RESEARCH ASSESSMENT

COPERNICUS INSTITUTE OF SUSTAINABLE DEVELOPMENT, 2014-2020

UTRECHT UNIVERSITY

Qanu
Catharijnesingel 56
3511 GE Utrecht
The Netherlands

Phone: +31 (0) 30 230 3100
E-mail: info@qanu.nl
Internet: www.qanu.nl

Project number: Q0807

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REPORT ON THE RESEARCH REVIEW OF THE COPERNICUS INSTITUTE OF SUSTAINABLE DEVELOPMENT OF UTRECHT UNIVERSITY

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 Copernicus Institute of Sustainable Development of Utrecht University 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 at the Copernicus Institute, which is without any doubt linked to the very research-friendly atmosphere and the good working conditions in the different research units.

Some of the specific issues discussed during the site visit included Copernicus' core scientific themes and challenges, perspectives on governance and micropolitics of sustainability, strategic impact, partnerships and engagement with the Global South, as well as the institute's efforts to create an environment for successful career pathways and actively strive for gender balance across all levels.

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 the Copernicus Institute were assiduous in giving us with a great deal of additional information on their work, thus providing us with the necessary means to sketch the whole picture of the ongoing research at the Copernicus Institute. 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

Utrecht University asked an assessment committee of external peers to perform an assessment of the research conducted at the Copernicus Institute of Sustainable Development 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.

This assessment was part of a cluster assessment of five institutes participating in the SENSE Research School: 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. 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 project manager Peter Hildering MSc and secretary drs. Mariette Huisjes 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 the Copernicus Institute. 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 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 visit of the Copernicus Institute took place on 23 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 the Copernicus Institute 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 the Copernicus Institute 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 Utrecht University 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 THE COPERNICUS INSTITUTE

3.1. Introduction

The mission of the Copernicus Institute is to contribute to sustainable development and to have a significant impact on the transition to a sustainable society. Working in a multi- and interdisciplinary manner, the institute aims to develop excellent and relevant knowledge and educate the change agents of the future. Over the last seven years, the Copernicus Institute has grown significantly, from 149 staff members in 2014 to 209 staff members today. The Copernicus Institute is one of four departments of Utrecht University's Faculty of Geosciences, the other departments being Earth Sciences, Physical Geography, and Human Geography and Spatial Planning.

3.2. Organization, Management and Governance

The institute has chosen to distinguish between a managerial and an intellectual structure. Formally, it consists of four research groups:

- Energy and Resources,
- Environmental Sciences,
- Environmental Governance,
- Innovation Studies.

The research groups only serve managerial purposes such as administration and human resource management. It appeared that staff feel comfortable in these structures and they stimulate internal cohesion.

Intellectually, the institute revolves a total of eight themes.
The three cross-topical themes are:

- transitions,
- governance,
- modelling.

They are supplemented with five topical sustainability challenges:

- sustainable energy,
- sustainable land,
- sustainable water,
- circular economy
- sustainable food.

The eight topics were chosen because they are the topics where most interaction is seen. Their function is to catalyze collaboration between researchers from different disciplines. As challenges they connect all researchers. This structure testifies to the Copernicus Institute's strong dedication to stimulate trans- and interdisciplinary research, the committee found.

The committee commends the Copernicus Institute for the steps it has taken in its governance, by separating its intellectual from its organisational structure. The dual way the research is organised fits with the trans- and interdisciplinary research ambitions. There seem to be genuine efforts to work across the themes, and some good examples came out in the discussion with the committee.

The board of the Copernicus Institute rotates among the lead scientists. It consists of a head, a director of research, a director of education and the managing director. The board shares the responsibility for long-term strategy and daily management of the institute, including financial management, human resource policies, coordination of teaching and research policy. The committee has established that the model works well for the Copernicus Institute. Since all senior scientists know that they will one day be in the shoes of a board member, the model stimulates a collegial atmosphere. It may be partly responsible for the fact that there is a lot of trust among the staff, as the

committee found. In addition, researchers get a chance to practice their management skills whilst doing service as a board member. This aligns with the trend towards a new system of recognition and rewards, one that does not exclusively focus on high impact publications.

Since 2014, all of the funding streams feeding into the Copernicus Institute have increased. As the previous review committee recommended, the institute has successfully improved its financial solidity by safeguarding a stable base funding from successful bachelor's and master's teaching programmes and by acquiring grants from competitive national and international programmes. At the same time, the Copernicus Institute continues to be successful in acquiring funding through contract research, for instance by participating in the Dutch Top Consortia for Knowledge and Innovation, by securing contracts from the European Commission and through transdisciplinary partnerships with industry and public research organisations. The growth of the Copernicus Institute was enabled by the support and generous funding of Utrecht University, that has selected sustainability research as one of its four strategic themes.

3.3. Strategy and aims

Since (and partly in reaction to) the former review committee's recommendations, the two main focus points of the Copernicus Institute's strategy have been to improve interdisciplinarity and to increase societal impact. The new governance model is an outcome of strategic thinking, and the eight research themes form the backbone of the Copernicus Institute's research strategy.

At first, staff members told the committee, the institute chose the Sustainable Development Goals (SDG's) as its organising principles. This turned out to be an unsatisfactory arrangement. The SDGs seem to be more suitable as general goals than as research targets. The institute then decided to change to the present intellectual research structure: the three cross-topical themes and the five topical challenges. It identified these challenges based on its own expertise as well as its interpretation of the major assessments in global sustainability science, including those by the Intergovernmental Panel on Climate Change, the Global Environmental Outlook and the Foresight Initiative of the United Nations Environment Programme. As mentioned above, the committee finds that the changes in governance structure have secured well-functioning and trustful collaborations throughout the institute. The decision to not organise the work around the sustainable development goals is well motivated.

An opportunity to transcend disciplinary barriers was offered by the institute's move to a brand-new building in 2017. The institute's new offices are specifically designed to facilitate collaborative research: a lot of glass, open staircases, many inviting places to meet and eight large open office spaces where staff from different departments are mixed together.

Both the interdisciplinary character and the impact of the institute's research are enhanced by the context of Utrecht University. In 2016, the university chose four main strategic themes around which it aims to focus interdisciplinary and transdisciplinary research. 'Pathways to Sustainability' is one of these themes, in which the Copernicus Institute obviously plays a pivotal role. In addition, it also contributes to the strategic theme 'Institutions for Open Societies'. Within these research themes, the university identified so-called hubs. These are university-wide platforms where Utrecht-based researchers collaborate with colleagues from different disciplines and societal partners such as other knowledge institutions, businesses, government authorities, NGO's and lobby groups try to have impact on certain topics. The Copernicus Institute helps to build these hubs. Its staff members for instance sit on the board of the 'Towards a Circular Economy and Society', 'Towards Industry with Negative Emissions', and the 'Future Food' hubs.

To further increase societal impact and public engagement, the Copernicus Institute formed new strategic collaborations, for instance with the Sustainable Industry Lab, which aims to accelerate industrial transformations, and with the Urban Futures Studio, which experiments at the intersection of science, art and policy. Staff members of the institute also adopted formal advisory positions, and outreach activities have been professionalised and are systematically monitored and shared.

The committee concludes that the Copernicus Institute's aims and strategy are clear and consistent. The institute's mission and vision align excellently with those of the university at a central level, to their mutual advantage. The mission statement, the aims and strategies excellently outline the institute's importance for the sustainability science field and demonstrate an impressive focus on cross-disciplinary knowledge and impact for societal transition. The committee also likes that the strategy is conceptualised as an ongoing process, reflecting on and reacting to previous assessments. In general, the Copernicus Institute has demonstrated an excellent strategic response to the previous reviews, in the committee's view.

3.4. Research Quality

To demonstrate the quality of its research, the Copernicus Institute uses key performance indicators. It notes, for instance, that the number of peer reviewed articles published has almost doubled since 2014, and that they are excellently cited.

After studying the documentation provided, the committee concludes that the Copernicus Institute has received ample recognition in its field, both in citations and in highly competitive personal research grants and awards. Its list of publications, citations, grants and awards is impressive. The institute is at the forefront in tackling many of the global sustainability challenges and has an important role in the international research landscape. The contribution to the body of sustainability science literature and knowledge is exceptional. The institute's leading position in the broader sustainability science field is also manifested in its concerted work to involve other researchers through organizing conferences, editing journals and coordinating networks. In particular the Earth System Governance and Sustainability Transitions Research networks are exceptional examples of how Copernicus provides important support for the wider community in initiating new research and providing a platform for young researchers across the world.

The Copernicus Institute has radically and successfully embraced interdisciplinarity in many respects and the committee fully supports these measures. It recommends the institute to proceed boldly on this path. The institute is already good at integrating natural environmental sciences and social sciences and strengthening the links between applied and more fundamental research. Now that it is at the start of intellectually fusing three different themes and five sustainability challenges, it could set out clear steps toward the integration of themes and challenges. The committee further suggests opening up further to other research fields, such as governance, normative research, micropolitics, engineering and new technologies. In doing so, it could make an even more meaningful contribution to the sustainable development goals. The committee's advice to the Copernicus Institute – in short – is to keep the focus on its own core topics, but work with other experts to get a broader perspective. This will be further elaborated on in section 3.5.

3.5. Societal relevance and impact

The committee studied the material offered and found that the Copernicus Institute has an impressive track record in societal impact. The strong and popular educational programmes are a clear sign of impact, the well-filled portfolio of contract research demonstrates that both government and private parties value the institute's work. The use of computer models, strategy studies, tools, training programmes and serious games developed by the Copernicus institute by high-profile stakeholders both at the national and international level is another clear indication of the institute's impact. Equally, the many high strategic positions of staff members in influential bodies convince the committee that research expertise finds its way into policy decisions.

In this respect, it is worth noting that the Copernicus Institute has all the structures in place to promote research impact. A wide international network of strategic collaborations, a governance structure that stimulates interdisciplinarity, and a university that is firmly focussed on co-creation. The university's four strategic themes and

20 so-called hubs form a great infrastructure to organise stakeholder engagement. All of these points may be a source of inspiration to other departments and institutes.

It pleases the committee that the Copernicus institute rightly considers global inclusiveness an important dimension of its work, in research as well as in management and teaching. The institute has a tailor-made course on Decolonizing Sustainability, for instance, and the Copernicus Institute as well as the Faculty of Geosciences and Utrecht University have long-term collaborations with universities in the South. The committee fully endorses this engagement with the Global South, as it is critical for making progress on the transformative ambitions of the 2030 Agenda as well as the institute's own mission of contributing to the transitions toward sustainable societies. The committee emphasises the importance of decolonising research practices and approaches. It is satisfied to see that the Copernicus institute 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 continue this debate and practice, going beyond the current 'understanding of perspectives', and developing more equitable ways of knowing, learning and 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.

During the virtual site visit, it became clear that the Copernicus Institute is looking for a next step to improve its impact. For this, the committee has a few suggestions.

It struck the committee that the current strategy appears to have a traditional focus on sustainability and transitions. In order to gain more impact, the Copernicus Institute could explore the politics of sustainability and the trade-offs around different goals and the tensions in the process towards a more sustainable society. Some research does seem to focus on contestations in sustainability transitions, but more could be made of this.

Also, the committee suggests changing the focus from transitions to transformations. The latter call for a structural change and have a normative focus on social and environmental climate justice. The committee did find that some researchers focus on these questions in their individual research, but the general strategy seems to take a more technical and incremental approach to societal change. Greater engagement with the politics of transformations and the equity dimensions could make its way to the overall strategy and presentation.

While some individual and more junior researchers focus on local and empirical contexts on grassroots innovations and movements, the overall thrust at the Copernicus Institute seems to be more on global governance issues and at the global scale. In the committee's view, the strategy could focus more on multiple scales and also the tensions from local to national and global, since sustainability transformations need to happen across all these scales.

Within the modelling crosscutting theme, the Copernicus Institute could augment the earth system science components. Currently, modelling approaches used for policymaking are strongly based on the integrated assessment model IMAGE. The relevance of IMAGE is undeniable, for instance in scenario development for the IPCC and application in studies linking the environment, societies and economies. However, integrated assessment models also have limitations in their ability to represent important feedbacks in the biosphere, that are currently major uncertainties in earth system modelling. The committee suggest that the Copernicus Institute could strengthen the biosphere modelling approaches already in-house and could consider increasing collaboration opportunities with WIMEK in Wageningen and the Institute for Environmental Sciences IVM at the VU on land-atmosphere interactions. In doing so, the institute could further increase its impact and provide fundamental information for policy making in terms of key uncertainties in the earth system response to management options and policy decisions.

Open science

Along with the university, the Copernicus Institute has adopted a strategy towards more open science. The aforementioned research hubs – as meeting platforms for university researchers and stakeholders – are one aspect of this strategy that is already in full bloom. The share of articles published open access has increased as well: from 47,6 % in 2014 to 78,9 % in 2020. The institute aims to improve this rate even further, as well as expand open-source data sharing and data management. The committee fully endorses this intention and recommends that the institute make use of the policies and support facilities that the university has put in place.

Following the previous review committee's advice, the Copernicus Institute has intensified its communication strategy to increase impact, with outreach training for PhD students and staff members, a podcast studio and an active social media strategy on several platforms. These initiatives have resulted in high publicity counts. All outreach activities are monitored and exciting examples are shared to inspire colleagues. Increasingly, impact activities count as criteria for promotion, as part of a university-wide and even national trend.

The committee recommends the Copernicus Institute to continue on the road taken, rewarding impact as one of the criteria for academic excellence. The institute stated that outreach activities are unevenly distributed among researchers. This is totally acceptable, in the committee's view, and should be seen as part of differentiated career paths. The institute could, however, look toward supporting those that would like to get on track with impact. The committee's advice to the Copernicus Institute is to consider prioritizing its efforts towards selected target groups that are most relevant to the research strategy. This will make its efforts more effective in the long run. The committee also suggests not only reaching out to stakeholders, but involving them in research design as well. While it found several examples of important co-design initiatives on an individual research group, the institute is encouraged to strengthen the institutional training and organization of co-creation. Finally, the committee advocates that the Copernicus Institute could take the initiative in the development of an international virtual dialogue platform and arena for complex discussions on conflicts in sustainability related topics, including both academics and stakeholders. This will reinforce the orientation towards the politics of sustainability that was mentioned in sections 3.4 and 3.5.

3.6. Viability

Research integrity and academic climate

The Copernicus Institute has several measures in place to guard research integrity, such as a joint Ethics Review Board of the Faculties of Sciences and Geosciences and Codes of Conduct for Scrupulous Academic Practice and Integrity. All PhD students take mandatory courses in scientific integrity. When in doubt, they can consult an academic integrity counsellor at the university level. Academic integrity is also part of various courses at undergraduate and graduate level. The committee is satisfied by this policy.

The Copernicus Institute has committed to a trans- and interdisciplinary research culture as one of its main strategic targets and headed straight for this goal. It radically changed its governance (as described in section 3.2), renewed its human resource policy and changed the way its PhD's are supervised (see below) and used its brand-new building to stimulate a transdisciplinary atmosphere. In addition, community building was put in place, both substantive and social: an annual two-day retreat for all academic staff and regular seminars and staff meetings. The committee is impressed by the interdisciplinary research community that the institute has created, where researchers from different fields work together in a trusting relationship.

Diversity

The committee found that diversity – particularly gender diversity – is high on the agenda for the Copernicus Institute, as well as for the Faculty of Geosciences and Utrecht University. In the last three years, the institute has promoted seven female assistant professors to the level of associate professor. In spite of this, at the level of full professor, gender diversity is still in need of improvement: currently only 20 % of full professors is female. The committee discussed this with the institute and heard that it is aware of the imbalance in higher level career positions. If there is a vacancy for a tenured position, the institute makes an effort to find a female candidate. If no

suitable female candidate can be found, the position is kept vacant. The committee concludes that gender balance is actively pursued and fully supports the institute in doing so. Unfortunately, in the present governance structure the gender disbalance among senior scientists is automatically imported into the institute's board. The committee suggests finding a shortcut to change this, for example by appointing guest professors, and/or involving early career researchers in decision making processes.

At the level of nationalities, 36 % of the institute's staff comes from outside the Netherlands, of which 9 % is from outside Europe. This is a good start, though it does not become apparent from the self-evaluation report how the nationalities are divided among academic ranks. The new English-taught bachelor's programme Global Sustainability Science has removed some barriers to hiring non-Dutch speaking international staff. The committee encourages the institute to continue to build a multicultural research environment, since this will contribute to its mission.

PhD students told the committee that they valued the effort to increase diversity amongst more senior researchers, but that they felt this was still lagging. In general, the Copernicus Institute could benefit from a more intersectional and integrated approach in their diversity and inclusion policy. 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. Focussing on these dimensions turns the question of diversity and inclusion into a 'recruitment problem' rather than aiming for the deep institutional change which is needed for guaranteeing the equal participation and well-being of minority groups (including queer, disabled, and non-whit communities). The committee encourages the institute 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. Engaging with the Global South, as advocated in section 3.5, could be one way of doing this.

Talent management

In the period under review, the Copernicus Institute changed its human resources policy to foster interdisciplinarity and diversity. This institute was supported in realising its ambitions by instruments at the faculty level, such as the Geosciences Gender Diversity Plan and the MERIT promotion scheme. The eight research themes now give direction when new tenure trackers are hired and since 2020 the human resources policy has been organised around MERIT. This scheme incorporates impact, teamwork and management besides research quality and education. The scheme aligns with a tendency in the Netherlands to assess academic staff more broadly than solely in terms of individual publications and citations. To the committee, the MERIT scheme seems a good instrument to diversify career paths, perhaps reduce the perceived workload and at the same time boost impact by giving outreach activities their just reward. The committee therefore encourages the institute to further implement the MERIT system, as planned.

PhD training and supervision

All PhD students working at the Copernicus Institute are part of the Graduate School Geosciences. This bears responsibility for the quality control of PhD supervision and training. Students have one or two daily supervisors at the level of associate or assistant professor. Increasingly they come from different fields, to stimulate trans- and interdisciplinarity. In addition, the PhD students are supervised by a full professor with whom they meet less frequently and who will be in charge of their PhD defence.

All PhD students draw up training and supervision agreements, signed by themselves and (one of) their daily supervisor(s). The training programme is tailor-made, suiting the needs of each student, except for the mandatory courses on scientific integrity. Each year, student and supervisor monitor and evaluate the progress, based on a detailed evaluation form that touches upon the work environment, research targets for the following year, the direction in which the student wishes to develop and professional development that is desirable. In addition to research-linked courses, the Geosciences Graduate School recently expanded its programme with courses on teaching, transferable skills and CV-writing. Utrecht University organises a yearly 'PhD Activating Career Event' to support PhDs in the last year of their appointment on career opportunities.

The PhD students can discuss practical PhD-related issues with a PhD coordinator, and turn to PhD counsellors if they struggle with issues concerning personal well-being, or safety. At the faculty level, there is a PhD confidential advisor, to be consulted in case of conflicts with other PhD students or their supervisors. At university level, the students can consult an academic integrity counsellor.

The committee finds the supervision of PhD students at the Copernicus Institute exemplary in many ways: the extensive supervision arrangements that stimulate interdisciplinarity, the tailor-made training programmes, the many consultation options, the detailed evaluation procedure and the justified efforts to prepare PhD students for a career outside the academic world. Those PhD students the committee met during its virtual site visit made a confident and mature impression and appeared to feel very much at home at the Copernicus Institute. In combination with the high success rates for thesis completion within the designated time and relatively low failure rates, the committee finds this commendable.

The committee got the impression that all PhD students at the Copernicus Institute have the same contracts. When PhD students are funded for only three years by the European Commission, the institute matches their contract by financing the fourth and final year to ensure equal opportunities. This is very important in guaranteeing fair and equal labor conditions for all PhDs; the committee finds the arrangement laudable and underscores the importance of keeping it this way and not caving in to financial pressures to hire PhDs under precarious scholarships.
There are still some possibilities to further improve the supervision and training for PhDs. First of all, PhD students said that the requirements and expectations for obtaining a PhD could be communicated more clearly at the beginning of the trajectory. Moreover, the PhD students explained that it was unclear what resources they had access to during their PhD trajectory. Perhaps the latter issue can be addressed in a take-in meeting or a collective meeting with recently entered PhD students in which the practical information regarding resources and research requirements are shared. Regarding the expectations of the supervisors and the institute for the PhD candidate, these should be negotiated between student and supervisor. A statement regarding the mutual expectations could be part of the training and supervision agreement, which is made at the start of the PhD trajectory. This can then be evaluated and adjusted during the annual appraisals.

Future outlook
In the next 6-year period the Copernicus Institute wants to intensify its trans- and interdisciplinary focus and impact, by further developing its governance structure and integrating the Urban Futures Studio into the institute. After a period of strong growth, the institute now wants to consolidate and reduce the workload for its staff members. Furthermore, it wants to improve the focus on inclusive use of data and improve diversity at the level of associate and full professor.

The committee concludes that the Copernicus Institute has drawn up credible plans to respond to new challenges and ensure a strategic and strong role for the foreseeable future. If the institute succeeds in deploying its plans as well as it has succeeded in choosing and executing a strategy in the past few years, the committee is convinced that it can further expand its reach worldwide and make an even greater mark on the global sustainability debate than it already does.

3.7 SENSE research school

The environmental and climate research institutes in the Netherlands cooperate in the SENSE Research School, in which the Copernicus Institute participates together with 12 other institutes spread over 10 research institutions. 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.

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 Copernicus Institute does benefit from SENSE, the committee found, particularly as a school for its PhD's (mainly those in the natural sciences), as a platform for new PhD's to get to know colleagues and as an instrument of benchmarking. Some PhDs need other research or summer schools, however. In general, the Copernicus Institute thinks SENSE has a lot to gain in the social sciences. There have been discussions within the Copernicus Institute whether or not to continue the participation in SENSE.

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. In any case, the committee sees the Copernicus Institute as a main candidate for supporting further developments and coordination in areas such as innovation, governance and critical modelling assessments.

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 Copernicus Institute is one of four departments of Utrecht University's Faculty of Geosciences. Its mission is to have a significant impact on the transition to a sustainable society. Working in a multi- and interdisciplinary manner, the institute aims to develop excellent and relevant knowledge and educate the change agents of the future. Over the last seven years, the Copernicus Institute has grown significantly. It plays a pivotal role in one of the four strategic themes identified by Utrecht University: 'Pathways to Sustainability'. The committee finds the Copernicus Institute's aims and strategy clear and consistent. They align well with Utrecht University's profile, to the advantage of both.

The institute distinguishes between a managerial and an intellectual structure. For managerial purposes, it has four research groups that stimulate internal cohesion. The research is focussed along the lines of three cross-topical themes and five sustainability challenges. These eight topics connect all researchers. This dual structure fits with the institute's interdisciplinary focus. It has secured well-functioning and trustful collaborations throughout the institute, which is worthy of a compliment. Now that the Copernicus Institute has identified eight guiding research topics, the next challenge is to integrate these.

The institute has received ample recognition of its excellent research quality; the list of publications, citations, grants and awards is impressive. The Copernicus operates at the forefront of tackling many of the global sustainability challenges. It serves the wider sustainability research community by initiating new research and providing a platform for young researchers across the world.

The Copernicus Institute also has an impressive track record in creating societal impact. This is manifested in strong and popular educational programmes, well-filled portfolio of contract research, the high-profile use of its computer models, strategy studies, tools, training programmes and serious games and the many high strategic positions in influential bodies taken up by its staff members. Nevertheless, the institute is looking for ways to further improve its impact. The committee offers a few recommendations that could help with this.

The Copernicus is already engaged with the Global South and rightly considers global inclusiveness an important dimension of its work, in research as well as in management and teaching. The committee fully endorses this.

In spite of diversity being high on the institute's agenda, at the level of full professor, gender diversity is still in need of improvement. In the present governance structure, this gender imbalance is automatically imported into the institute's board. This could be repaired, the committee thinks.

In the period under review, the Copernicus Institute adopted the so-called MERIT promotion scheme, which incorporates impact, teamwork and management besides research quality and education. MERIT seems a good instrument to diversify career paths, perhaps reduce the perceived workload and at the same time boost impact by giving outreach activities their just reward.

The committee finds the supervision of PhD students at the Copernicus Institute exemplary in many ways: the extensive supervision arrangements that stimulate interdisciplinarity, the tailor-made training programmes, the many consultation options, the detailed evaluation procedure and the justified efforts to prepare PhD students for a career outside the academic world. Those PhD students the committee met during its virtual site visit made a confident and mature impression and appeared to feel very much at home at the Copernicus Institute.

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. Depending on the ambitions, this could result in maintaining the current, low-profile set-up, discontinuing SENSE or revitalizing the network. According to the committee, there is much to gain both nationally and internationally by joining forces.

5. RECOMMENDATIONS

- Proceed boldly in your approach toward interdisciplinarity. Set out clear steps on how to ensure the integration of the themes and challenges you identified.
- Keep the focus on your own core topics, but work with others to get a broader perspective. Think of mechanisms to engage further with other research fields such as governance, normative research, micropolitics and engineering.
- Keep the active engagement with the Global South, as it is critical for making progress on the 2030 Agenda as well as your own mission. Reflect critically on the traditional top down, modernist view of 'capacity building' in research projects in the Global South.
- Decolonise research practices and approaches as well as your educational programmes.
- Focus more on transformations than on transitions. They call for a structural change and have a normative focus on social and environmental climate justice. Explore the politics of sustainability, the trade-offs around different goals and the tensions in the process toward a more sustainable society.
- Take the initiative in the development of an international virtual dialogue platform and arena for complex discussions on conflicts in sustainability related topics, including both academics and stakeholders.
- In your research strategy, focus more on multiple scales and the tensions between the local, national and global levels. Sustainability has to happen across all these scales.
- Strengthen the biosphere modelling approaches already in-house and consider increasing collaboration opportunities with WIMEK in Wageningen and the Institute for Environmental Sciences IVM at the VU on land-atmosphere interactions. This will help to increase your impact and provide fundamental information for policy making in terms of key uncertainties in the earth system response to management options and policy decisions.
- Further improve the share of articles published open access and expand open-source data sharing and data management. Make use of the policies and support facilities that Utrecht University has put in place.
- Further implement the MERIT system, to diversify career paths, reduce the perceived workload and boost impact by giving outreach activities their just reward. Support those that would like to get on track with outreach activities.
- Involve stakeholders in research design. Strengthen the institutional training and organisation of co-creation.
- Continue to actively pursue gender balance at all academic levels. Find a shortcut to improve gender balance in the board, for example by appointing guest professors, and/or involving early career researchers in decision making processes. Reflect on methods to increase diversity beyond gender and nationality.
- Continue to match the contracts of PhD students that are financed for only three years by financing the fourth and final year to ensure equal opportunities. Do not cave in to financial pressures to hire PhDs under precarious scholarships.
- At the beginning of PhD students' trajectory, communicate more clearly about the requirements and expectations for obtaining a PhD and about resources that they can access.
- 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	Panel instruction & preparation

Monday 19 April

Time slot	Meeting
14.00 - 15.00	Internal panel 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:** organization, 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

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	#	fte	#	fte	#	fte	#	fte	#	fte	#	fte	#	fte
Professor	10	3.0	11	3.2	13	4.2	13	4.4	17	4.5	18	5.2	17	5.4
Associate Professor	9	3.0	9	2.8	8	2.4	7	2.1	10	2.8	12	4.0	17	4.9
Assistant Professor	27	9.5	31	9.4	37	13.1	45	13.1	56	16.1	51	16.6	54	16.5
Postdoc	18	9.2	23	12.8	25	14.3	22	11.5	30	15.7	33	18.7	29	15.8
Junior UD	2		6		8		6		7		6		5	
PhD Candidate	41		42		44		47		55		60		59	
Junior researcher	28		16		14		23		18		19		25	
Junior researcher in PhD trajectory	14		18		14		12		11		6		3	
Total	**149**	**24.8**	**156**	**28.3**	**163**	**34.0**	**175**	**31.1**	**204**	**39.0**	**205**	**44.6**	**209**	**42.6**
Technical support	1		1		1		1		1		1		1	
Visiting	2		4		7		10		9		8		9	

	2014		2015		2016		2017		2018		2019		2020	
Total funding	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Base funding	5,266	55.2%	5,952	48.2%	5,933	45.8%	6,205	56.1%	7,172	42.2%	8,223	55.6%	9,558	56.8%
Public research grants (Dutch)	1,288	13.5%	2,794	22.6%	2,071	16.0%	1,969	17.8%	2,977	17.5%	2,086	14.1%	1,808	10.7%
Contract research and other grants	2,983	31.3%	3,591	29.1%	4,946	38.2%	2,890	26.1%	6,833	40.2%	4,485	30.3%	5,456	32.4%
Total	**9,536**		**12,337**		**12,950**		**11,064**		**16,982**		**14,794**		**16,823**	

Enrolment				Success rates													
Starting year	M	F	Total	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	
2011	10	6	16	6	38%	10	63%	13	81%	16	100%	0	0%	0	0%	0	0%
2012	5	5	10	3	30%	5	50%	6	60%	7	70%	2	20%	0	0%	1	10%
2013	11	4	15	6	40%	8	53%	11	73%	12	80%	2	13%	0	0%	1	7%
2014	10	8	18	4	22%	11	61%	12	67%	12	67%	5	28%	1	6%	0	0%
2015	13	11	24	9	38%	15	63%	16	67%	16	67%	7	29%	0	0%	1	4%
2016	18	13	31	15	48%	22	71%	22	71%	22	71%	9	29%	0	0%	0	0%
>2016	48	43	91	12	13%	12	13%	12	13%	12	13%	76	84%	1	1%	2	2%
Total	**115**	**90**	**205**	**55**	**27%**	**83**	**40%**	**93**	**45%**	**97**	**47%**	**101**	**49%**	**2**	**1%**	**5**	**2%**