



RESEARCH ASSESSMENT

INSTITUTE FOR ENVIRONMENTAL
STUDIES, 2014-2020

VRIJE UNIVERSITEIT AMSTERDAM

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REPORT ON THE RESEARCH REVIEW OF THE INSTITUTE FOR ENVIRONMENTAL STUDIES OF THE VRIJE UNIVERSITEIT AMSTERDAM

1. FOREWORD BY COMMITTEE CHAIR

Regular review of a research institute is an essential instrument to guarantee its scientific quality, societal relevance and viability. A panel of international experts had the challenging task to form a balanced judgement of the Institute for Environmental Studies of Vrije Universiteit Amsterdam (IVM) on the basis of a self-evaluation report, a site visit (which was organized virtually this year) and a variety of discussions with research leaders, senior and junior staff, and PhD students. The committee members were impressed by the high quality of the research produced in IVM, which is without any doubt linked to the very research-friendly atmosphere and the good working conditions in the different research units.

Some specific issues discussed during the site visit included IVM's strategies to achieve prosperity and stability through a focus on education, complemented with high quality sustainability science and strong societal engagement, impact and strategic partnerships. As well as importance of strengthening overarching institutional frameworks and conditions for diversity in recruitment and career progression.

Given the particular circumstances of this year's online visit, I would like to stress the keen organization and the smooth interaction before and during the assessment visit. The researchers of IVM were assiduous in providing us with a great deal of additional information on their work, thus giving us the necessary means to sketch the whole picture of the ongoing research at IVM. I am certain that I speak for all committee members when I acknowledge how much we profited from this very cooperative atmosphere.

Many persons were involved to make the effort as enjoyable as it turned out to be. On behalf of the review committee I would like to acknowledge and thank them all.

Prof. Emily Boyd
Chair



2. THE REVIEW COMMITTEE AND THE PROCEDURES

2.1. Scope of the review

The Vrije Universiteit Amsterdam (VU) asked an assessment committee of external peers to perform an assessment of the research conducted at the Institute for Environmental Studies (IVM) over the period 2014-2020.

In accordance with the Strategy Evaluation Protocol 2021-2027 (SEP) for research reviews in the Netherlands, the committee was requested to carry out the assessment according to a number of guidelines. The evaluation was to include a backward-looking and a forward-looking component. The committee was asked to judge the performance of the unit on the main assessment criteria specified in the SEP and to offer its written conclusions as well as recommendations based on considerations and arguments. The main assessment criteria are:

- 1) Research Quality;
- 2) Societal Relevance;
- 3) Viability of the Unit.

During the evaluation of these criteria, the assessment committee was asked to incorporate four specific aspects relating to how the unit organises and actually performs its research, how it is composed in terms of leadership and personnel, and how the unit is run on a daily basis. These aspects are:

- 1) Open Science;
- 2) PhD Policy and Training;
- 3) Academic Culture;
- 4) Human Resources Policy.

Finally, VU asked the committee to reflect on two issues specific to the unit, namely:

- How to safeguard and improve interdisciplinary research at the institute?
- How to navigate an increasingly crowded field of sustainability institutes?

This assessment was part of a cluster assessment of five institutes participating in the SENSE Research School. Institutes could choose to participate in this joint assessment on a voluntary basis. Other partner institutes opted for a stand-alone review, or a joint review at a higher or lower level of aggregation within their own university.

2.2. Composition of the committee

The composition of the committee was as follows:

- Prof. Emily Boyd (Lund University Centre for Sustainability Studies, Lund University) - chair
- Prof. Joe Alcamo (Sussex Sustainability Research Programme, University of Sussex)
- Dr. Ana Bastos (Department Biogeochemical Integration, Max Planck Institute for Biogeochemistry)
- Prof. Rik Eggen (Department of Environmental Systems Science, ETH Zürich)
- Fenna Hoefsloot MSc (ITC, Twente University) - PhD student member
- Prof. Björn-Ola Linnér (Department of Thematic Studies – Environmental Change, Linköping University)
- Prof. Lyla Mehta (Institute of Development Studies, University of Sussex)
- Prof. Lena Neij (The International Institute for Industrial Environmental Economics, Lund University)

The committee was supported by Peter Hildering MSc as project manager and drs. Mariette Huisjes as secretary on behalf of Qanu.

2.3. Independence



All members of the committee signed a statement of independence to guarantee an unbiased and independent assessment of the quality of the research performed by IVM. Personal or professional relationships between committee members and the research unit under review were reported and discussed at the start of the site visit amongst committee members. The committee concluded that no specific risk in terms of bias or undue influence existed and that all members were sufficiently independent.

2.4. Data provided to the committee

The committee received the self-evaluation report from the units under review, including all the information required by the SEP.

The committee also received the following documents:

- The Terms of Reference;
- The SEP 2021-2027.

2.5. Procedures followed by the committee

All five assessments were planned in the week of 19-23 April. The five participating institutes were Wageningen Institute for Environment and Climate Research (WIMEK) of Wageningen University and Research, the Institute for Environmental Studies (IVM) and the Department of Environment & Health (E&H) of Vrije Universiteit Amsterdam, IHE Delft Institute for Water Education (IHE Delft) and the Copernicus Institute of Sustainable Development (Copernicus) of Utrecht University.

The committee proceeded according to the SEP 2021-2027. Due to Covid 19 restrictions, all meetings took place online. Prior to the first online meeting, all committee members independently formulated a preliminary assessment of the units under review based on the written information that was provided before the site visit. In a preliminary online meeting on 16 April 2021, the committee was briefed by Qanu about research reviews according to the SEP 2021-2027. It also discussed the preliminary assessments and identified questions that they would raise during the site visit. The committee also agreed upon procedural matters and aspects of the review.

The online site to IVM took place on 21 April 2021. After the interviews the committee discussed its findings and comments in order to allow the chair to present the preliminary findings and to provide the secretary with argumentation to draft a first version of the review report. The full schedule of the assessment week is included in Appendix 2. The final review is based on both the documentation provided by IVM and the information gathered during the interviews with management and representatives of the research unit during the site visit.

The draft report by the committee and secretary was presented to IVM for factual corrections and comments. In close consultation with the chair and other committee members, the comments were reviewed to draft the final report. The final report was presented to the Board of the Vrije Universiteit Amsterdam and to the management of the research unit.

The committee used the criteria and categories of the Strategy Evaluation Protocol 2021-2027. For more information see Appendix 1.

2.6. About the SENSE Research School

SENSE is an academic network for integrated environmental and sustainability research PhD training. It is a partnership involving ten Dutch universities and research organizations. SENSE provides disciplinary and multidisciplinary PhD training, a network for high quality environmental and sustainability research, as well as a bridge for sustainable solutions at the science-practice interface. More information: www.sense.nl



3. RESEARCH ASSESSMENT OF IVM

3.1. Introduction

The Institute of Environmental Studies (in Dutch: Instituut voor Milieuvraagstukken, or IVM) at the Vrije Universiteit (VU) in Amsterdam was founded in 1971 and is the oldest academic research institute in the Netherlands working on environmental issues. IVM's mission is to conduct excellent, actionable science for addressing contemporary sustainability challenges concerning biodiversity, climate, energy, food, land and water. The institute focuses explicitly on impact. It strives to catalyse change towards sustainability and is firmly embedded in society at the local, national, regional and global level. To align with an increasingly complex web of societal interactors, IVM's research is characterised by system thinking and integration. The institute hosts about 110 staff members.

3.2. Organization, Management and Governance

IVM has four departments:

- *Environmental Economics* studies the economics of human-environment relations, focusing on economics of ecosystems, economics of climate change and economics of clean energy.
- *Environmental Geography* studies the geographic variation of human-environment systems, focusing on changes in the ways land is used by humans: land system change.
- *Environmental Policy Analysis* studies governance for sustainability, focusing on the institutional and political aspects of global and environmental change.
- *Water and Climate Risk* studies the interaction between society and the hydrological and climate systems, focusing on water and climate extremes such as floods, droughts, windstorms and hail.

Since the previous evaluation, IVM implemented some organisational changes. The Chemistry and Biology department split off from IVM in 2015 to form its own Department of Environment and Health within the Faculty of Science. In 2018 IVM incorporated the Environmental Geography group. After this period, the institute has stabilized and pivoted back, with a rejuvenated leadership team, a stable balance sheet and a new generation of tenure track staff.

IVM's management team consists of the department heads, a department manager and a human resource professional. It is headed by a director. The management team is responsible for the overall management of the institute, its facilities and cross-collaboration, it implements the institute's mission and strategy and monitors progress. IVM has a rotating leadership model, where department heads triannually take turns as director of the institute.

Almost half of the institute's financial income consists of direct funding (first money stream), a lump sum budget received from the Dutch government based on the number of students, to be used for hiring staff that combines teaching with research. Roughly speaking, the other half consists of research grants (second money stream), obtained in national scientific competition. This sum can in part be used to hire PhD students and postdocs who perform research tasks. A small percentage (5 %) is obtained from research contracts with third parties, such as industry (third money stream). Over the review period, the share of direct funding increased significantly (from 27 % in 2014 to 45 % in 2020), the other two income sources decreased somewhat.

The committee thinks that IVM's governance model suits its strategy. Concerning the rotating leadership model, the committee feared at first that while it could stimulate integration, it could at the same time offer a challenge in terms of commitment to leadership and long-term planning. But during the interviews it became clear that the collaborative atmosphere at IVM guarantees that all directors take full responsibility for difficult decisions during



their administrative term, and make sure that their successors start with a clean sheet. The model seems to work quite well for the institute, the committee found.

3.3. Strategy and aims

The past seven years have been turbulent for IVM. In 2014, it had to fight to retain its independence, in the face of reorganisations and an impending merger at faculty level between the VU and the University of Amsterdam. This merger is now off the table, but in reaction IVM has pursued financial stability by increasing its efforts to acquire second money stream projects, by increasing the amount of teaching carried out by the institute's core staff and by being reticent with permanent contracts. These efforts have been successful. IVM has grown, expanded its research staff and acquired new projects and teaching. It is now less vulnerable, and financially and organisationally stable. In addition, the institute has invested in a productive academic culture by increasing transparency, creating a flatter hierarchy and arranging more frequent institute-wide events, both substantive and social. In the course of all this, IVM has also taken the recommendations made by the previous review committee to heart, such as: develop a vision for the future, improve collaboration between the departments and diversify sources of funding.

Now that IVM has reached a stable phase it wishes to consolidate and invest in its own internal culture. It aims to conduct excellent science that addresses key sustainability challenges in biodiversity, climate, energy, food, land and water. To operationalise this mission, it applies four scientific approaches:

- System thinking and integration
- Cross-scale and multilevel orientation
- Trans- and interdisciplinarity
- Actionable and impact-driven research.

Whereas these approaches apply to IVM's external outlook, IVM also has ambitions for its internal organisation. It aims for a flatly organised community of researchers, and low thresholds for collaboration and exchange of ideas across departments and levels of seniority. Within this community, each department contributes to the realisation of IVM's mission with its own empirical and methodological emphasis. IVM makes an effort to create a sense of commonality among researchers, enabling cross-fertilization across disciplines, themes and methods by research seminars, institute prizes, seed grants and social events. In the coming six years, IVM intends to strengthen the organization, consolidate and transform teaching, innovate research, and extend societal impact.

The committee has considered IVM's aims and strategy. It is impressed by IVM's excellent development since the previous evaluation. IVM has had to reinvent itself in the face of reorganizational challenges and threats, and has done so quite successfully. IVM has increased its focus on education, moved away from consultancy and grown significantly both in terms of scope and number of students. In the panel's view, IVM has every right to be proud of the fierce way it has bounced back. In the present as well as in the recent past, the institute demonstrates an active approach to viability. This is highly commendable in the panel's view.

The committee is of the opinion that IVM has a clear focus on impact-oriented sustainability research via systems thinking, interdisciplinary and multidisciplinary research. IVM's overall sustainability agenda has a strong focus on modelling and natural sciences. To supplement this, the committee suggests IVM could think about expanding the critical social science work that is also taking place in some parts of IVM, making the political and uncertainty issues more explicit and clarifying its unique expertise with regard to the contributions from political and social sciences to sustainability issues. Furthermore, the committee finds IVM's strategy to invest in its own culture, consolidate and improve its involvement in teaching, innovate research and extend its impact highly pertinent.

Concerning research innovation, the committee acknowledges that a bottom-up strategy in identifying new research niches fits well in IVM's flat organisational culture. It is clear to the committee that staff members enjoy the freedom they have in developing their own ideas. A consequence of this, however, is that the definition of the new research areas appears to be done mostly on an ad-hoc basis, rather than part of an overarching institutional



framework. An example is the use of artificial intelligence and machine learning in environmental and climate research. These methods are surely important tools and they are increasingly used to address problems in climate and environmental research. However, the simple application of these methods does not in itself guarantee high impact research. The committee recommends IVM to more specifically frame the development of artificial intelligence and machine learning towards new scientific problems that can only be solved by such applications, or towards older fundamental problems, that cannot be solved by traditional approaches.

In general, the committee recommends adding some systematic approach to the periodic evaluation of research policies, perhaps mapping them against plans of other SENSE institutes. Furthermore, the committee recommends giving more weight to critical future challenges such as biodiversity and ecosystem services that may become increasingly relevant, and to which IVM could certainly contribute.

Concerning IVM's ambition to further improve its own culture, the committee considers it an urgent matter that diversity is improved in all ranks as soon as possible. This is a necessary step towards optimising the conditions under which IVM can fully realise its strategic potential. On diversity, the committee further elaborates in section 3.6.

3.4. Research Quality

To assess the quality of research conducted within IVM, the committee considered the research output in the light of the strategic aims described above. It concludes that the scientific output is impressive, both in its quantity and its quality. On average, IVM publishes almost 200 articles or other forms of knowledge-sharing per year. The overwhelming majority of these (96 %) are written in collaboration with other international authors. Although not all of these articles are necessarily interdisciplinary, cross-scale, multi-level, multi- or interdisciplinary, the fact that practically all publications originating at IVM are co-authored is in accordance with the spirit of team science it promotes. In most of its research areas, IVM is top cited. Nearly 35 per cent of all articles published by IVM researchers are in the top 10 per cent most cited in their fields, and about 5 per cent are in the top 1 per cent most cited in their fields. These high numbers are partly due to a few very prominent senior researchers. In several research areas, such as environmental governance staff members of the institute have internationally leading roles. The quality of research also emerges from the many prestigious grants and rewards that IVM staff members receive, such as NWO talent scheme grants, ERC-grants, the Allianz Climate Risk Research Award and the Lloyd Science of Risk Prize. The committee concludes that IVM makes a strong contribution to scientific knowledge and that without a doubt IVM is successful in its ambition to conduct *excellent* research.

Another IVM ambition is to do *actionable* research. One of the indicators for this is the citation of IVM publications in policy documents. During the review period, at least some 270 IVM publications were cited by international organisations such as UN Environment, the Food and Agriculture Organization, the World Bank and the American Development Bank, as well as government bodies in the Netherlands. It therefore seems to the committee that IVM's research has been actionable as well as excellent.

It pleased the committee that while IVM's overall approach is focussed on mainstream environmental and sustainability research, there does seem to be a sense of mutual respect for different perspectives from other disciplines and the Global South. While the wider politics and contestations around sustainability are addressed in the governance department, some of these issues could perhaps also be addressed more widely in the natural science and modelling work, for instance the role of politics in determining which models count or how uncertainty is dealt with in models and the natural sciences and the governance challenges around these.

It is clear to the committee that interaction and dialogue between the researchers across the departments is high on IVM's agenda. However – apart from some PhD and large EU projects that tend to focus on mixed methods – a lot of interaction seems to happen informally or incidentally: interdisciplinarity at the coffee machine, so to speak, or in annual brainstorming events. In the committee's view, it can be fruitful not to rely too much on these informal



structures and strive for a more systematic interaction across the departments. For example, IVM could develop a creative interdisciplinary approach toward sustainability, not just focussing on sectors but also on some cross cutting themes such as governance challenges or the science/policy interface. The committee recommends not only crossing borders within the institute, but outside as well. IVM could for instance benefit from active engagement with the natural sciences.

3.5. Societal Relevance

As one of the oldest Dutch institutes involved in environmental research, IVM is well-connected at all levels, the committee found. At the local level, it collaborates with the City of Amsterdam to support green roofs and local energy communities. At the national level it helps the Dutch Environmental Assessment Agency (PBL) devising an international biodiversity agenda. At the international level, it works with the World Bank and other United Nations organisations to support sustainable development in the Global South. A flagship of societal engagement is the Amsterdam Sustainability Institute initiated by IVM. This includes all sustainability-related research at the Vrije Universiteit and aims to build bridges to the wider community.

The committee is impressed with IVM's strong public engagement. From the documentation and the interviews, the committee got the impression that impact is 'in the DNA' of IVM. Staff at the institute is passionately motivated to create change. This is a great asset for IVM's strategy, in the committee's view, and should be cherished. The committee fully supports IVM in its intention to strengthen and expand collaborations with strategic societal partners such as the Dutch Environmental Assessment Agency PBL, the Royal Netherlands Meteorological Institute KNMI and Deltares, an institute for applied water and subsurface research. The committee also encourages IVM in its ambition to forge new alliances.

In its positive assessment of IVM's research impact, the committee also takes into account IVM's teaching activities. These have expanded significantly in the past five years. By the end of 2020, IVM staff taught in a total of 58 master and bachelor courses at the VU, plus an additional 16 courses at the University of Amsterdam and the Amsterdam University College. IVM has its own Environment and Resource Management master's programme, with nearly 170 students in the class of 2020-2021. The committee finds that all of these teaching activities strongly contribute to IVM's impact, ensuring that the next generation of decision-makers is trained in science for sustainability.

The committee found that IVM is actively reaching out to a broader public through broadcast media, and building an online community of followers through organizational and individual social media accounts. The committee acknowledges that IVM is clearly visible for the general public. Nevertheless, it is of the opinion that IVM could gain power and increase its impact if it develops a more strategic uptake of an outreach strategy, in which it specifies its goals, target groups, funding sources and actions.

Open science

With regard to accessibility of research to other researchers and societal stakeholders, IVM's efforts and achievements are laudable. Publishing in open access journals is gradually becoming the norm, facilitated by deals between Dutch research institutions and large academic publishers. Increasingly, individual research projects have a dedicated budget for open access publishing. IVM is actively promoting FAIR data, freely accessible coding routines and the development of open-source software. In 2020, 78 % of IVM's publications was open-access, and many models developed by IVM are freely available. This makes the institute a forerunner and an example for other academic institutions.

In the sense that stakeholders need to be involved in the preparation and execution of research, the committee sees some room for improvement. Even though IVM's research impact is already impressive as it is, whether or not co-creation takes place now seems to rely mostly on researchers' personal networks. This contingency risks that researchers miss out on important perspectives. Co-creation should therefore become more institutionalized, in the



committee's view. It recommends building further on an overall strategy for co-creation of research and education together with partners and make such a strategy more explicit.

The committee is satisfied to see that IVM reflects critically on its role in the global debate where research projects in the Global South are increasingly challenged for their traditional top down, modernist view of 'capacity building'. The committee encourages the institute to take the opportunity to engage more broadly in this debate and go beyond the current 'understanding perspectives'. Rather, the aim should be to develop more equitable ways of knowing, learning, working and also co-designing and co-producing with a range of stakeholders from the very beginning. Equitable research collaborations mean nurturing ownership and engagement of all partners in the design, implementation, and publication phases of research projects. This also entails considering equitable data ownership and authorship. To open up its research, this is an important step for IVM. Therefore, the committee finds it highly commendable that it builds strategies for equal partnerships, that many staff members reflect critically on its modes of collaboration with partners from abroad and that in different projects IVM is using novel ways of collaboration.

3.6. Viability

Academic culture, research integrity

From the online interviews the committee had with staff members and PhD students of IVM, it got the impression that the institute has a remarkably friendly, collegial atmosphere and that people are in general happy with their work. Junior staff members mentioned, for instance, that their ideas for new research or new epistemologies are very well received and that they feel supported in building their own academic identity and setting up their own research track. The committee agrees with IVM that this positive spirit and sense of togetherness is one of IVM's most important strengths. The institute also deserves praise for trying to be self-reflective and open; the committee recognised these ambitions in the interviews, where staff members did not shy away from freely talking about imperfections and blind spots as well as assets of IVM. This attitude is of the greatest value, in the committee's view. It ensures that IVM will continuously improve itself. The committee strongly recommends targeting the spirit of reflexivity specifically on topics of diversity, inclusion and decolonisation, as is further explained below.

The committee found that integrity is on the agenda at the VU in general and therefore at IVM as well. All PhD's and tenure trackers are trained in the principles of scientific integrity. IVM intends to stimulate dialogue among staff members about integrity, research ethics, activism in academia and organizational norms and values. The committee wholeheartedly supports this intention.

Diversity

The committee thinks that for IVM to remain relevant and accomplish its mission, it would be highly recommendable to increase diversity in the top rank. This is necessary to prevent IVM from missing out on important perspectives and representations. At present, the top ten positions of director, institute manager, department heads and deputy department heads are all exclusively held by males with a western-European background. The lack of diversity is partly rooted, the committee heard, in the re-organisation process, when a number of very talented female researchers left. The committee appreciates that due to a proactive hiring strategy towards female academics, the gender-balance among assistant professors is nearly optimal: around 50/50. These new recruits are now expected to move up the ranks over time and improve the balance at associate professor and full professor levels, and eventually in the managerial positions. The committee, however, is of the opinion that change is needed sooner, and IVM can simply not wait to see if and when people with a different gender and/or cultural background make their way up. Instead, some targeted internal recruitment could take place to diversify the professorship and also the management team. IVM could also consider opening it up to assistant professors. After all, academic seniority is not an absolute prerequisite for being a good manager. Alternatively, IVM could invite guest professors to become involved in management.



Diversity is not only a matter of recruitment and positions of leadership. According to the committee, IVM could put more effort in developing strategies to support young female and international researchers in academic positions. As it is, this support is limited to informal and largely self-organised discussion groups for female academics. While these initiatives are well-intended, they are not likely to address many of the challenges faced. Institutional initiatives to support work-life and work-family balances would benefit not only women, but also facilitate male researchers being more involved in family duties. Such measures could also facilitate keeping international staff in higher seniority levels. Many institutions globally are currently trying to find solutions for these problems, which are not specific to IVM. Such solutions could serve as examples and be adapted by IVM to develop best practices that promote diversity across all levels. IVM could also consider a seed grant to improve diversity, inclusivity and decolonisation.

On top of all this, the committee thinks that IVM could benefit from a more intersectional and integrated approach to diversity. Diversity is currently largely defined by the male/female ratio and internationalization. Although important, this only focuses on physical representation in staff and student bodies. In order to guarantee the equal participation and well-being of minority groups – including queer, disabled, and people of colour – deep institutional change is necessary. The committee recommends IVM to reflect on how diversity can be increased beyond gender dichotomies and nationality, to include diversity in knowledge, expression, and experience in education, research, and institutional practice. This will help IVM in reaching its strategic goal to make the institute an even more enjoyable, inclusive and secure workplace.

Talent management

The committee compliments IVM for its ambitious human resource policy and generosity with regard to the support of its staff and students. In particular, the committee is satisfied by the strategic personnel plan, which is the basis for annual discussions by the management of career trajectories for each employee. IVM's mentorship program for early career researchers is a good way of promoting career development support.

IVM uses a so-called Ajax model for hiring and promotion. This means young IVM researchers are likely to find a position as professor at IVM, if all pre-defined criteria are met and no better candidates are available. Although the committee values the efforts to train internal talent, it also sees an associated risk. Using internal promotions can lead to a situation where - however unintentionally – existing values and attitudes are constantly reproduced instead of being refreshed, and that there is an unconscious bias away from hiring people that do not strongly resemble the staff that is already there. The committee suggests that IVM reconsiders this strategy, or at least complements it with open calls for more external researchers in new areas. This will provide a stronger process of renewal and quality care. It may prove to be quite inspiring to bring in new people with fresh ideas, for instance from abroad. Another reward may be that staff who have been trained at IVM and subsequently leave the nest can then become valuable relations, expanding IVM's network. Also, for some talents that IVM cherishes and wishes to maintain, it may be fruitful if they go abroad for a couple of years and come back replenished with fresh influences.

As for many academic institutes, a high workload is an issue at IVM. In its case it may well be explained by IVM's ambitions to grow, the rising number of PhD students, the pressure to acquire research grants, and the ambition to dedicate staff to teaching. The committee appreciates that IVM takes workload seriously as a threat to staff's well-being and that it acts accordingly. IVM has started to measure and map work pressure and begun a wave of hiring new personnel, including additional teaching support for staff members who are involved in courses with a high teaching load. However, IVM expects work pressure to remain a key challenge for the coming years.

One of the proposed solutions is to lower the pressure on in particular junior staff by changing the culture of rewarding and recognition from scientific output indices to a more diverse set of activities. Recently, the VU has started on adjusting the assessment criteria for its tenure track system to recognize achievements in all key areas of an academic career: education, research and leadership. This allows for differentiation and specialization: not all staff has to be equally active and successful in all three aspects. Additional steps can be taken in promoting a better



work-life balance in the institution, such as support for staff with young families or other private life constraints, or with mental health issues. There is no universal solution, but such efforts are ongoing across the world, so that IVM can adapt best practices from other institutions.

PhD training and supervision

The committee found the PhD quality assurance at IVM to be very well-organised. In the 9-month 'go / no-go' milestone, candidates present a detailed research plan of the PhD project to a committee of the supervisor, the co-supervisor, and a senior researcher from another IVM department. The quality of the PhD thesis itself is ensured by submitting the individual chapters to peer-reviewed journals, where reviews may help to secure adhering to international quality standards. In most cases at least two of the chapters have been published as journal articles papers before submitting the thesis. The committee is satisfied that this procedure provides both in-house and external quality control.

PhD training is also well-devised. Each PhD candidate's training programme is detailed in their training and supervision plan, which follows the protocol of the SENSE Research School. Supervisors are prepared for their task, through supervision courses that are part to the tenure track agreement. Beyond formal supervision, IVM's 'open door policy' allows for informal communication and contact between the PhD candidate and the supervisors. A buddy system is in place to ensure appropriate integration of PhD students. to the interview with junior researchers presented the committee with an image of highly motivated, pleasantly self-assured academics who were well looked-after and felt much at home. Of course, writing a thesis remains stressful, and PhD students may feel pressure to live up to their supervisor's expectations, particularly if these supervisors are of an international high profile.

It is to IVM's credit that it concerns itself with PhD's mental health and future career perspectives. Currently a survey is executed into well-being, and apart from the buddy system there are morning coffees for PhD's and their supervisors twice a week. PhD students told the committee that they feel free to talk about anything that is on their mind during these coffee meetings, emotional problems as well as intellectual or practical challenges. Future careers are also a regular topic of conversation between PhD student and supervisor, the committee found. Supervisors take trouble to introduce their PhD students to their network. Since research projects are often linked to strategic partners, this opens up career possibilities outside of academia. All in all, the committee is impressed by the way IVM supervises, trains and supports its PhD students. It fully supports the institute in further expanding support mechanisms. A suggestion would be to make guidelines for supervision. That will help to create a similar supervision culture across the department.

Future outlook

While the past seven years have been a period of building an ambitious and united team, as well as a viable and visible institute, IVM now aims at consolidating and strengthening its unique position in the field of sustainability and environmental science and education. It no longer aims at large growth, but rather at facilitating the learning curve of the team, reducing workload, striving for high quality publications and personal grants, and investing in the quality and innovation of teaching. The committee strongly supports this position.

The committee is fully convinced that IVM's work is and will remain extremely relevant, both for society and within the SENSE framework. In order to deal with increasing competition for research grants, the committee recommends IVM to not only embrace cutting-edge themes but also put its own specific angle on them. This was elaborated in section 3.3.

3.7 SENSE Research school

The environmental and climate research institutes in the Netherlands cooperate in the SENSE Research School, in which IVM participates together with 12 other institutes spread over 10 research institutions participate. All of the five institutes the committee reviewed during the week were part of SENSE. SENSE primarily supports PhD education



in educational and climate science, and to some limited extent researchers, by providing courses and a network. The committee found that IVM benefits from SENSE primarily because it offers a platform for PhD-students to meet colleagues in the same field, and because it unites Dutch sustainability researchers and offers them an opportunity to be at the forefront of discussions and influence national policy.

During the site visits, the committee learned that SENSE is the continuation of a former national research school. Where most research schools were discontinued once universities started to increasingly use own graduate schools, the SENSE research school was maintained, as the participating institutes saw the added value of a national school in PhD education. The committee also learned that the added value attributed to SENSE differed among the institutes, and that this is the reason why the research school has a rather narrow scope, focusing on PhD education and a number of networking and outreach opportunities.

The committee thinks that a national network for cooperation between environmental institutes is a very good idea with great potential. The current limited scope however does not fully realize the opportunities such a network has. Also, the level of support is very dependent on a small number of participants. The committee encourages SENSE to develop a vision of the future.

It could be that the Research School is happy with the current situation, and does not see possibilities for cooperation beyond the current efforts. Another possibility is to discontinue SENSE. The third scenario is a revitalization of the network. In that case, the committee sees lots of possibilities. As discussed earlier in this report, the sustainable development goals that environmental and climate sciences work on are so interdisciplinary that SENSE should consider a broader range of institutes working on environment and science from other disciplines, such as social sciences, governance, political science and law. This would mean opening up the requirements and prerequisites for the certificates, for instance by cooperation with other Research Schools such as CERES of WTMC to suit PhD students' needs.

In the most ambitious scenario, SENSE could be a platform for interdisciplinary cooperation, which can be used to collectively seek collaboration with other fields, governments and international partner. It could also co-ordinate outreach and lobbying activities. Another possibility is to develop SENSE into a platform for the interests of PhD students and other researchers in the field, and develop joint policies and procedures on issues such as intersectional inclusivity, safety, equal opportunities and work-related conflicts.

The Netherlands is a relatively small country with a relatively large number of small and medium sized research institutes in environmental and climate sciences. The committee thinks that in this context, there is much to gain both nationally and internationally by joining forces.



4. EXECUTIVE SUMMARY

The Institute of Environmental Studies aims to address contemporary sustainability challenges concerning biodiversity, climate, energy, food, land and water by conducting excellent, actionable research. The institute has four departments: Environmental Economics, Environmental Geography, Environmental Policy Analysis and Water and Climate Risk. After some turbulent years, IVM has managed to regain prosperity and stability by focussing more on education. It has grown significantly both in terms of scope and number of students. It now wants to consolidate and invest in strengthening its own internal culture. The committee is impressed by IVM's excellent development since the previous evaluation, and the fierce way it has bounced back after reorganizational challenges.

IVM has a clear focus on impact-oriented sustainability research via systems thinking, interdisciplinary and multidisciplinary research. IVM has adopted a bottom-up strategy for identifying new research niches, which fits in well with its flat organisational structure. A consequence of this, however, is that the definition of the new research areas appears to be done mostly on an ad-hoc basis, rather than as part of an overarching institutional framework. IVM's scientific output is impressive, both in its quantity and its quality. This is demonstrated by its high citation index and the many prestigious prizes and grants it has received. The fact that practically all publications originating at IVM are co-authored is in accordance with the spirit of team science it promotes. While it is clear that interaction and dialogue between researchers across the departments is high on IVM's agenda, it struck the committee that a lot of interaction seems to happen informally or incidentally.

Besides a high scientific output, IVM also shows a strong public engagement, and its staff is passionately motivated to create change. This is a great asset, according to the committee. Through collaborations with organisations at regional, as well as national and international levels and by educating new generations of environmental specialists, IVM manages to realise significant impact. IVM is actively promoting FAIR data, freely accessible coding routines and the development of open-source software. In 2020, 78 % of IVM's publications was open-access, and many models developed by IVM are freely available. This makes the institute a forerunner and an example for other academic institutions.

The committee got the impression that IVM has a remarkably friendly, collegial atmosphere and that staff and PhD students are in general happy with their work, which is another of the institute's strengths. Although the gender-balance among assistant professors has significantly improved in the past years, the top ten positions of director, institute manager, department heads and deputy department heads are exclusively held by males with a western-European background.

IVM uses a so-called Ajax model for hiring and promotion. This means young IVM researchers are likely to find a position as professor at IVM, if all pre-defined criteria are met and no better candidates are available. Although the committee values the efforts to train internal talent, it also sees an associated risk. Using internal promotions can lead to a situation where - however unintentionally - existing values and attitudes are constantly reproduced instead of being refreshed.

PhD supervision at IVM is very well-organised, and the training programme is well-devised. The committee got the impression that IVM's PhD students are well-looked after and found its interview partners at the PhD level highly motivated, pleasantly self-assured academics. All in all, the committee is impressed by the way IVM supervises, trains and supports its PhD students.

The committee considers the SENSE Research School to be a valuable network between universities working on environmental and climate science, that could have more potential than is currently envisioned by the participating universities. The committee encourages SENSE to develop a vision of the future.



5. RECOMMENDATIONS

- Give more weight to political and uncertainty issues around sustainability.
- Add a systematic approach to the periodic evaluation of research policies, perhaps mapping them against plans of the other SENSE institutes.
- Frame the development of artificial intelligence and machine learning towards new scientific problems that can only be solved by such applications, or towards older fundamental problems that cannot be solved by traditional approaches.
- Improve diversity in the top rank of the institute, for instance by targeted internal recruitment and/or by opening up the management team to assistant professors.
- Do not rely too much on informal structures while stimulating interdisciplinarity. Strive for a more systematic interaction across the departments.
- Strengthen and expand collaborations with strategic societal partners and forge new alliances.
- Develop a more strategic outreach strategy, in which goals, target groups, funding sources and actions are specified.
- Institutionalise co-creation; build further on an overall strategy for co-creation of research together with partners and make this strategy more explicit.
- Continue to reflect critically on the traditional top down, modernist view of 'capacity building' in research projects in the Global South. Take the opportunity to engage more broadly in the global debate on equitable research collaborations.
- Develop strategies to support young female and international researchers in academic positions.
- Take institutional initiatives to support work-life and work-family balances.
- Reflect on methods to increase diversity beyond gender and nationality, in order to make the institute an even more enjoyable, inclusive and secure workplace.
- Lower the pressure on – in particular – junior staff by changing the culture of reward and recognition from scientific output indices to a more diverse set of criteria. Allow for differentiation and specialisation.
- Expand support mechanisms for PhD's and postdocs. Make guidelines for their supervision, to create a similar supervision culture across departments.
- Develop a vision of the future for SENSE and organise the SENSE Research School accordingly.



APPENDICES



APPENDIX 1: THE SEP 2021-2027 CRITERIA AND CATEGORIES

The committee was requested to assess the quality of research conducted by the UHS as well as to offer recommendations in order to improve the quality of research and the strategy of the UHS. The committee was requested to carry out the assessment according to the guidelines specified in the Strategy Evaluation Protocol. The evaluation included a backward-looking and a forward-looking component. Specifically, the committee was asked to judge the performance of the unit on the main assessment criteria and offer its written conclusions as well as recommendations based on considerations and arguments. The main assessment criteria are:

- 1) **Research Quality:** the quality of the unit's research over the past six-year period is assessed in its international, national or – where appropriate – regional context. The assessment committee does so by assessing a research unit in light of its own aims and strategy. Central in this assessment are the contributions to the body of scientific knowledge. The assessment committee reflects on the quality and scientific relevance of the research. Moreover, the academic reputation and leadership within the field is assessed. The committee's assessment is grounded in a narrative argument and supported by evidence of the scientific achievements of the unit in the context of the national or international research field, as appropriate to the specific claims made in the narrative.
- 2) **Societal Relevance:** the societal relevance of the unit's research in terms of impact, public engagement and uptake of the unit's research is assessed in economic, social, cultural, educational or any other terms that may be relevant. Societal impact may often take longer to become apparent. Societal impact that became evident in the past six years may therefore well be due to research done by the unit long before. The assessment committee reflects on societal relevance by assessing a research unit's accomplishments in light of its own aims and strategy. The assessment committee also reflects, where applicable, on the teaching-research nexus. The assessment is grounded in a narrative argument that describes the key research findings and their implications, while it also includes evidence for the societal relevance in terms of impact and engagement of the research unit.
- 3) **Viability of the Unit:** the extent to which the research unit's goals for the coming six-year period remain scientifically and societally relevant is assessed. It is also assessed whether its aims and strategy as well as the foresight of its leadership and its overall management are optimal to attain these goals. Finally, it is assessed whether the plans and resources are adequate to implement this strategy. The assessment committee also reflects on the viability of the research unit in relation to the expected developments in the field and societal developments as well as on the wider institutional context of the research unit

During the evaluation of these criteria, the assessment committee was asked to incorporate four specific aspects. These aspects were included, as they are becoming increasingly important in the current scientific context and help to shape the past as well as future quality of the research unit. These four aspects relate to how the unit organises and actually performs its research, how it is composed in terms of leadership and personnel, and how the unit is being run on a daily basis. These aspects are as follows:

- 4) **Open Science:** availability of research output, reuse of data, involvement of societal stakeholders;
- 5) **PhD Policy and Training:** supervision and instruction of PhD candidates;
- 6) **Academic Culture:** openness, (social) safety and inclusivity; and research integrity;
- 7) **Human Resources Policy:** diversity and talent management.



APPENDIX 2: PROGRAMME OF THE SITE VISIT

Friday 16 April

Time slot	Meeting
09.00 - 13.00	Committee instruction & preparation

Monday 19 April

Time slot	Meeting
14.00 - 15.00	Internal committee meeting: final preparation
15.00 - 16.00	Welcome and introduction by the rector of Wageningen University and Research and the participating SENSE institutes

Tuesday 20 April

Time slot	Meeting
11.00 - 11.30	Final preparations for Tuesday
11.45 - 12.30	Management WIMEK-WUR: organisation, SWOT, future strategy and policy
13.30 - 14.15	Research at WIMEK-WUR: presentation and discussion regarding WIMEK's Grand Challenges and case studies; research facilities; future perspectives
14.30 - 15.30	Training and education of young researchers: PhD and postdoc policy WUR and WIMEK; PhD education and training programme; meeting with the WIMEK PhD Council and/or PhD and postdoc representatives.
15.45 - 16.45	Evaluation WIMEK-WUR
16.45 - 17.30	Final preparations for Wednesday

Wednesday 21 April

Time slot	Meeting
08.30 - 08.45	Welcome by Dean VU Faculty of Science
08.45 - 09.30	Organizing IVM-VU: management & strategy
09.45 - 10.30	Using research from IVM-VU: social impact & academic excellence
10.45 - 11.30	Working at IVM-VU: careers & community
11.45 - 12.45	Evaluation IVM-VU
13.45 - 14.30	Organization E&H-VU (incl. management, HR policy)
14.45 - 15.30	Research quality E&H-VU (incl. PhD policy, academic culture)
15.45 - 16:30	Societal Impact E&H-VU
16:45 - 17:45	Evaluation E&H-VU

Thursday 22 April

Time slot	Meeting
12.00 - 12.45	Final preparations for Thursday
13.00 - 14.00	IHE Delft - Research management and infrastructure
14.15 - 15.00	IHE Delft - From research to impact
15.15 - 16.00	IHE Delft - Future positioning in an international playing field
16.15 - 17.15	Evaluation WIMEK-WUR



17.15 – 17.45	Final preparations for Friday
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Friday 23 April

Time slot	Meeting
09.30 - 10.30	Copernicus UU - Management/ Strategy / Talent policy
10.45 - 11.30	Copernicus UU - Young Researchers / PhDs / Postdocs
11.45 - 12.30	Copernicus UU - Research and Societal Impact
13.30 - 14.30	Evaluation Copernicus - UU
14.30 - 16.30	Preparation provisional findings all institutes
16.30 - 17.30	Presentation provisional findings & wrap-up

APPENDIX 3: QUANTITATIVE DATA

Quantitative data on the research unit's composition and funding, as described in Appendix E, Tables E2, E3 and E4:

- Research staff;
- Funding;
- PhD candidates

	2014		2015		2016		2017		2018		2019		2020	
Scientific staff														
Professor	1.68	FTE	2.12	FTE	1.72	FTE	1.68	FTE	1.28	FTE	2.04	FTE	2.44	FTE
Associate prof	2.12	FTE	1.12	FTE	0.84	FTE	1.16	FTE	1.16	FTE	0.48	FTE	1.2	FTE
Assistant prof	6	FTE	4.6	FTE	6.48	FTE	8	FTE	5.24	FTE	5.64	FTE	8.24	FTE
Postdocs	0.9	FTE	3.78	FTE	5.58	FTE	3.33	FTE	2.34	FTE	1.8	FTE	7.83	FTE
PhD candidates	24.72	-	18.8	-	21.6	-	20.64	-	16.48	-	17.44	-	31.92	-
Junior researchers (no PhD)	1.92	FTE	1	FTE	1.64	FTE	3	FTE	0.4	FTE	1.84	FTE	4.98	FTE
Total	37.34	FTE	31.42	FTE	37.86	FTE	37.81	FTE	26.9	FTE	29.24	FTE	56.61	FTE
Tech. supp. staff														
Tech. supp. staff	11.05	-	11.05	-	9.85	-	4.05	-	4.55	-	4.7	-	5.4	-
Visiting fellows	23.48	-	25.48	-	27.58	-	22	-	24.81	-	23	-	15.83	-
Total staff	71.87	-	67.95	-	75.29	-	63.86	-	56.26	-	56.94	-	77.84	-

	2014	2015	2016	2017	2018	2019	2020	average
Funding								
Direct funding (1)	27%	30%	33%	22%	33%	39%	45%	33%
Research grants (2)	66%	62%	58%	65%	60%	55%	50%	59%
Contract research (3)	7%	8%	9%	13%	7%	6%	5%	8%
Other (4)	0%	0%	0%	0%	0%	0%	0%	0%
Total funding	100%	100%	100%	100%	100%	100%	100%	

(1) Direct funding ('basisfinanciering' / lump-sum budget).

(2) Research grants obtained in national scientific competition (e.g. grants from NWO and KNAW).

(3) Research contracts for specific research projects obtained from external organizations, such as industry, government ministries, European organizations and charitable organizations.

(4) Funds that do not fit into the other categories.

Enrolment		
Starting year	Enrolment (male / female)	Total (M+F)
2011	9 / 8	17
2012	4 / 2	6
2013	6 / 11	17
2014	8 / 4	12
2015	6 / 3	9
2016	8 / 8	16
Total	41 / 36	77



Enrolment Success rates								
Starting year	Graduated in year 4 or earlier	Graduated in year 5 or earlier	Graduated in year 6 or earlier	Graduated before 31-12-2020	Not yet finished	Discontinued <18 months	Discontinued 18-48 months	ABD
2011	2 / 12%	2 / 12%	4 / 23%	6 / 35%	2 / 12%	0 / 0%	0 / 0%	1 / 6%
2012	3 / 50%	1 / 17%	2 / 33%	-	-	-	-	-
2013	4 / 23%	5 / 29%	3 / 18%	-	2 / 12%	2 / 12%	-	1 / 6%
2014	1 / 8%	6 / 50%	1 / 8%	-	1 / 8%	-	3 / 25%	-
2015	2 / 22%	2 / 22%	-	-	4 / 45%	-	1 / 11%	-
2016	5 / 31%	-	-	-	9 / 56%	1 / 6%	1 / 6%	-
Total	17 / 22%	16 / 21%	10 / 13%	6 / 8%	18 / 23%	2 / 4%	5 / 6%	2 / 3%

