved in safeguarding quality of examinations.

Considerations

The panel established that the assessment and exam regulations are clearly described in the Education and Examination Regulations. The Examination Board has reliable procedures and the necessary level of independence. The panel finds the assessment policy coherent and transparent. The interim examinations and the thesis assessments are transparent, valid and reliable. The panel also established that there are adequate assessment forms in place for the master thesis. During the site visit the panel discussed the thesis assessment form with the programme committee and the Examination Board and concluded that some improvements can be made in the assessment form and the corresponding rubric. For instance, the panel advises to give weight percentages to the different criteria and to add criteria for the public/oral defence. Furthermore, the quality of the discussion in a thesis should be part of the rubric. The panel also advises to develop a clear procedure for reconciliation of the differences in mark allocation between the internal and external examiners.

The panel recommends that the Examination Board regularly checks the thesis assessments by taking a sample to review whether the thesis assessment is of high enough quality to be endorsed.

Conclusion

Satisfactory

4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Outline of findings

The panel concluded that the learning goals of the modules are in line with the intended learning outcomes of the programme and that the assessments adequately test the learning goals. It is convinced that students who have finished the master programme Water Management and Governance will have achieved the programme's intended learning goals.

The panel studied 15 theses to establish whether the graduates had achieved the intended learning outcomes of the programme. The panel found the theses appropriate as the final product of an academic master degree programme and of sound academic quality. They showed good analyses, correct application of methods and correct application of theory. The panel would have graded some of the theses slightly lower and other theses slightly higher, but the differences were within acceptable boundaries.

The critical reflection describes that the adequacy of the final assessment is confirmed by the fact that many of the master theses with high marks resulted in publications in renowned scientific journals. Success of the students is also reflected in the number of graduates enrolled in PhD programmes at respected universities, or in the career success of alumni working at senior positions in the water sector in their home countries. This is confirmed by the alumni who were interviewed during the site visit. The panel concluded the alumni were all very satisfied with their training at IHE. They still feel closely connected and are very willing to promote and support the institute in their home country. They definitely see the added value of their education at the institute and would allow professionals in their vicinity to study at IHE-Delft.

Considerations

The panel concludes that graduates of the master programme have achieved the intended learning outcomes. The graduates seem to be well prepared for enhancing their career in the water sector. However the panel did not get a complete overview of the current positions of alumni. The panel learnt that it is on the to-do-list of the Education Bureau to do a survey among alumni. The panel advises to systematically investigate what alumni are doing, how they are using their degrees, and how they look back at their master programme.

It became clear to the panel that IHE-Delft has an amazing outreach to alumni. This can be considered a clear strength of the programme and evidence of dedication of IHE and teaching staff.

Conclusion

satisfactory

4.5 Conclusion

The panel assessed each of the four standards as satisfactory. Following the NVAO decision rules, the panel's general conclusion is that the programme meets the criteria for accreditation.

5 Overview of the assessments

Standard	Assessment
<p>Intended Learning outcomes <i>Standard 1 : 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</i></p>	satisfactory
<p>Teaching-learning environment <i>Standard 2 : The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.</i></p>	satisfactory
<p>Student assesment <i>Standard 3: The programme has an adequate system of student assesment in place.</i></p>	satisfactory
<p>Achieved learning outcomes <i>Standard 4: The programme demonstrates that the intended learning outcomes are achieved..</i></p>	satisfactory
<p>Conclusion</p>	satisfactory

Annex 1: Composition of the panel

Chair:

Prof.dr. G. Zeeman, professor emeritus in New Sanitation at Wageningen University, the Netherlands. Grietje Zeeman has teaching and testing experience as well as more than 35 years in scientific, technological and research application projects. She is expert in Environmental Technology, Sanitation, Wastewater treatment and Urban Systems Engineering.

Panel members:

- Dr. K. Rebel, assistant professor at Utrecht University Copernicus Institute of Sustainable Development, the Netherlands. Karin Rebel is expert in Sustainable Development, Ecohydrology, Environmental Sciences and Dynamic Ecosystems. She has professional field expertise, her former students are currently active within companies, government agencies and research institutes, where they use an interdisciplinary approach to analyse sustainability problems in NL and the rest of the world.
- Prof. A. Schleiss, professor emeritus at the Swiss Federal Institute of Technology Lausanne (EPFL) with professional field and academic expertise in hydrology, hydraulic engineering, applied hydraulics and hydraulic structures. Anton Schleiss worked for 11 years for a global and independent engineering company that focuses on energy and infrastructure and was Director of the Master of Advanced Studies in Water Resources Management and Engineering for 10 years. He has supervised more than 50 PhD and Postdoc projects.
- Prof. E. Manzungu is professor in Agricultural Landscapes, Waterscapes and Environmental Management at the University of Zimbabwe, where he served as Chairperson of the Department of Soil Science and Agricultural Engineering and Deputy Dean of the Faculty of Agriculture. Emmanuel Manzungu has over 20 years- experience in research and evaluation of projects in smallholder irrigation management, water resource management, climate and water smart agriculture, and environmental management. He has undertaken assignments in nine southern African countries.
- Dr. L. Harris, associate professor at the Institute for Resources Environment and Sustainability and at the Institute for Gender, Race, Sexuality and Social Justice at the University of British Columbia (UBC), Canada. Leila Harris is co-director of the UBC's programme in Water Governance. Her current projects are related to everyday water access in underserved settlements in South Africa and Ghana. She has more than 70 featured publications.

Student member:

- E.L. Okoro, master student in Law and Technology at Tilburg University, the Netherlands. Egoyibo Okoro graduated from the joint Erasmus Mundus Master of Arts in Women's and Gender Studies of the University of Hull and Utrecht University. She has a bachelor of law from the Nigeria Law School, Lagos Campus, Nigeria.

Annex 2 Intended learning outcomes WMG Programme

Graduates in the master degree programme Water Management and Governance have the ability to:

Knowledge and Understanding

1. Place the specialised knowledge gained into a broader understanding of water issues, challenges, debates and developments.
2. Analyse biophysical and social processes and appraise principles and approaches relevant to water management and governance.
3. Recognise and distinguish different ways of knowing and framing water questions and problems in order to analyse water management and governance processes from an interdisciplinary perspective.

Applying knowledge and understanding

4. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques.
5. Conduct research independently in a scientifically sound and ethically responsible manner.
6. Contribute to interdisciplinary and evidence-based knowledge development and problem solving.
7. Analyse and contextualise governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways.

Making judgements

8. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems.
9. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches.
10. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations.
11. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint.

Communication

12. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the audience and the purpose.
13. Debate and defend findings and insights, in a clear, systematic and convincing manner.
14. Communicate effectively across disciplines and cultures to enhance collaborations in teams.

Lifelong learning skills

15. Develop competencies required to further expand their knowledge and skills on their own initiative.
16. Reflect on own professional and educational background in order to identify a personal learning trajectory to realise career objectives and professional development goals.

Graduates in the joint specialisation on **Water Conflict and Diplomacy** of the master degree programme Water Management and Governance have the ability to:

Knowledge and Understanding

1. Place the specialised knowledge gained into a broader understanding of water issues, challenges, debates and developments.
2. Analyse biophysical and social processes and appraise principles and approaches relevant to water management and governance.
3. Recognise and distinguish different ways of knowing and framing water questions and problems in order to analyse water management and governance processes from an interdisciplinary perspective.
4. Discuss and compare theories and concepts that relate to water conflict, cooperation and diplomacy.

Applying knowledge and understanding

5. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques.
6. Conduct research independently in a scientifically sound and ethically responsible manner.
7. Contribute to interdisciplinary and evidence-based knowledge development and problem solving.
8. Analyse and contextualise governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways.
9. Critically analyse latent and actual water disputes including key elements of conflict analysis and key contextual elements.
10. Critically analyse different dispute resolution mechanism and participatory processes.
11. Select and use conflict management tools to develop water cooperation and diplomacy processes and arrangements to mitigate and resolve water disputes in socially inclusive and ecologically sustainable ways.

Making judgements

12. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems.
13. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches.
14. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations.
15. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint.
16. Identify and reflect critically on issues, challenges and potential conflicts regarding competition and cooperation around water at different scales.

Communication

17. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the audience and the purpose.
18. Debate and defend findings and insights, in a clear, systematic and convincing manner.
19. Communicate effectively across disciplines and cultures to enhance collaborations in teams.

Lifelong learning skills

20. Have the competencies to further develop and expand their knowledge and skills on their own initiative.
21. Be able to reflect on own professional and educational background in order to identify a personal learning trajectory to realise career objectives and professional development goals.

Thematic Profile on Water Quality

Water Quality studies the water quality impacts of human activities on aquatic ecosystems, as well as alternative remedial actions, under different levels of environmental stress and in different socioeconomic contexts, and develops skills to develop alternative policies and strategies for environmental sustainability.

The learning objectives of the thematic profile on Water Quality are:

1. Describe and predict for a given water resources system the main hydrological, hydraulic, chemical and biological processes and how these processes are dynamically linked with aquatic ecosystems as well as with human activities such as land and water use and pollution.
2. Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements for water quality management, including policies, laws and institutions, and by adopting a historical perspective.
3. Interpret, design and optimize water quality assessment and monitoring programmes by applying experimental, statistical and modelling tools.
4. Define a given water resources system, and describe the water and pollution flows across time and space, including the various water uses, and describe the interdependencies these create between the various water users.

Students who opt for the thematic profile on Water Quality are expected to carry out thesis research on a related topic and enrol at least in four of the following modules: Water and environmental law; Water quality assessment; Wetlands for wastewater treatment; Environmental management and water services; Environmental planning and implementation; Environmental assessment for water-related policies and developments; Aquatic ecosystem processes and applications. Other recommended modules for this profile are: Water economics; Water and environmental policy analysis; Wetlands for livelihoods and conservation; Strategic planning of river basins and deltas.

Thematic Profile on Water Resources

Water Resources studies the ways in which water availability and use are matched as well as the implications of land use and water allocation policies and interventions at different scales, and develops skills to critically reflect on legal and institutional arrangements from the local watersheds to the basin scale and beyond.

The learning objectives of the thematic profile on Water Resources are:

1. Define a given water resources system, and describe the water flows across time and space, including the various water uses, and describe the interdependencies these create between the various water users.
2. Describe and predict for a given water resources system the main hydrological, hydraulic, chemical and ecological processes and how these processes are dynamically linked with human activities, including land and water use.
3. Model processes of the water system (rainfall-runoff, flooding, water allocation, water accounting), validate models, critically interpret model outcomes in order to derive insight in trends, causes and effects, and define and explain model limitations.

4. Describe different concepts to determine the value of water for various uses and users in (amongst others) economic and social terms and explain how these concepts can be used in water resources planning at various spatial and temporal scales.

Students who opt for the thematic profile on Water Resources are expected to carry out thesis research on a related topic and enrol at least in four of the following modules: Water and environmental law; Water economics, Water resources assessment; Water system modelling; Water resources planning; Institutional analysis; Strategic planning of river basins and deltas; IWRM as tool for adaptation to climate change.

Other recommended modules for this profile are: Drought management and reservoir operations; Flood risk management; Applied groundwater modelling; Innovative systems for agriculture; Hydroinformatics for decision support.

Thematic Profile on Water Services

Water Services studies policies and business models for the provision of water and sanitation services through the analysis of organizational, infrastructural and financial arrangements in different socio-economic contexts, and develops skills to design and reflect on arrangements for water service provision.

The learning objectives of the thematic profile on Water Services are:

1. Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analysing service delivery modalities.
2. Relate debates concerning water supply and sanitation provisioning to the management and governance of water organizations using theories from different academic disciplines (e.g. economics, public administration, sociology, political science, law).
3. Analyse various approaches and tools water service providers can employ in order to improve the sustainability and resilience of their practices.
4. Design and defend water and sanitation service arrangements in different socio-economic, political and administrative contexts.

Students who opt for the thematic profile on Water Service are expected to carry out thesis research on a related topic and enrol at least in three of the following modules: Managing water organizations; Environmental management and water services; Finance in the water sector; Partnerships in the water sector; Institutional analysis. Other recommended modules for this profile are: Urban water governance; Decentralized water supply and sanitation; Water sensitive cities.

Thematic Profile on Water Cooperation and Conflict Management

Water Conflict and Cooperation studies processes of conflict and cooperation over water taking account of the interplay between the main biophysical processes and social dynamics with a view of anticipating, preventing and managing conflicts, and develops skills to design and facilitate inclusive consultation and conflict management processes between actors at different levels.

The learning objectives of the thematic profile on Water Cooperation and Conflict Management are:

1. Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analysing, anticipating, preventing and managing conflicts.
2. Define a given water resources system, assess the different functions of the water resources system and the often competing interests of water using sectors and actors, describe the interdependencies between these, and finally assess the possibilities and limitations of cooperation.
3. Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements over water for cooperation, including policies, laws and institutions, and by adopting a historical perspective.
4. Design and facilitate conflict prevention and management processes, such as consensus building, public participation, negotiation or mediation between actors at different levels.

Students who opt for the thematic profile on Water Conflict and Cooperation are expected to carry out thesis research on a related topic and enrol in at least three of the following modules: Water and environmental law; Water conflict management I; Water conflict management II; Institutional analysis.

Other recommended modules for this profile are: Water resources planning; Water and environmental policy analysis; Urban water governance; Strategic planning of river basins and deltas; IWRM as tool for adaptation to climate change.

Annex 3 Curriculum of the WMG master programme

Foundation	Principles of Integrated Water Resource Management			
	The Water Resources System			
	Water Governance			
	Water Economics			
	Water & Environment Law			
	Water Quality	Water Resources	Water Conflict	Water Services
Tailor made Trajectories	Water Quality Assessment	Water Resources Assessment	Water Conflict Management I	Managing Water Organisations
	Wetlands for Water Quality or Environmental Engineering	Water Systems Modelling	Water Conflict Management II	Environmental Management and Water Services
	Environmental Planning and Implementation	Water Resources Planning	Water Resources Planning	Finance in the Water Sector
Integration	International Fieldwork			
Tailor made trajectories	Aquatic Ecosystems Institutional Analysis Partnerships for Water Supply and Sanitation			
	IWRM as a Tool for Adaptation to Climate Change Strategic Planning for River Basins and Deltas Urban Water Governance			
Integration	Group Work			
	Summer Course			
Research	Preparatory Course and Thesis Proposal			
	Master Thesis and Research			

Annex 4: Schedule of the site visit

Time	Subject	Participants
Wednesday 14 November		
08.45 – 09.00	Welcome day 1	Prof. Eddy Moors, Rector Erwin Ploeger, Education Bureau
09.00 – 09.30	Introduction on the Information provided	Erwin Ploeger
09.30 – 12.15	Preparatory meeting and initial discussion of the panel	
12.15 – 13.00	lunch	
13.00 – 14.00	Institute's management	Prof. Eddy Moors, Rector Prof. Charlotte de Fraiture, Vice-rector Johan Aad van Dijk, Business Director
14.00 – 14.45	Students master programme Water Management and Governance	Adham Badawy, Egypt Amani Matar, Lebanon Phuong Thao Nguyen, Vietnam Iara Bueno Giacomini, Brazil Sadeq Ahmadi, Afghanistan
14.45 – 15.30	Programme committee Water Management and Governance	Prof. Margreet Zwarteveen, chair Prof. Pieter van der Zaag Ilyas Masih, programme coordinator Mireia Tutusaus Zaki Shubber Jeltsje Kemerink
15.30 – 16.00	Break	
16.00 – 16.45	Students master programme Water Science and Engineering	Alka Subedi, Nepal Gustave Nkurunziza, Rwanda Ibrahim John Migadde, Uganda Mohamed Ghonim, Egypt Tanvir Ahmed, Bangladesh
16.45 – 17.30	Programme committee Water Science and Engineering	Prof. Mário Franca, Chair László Hayde, programme coordinator Prof. Michael McClain Prof. Dimitri Solomatine Alvaro Semedo Lauren Arendse, student member

17.30	Rounding up	
Thursday 15 November		
08.45 – 09.45	Guided tour of the premises	
09.45 – 10.30	Students master programme Urban Water and Sanitation	Sabita Adhikari, Nepal Parth Kamath, India Valentina Duboué Clavijo, Uruguay Moses Kapala, Zambia Sonam Jamtsho, Bhutan Jovine Bachwenkizi, United Republic of Tanzania
10.30 – 11.15	programme committee Urban Water and Sanitation	Prof. Maria Kennedy, chair Prof. Damir Brdjanovic Saroj Sharma, programme coordinator Arlex Sanchez Zoran Vojinovic
11.15 – 11.45	Break	
11.45 – 12.15	Skype meeting with Management committee joint degree UWEM	Arlex Sanchez, IHE Delft Zoran Vojinovic, IHE Delft Saroj Sharma, IHE Delft Prof. Babel, AIT Bangkok Prof. Visu, AIT Bangkok Dr. Wenchao, AIT Bangkok
12.15 – 13.00	Lunch	
13.00 – 13.45	Students master programme Environmental Science	Tanding Tshering, Bhutan Sristika Adhikari, Nepal Carolyne Kabui, Kenya
13.45 – 14.30	Programme committee Environmental Science	Prof. Ken Irvine, chair Erik de Ruijter van Steveninck, programme coordinator Peter van der Steen Wim Douven Prof. Leon Hermans
14.30 – 14.45	Break	
14.45 – 15.15	Skype meeting with Management committee Limnology and Wetland Management	Edwin Hes, IHE Delft Prof. Ken Irvine, IHE Delft Gerold Winkler, BOKU, Vienna Assoc.prof. Wolfram Graf, BOKU, Vienna Nina Haslinger, BOKU, Vienna

Prof.dr. Mwonya, Njoro Kenya
Dr. Kitaka, Egerton University, Njoro, Kenya

15.15 – 15.45	Break	
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15.45 – 16.15	Skype meeting with Management Committee Environmental Technology and Engineering	Peter van der Steen, IHE Delft Dr. Jan Bartacek, UTC Prague Prof. Philip Tack, University Ghent
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16.15 – 17.15	Meeting with lecturers	Nemanja Trifunovic Tineke Hooijmans Jan Willem Foppen Mick van der Wegen Yasir Mohamed Mireia Tutusaus Alissa Zuijdgeest Jack van de Vossenber
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17.45	Rounding up	
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Friday 16 November

09.00 – 09.45	Examination Board and Registrar	Tineke Hooijmans, Chair Shreedhar Maskey Peter van der Steen Erwin Ploeger
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09.45 – 10.00	Break	
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10.00 – 11.00	Alumni by skype	Ervin Bucpapai, Albania, UWS Sara Elkhalfifa, Sudan, ES Mumba Mwape, Zambia, WSE Sachin Tiwale, India, WMG
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11.00 – 11.30	Break	
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11.30 – 12.15	Preparation for second meeting with Institute's Management	
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12.15 – 13.00	Lunch	
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13.00 – 14.00	Second meeting with Institute's Management	
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14.00 – 16.30	Deliberations panel, formulating preliminary findings and conclusions	
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16.30 – 17.00	Feedback to IHE community	
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Annex 5: Documents reviewed

Programme documents presented by the institution

Critical Reflection Master of Science Programme in Water Management and Governance

Annexes to the Critical Reflection:

1. HE Delft vision on quality of education.
2. Final qualifications WMG Programme.
3. Final qualifications Water Cooperation and Diplomacy Specialization.
4. Description and learning objectives of WMG thematic profiles.
5. Overview of WMG curriculum and assessment methods.
6. Overview of Water Cooperation and Diplomacy Specialization curriculum.
7. Link between WMG final qualifications and modules.
8. IHE Delft policy on instructional methods and didactic approaches.
9. Staff involved in teaching in WMG programme 2016-2018.
10. Guest lecturers teaching in WMG programme 2016-2018.
11. IHE Delft assessment policy.
12. IHE Delft education and examination regulations 2016-201835.
13. Rubric MSc thesis examination.
14. Overview of WMG MSc theses 2016-2018.
15. Journal papers co-authored by WMG Students based on MSc thesis research.

Students' Critical Reflection on IHE Master Programmes

Annual Reports Examination Board 2016-2017, 2017-2018

Dossier Module 13

(15) Master Theses

Annex 6: List of abbreviations

EC	European Credit
IHE	IHE Delft Institute of Water Education
ILO	Intended Learning Outcome
NVAO	Nederlands-Vlaamse Accreditatieorganisatie
OER	Education and Examination Regulations
UTQ	University Teaching Qualification
WMG	Water Management and Governance