ASSESSMENT REPORT Animal Sciences Group Wageningen Research







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Preface

On behalf of the peer review committee, it is my pleasure to present the assessment report for the three research institutes of the Animal Sciences Group: Wageningen Bioveterinary Research, Wageningen Livestock Research, and Wageningen Marine Research.

The committee gratefully acknowledges the preparatory work by staff and management preceding our site visit. A detailed, voluminous, well written selfassessment report was made available to the committee well in advance. During our three-day visit, we experienced much openness and cooperation in the interviews and excursions to the labs. For this, we would like to express our sincere gratitude. It certainly helped to gain a balanced view on the performance and situation of the three institutes.

As a committee we encountered a few days of good fellowship, competent organization and generous hospitality. The committee is impressed with the stamina showed by the institutes during the period under review, which confronted them with the global COVID-19 pandemic as well as a double change in leadership of the Animal Sciences Group. The institutes' effective coping with these challenges is a true sign of their capability and flexibility. These qualities may be put to good use in the upcoming period, where new challenges arise. On the one hand, the institutes need to maintain their financial viability, on the other hand they have to find a new narrative and position in response to the polarization in the public debate concerning the role of animals in food production. This means that the Animal Sciences Group needs to carefully consider what contributions it can make to the necessary transitions, without compromizing its specific strengths.

To the committee, the enthusiasm, can-do spirit and inspiring atmosphere displayed by management and staff are a source of confidence that they have both the courage and the competence to make the right choices and achieve further focus in their scientific research.

We hope that our conclusions and recommendations will be of value to the Animal Sciences Group, and will contribute to the further enhancement of the scientific strength, the economic and societal significance, and the viability of Wageningen Bioveterinary Research, Wageningen Livestock Research, and Wageningen Marine Research in the future.

Heemstede, January 2024 Renée Bergkamp, chair of the assessment committee

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Executive summary

The Animal Sciences Group

The One Wageningen approach presents a compelling vision. However, in practice, collaboration proves challenging. The committee found that Wageningen University and Wageningen Research still operate as separate entities, each with their unique rules, budgets, and cultures.

The focal areas of the Animal Sciences Group cover a very broad scope. The committee deems prioritization essential to maintain scientific excellence, which is vital for the institutes' sustainability.

The Animal Sciences Group may be proud of its impressive facilities. Obviously, huge costs are involved in maintaining them. Given these costs, informed investment decisions are necessary, extending beyond the institute directors' purview. The need for major investment in facilities will require large sums of government funding. This funding needs to be won both at the level of the ministry of Agriculture, Nature and Food Quality, as well as in the national parliament.

The knowledge base budget is an essential element in the research funding of the Animal Sciences Group. The group needs it to prepare for future demands on its expertise. It struck the committee that within the ASG, only 9% of the LNV's total contribution is invested in the knowledge base budget, whereas for other groups this is significantly more.

Financial issues relating to hourly rates and costing of projects were raised several times during the site visit. Some clients noted that work executed by the Wageningen institutes is relatively costly. This issue may become of increasing importance.

The committee is impressed with the quality of work that is done on the statutory task programmes, including Transmissible Animal Diseases, Fisheries Research, Genetic Resources, and Nature and Environment. They deserve to be cherished as critical national monitoring programmes and crucial components in the research portfolio of the Animal Sciences Group.

Recommendations for the Animal Sciences Group

Make a constant and strong effort to implement One Wageningen. Identify and address barriers for seamless integration between fundamental and applied science in practice. Incorporate tools and skills for optimizing internal collaboration into the human resources strategy.

Make sure that the narrative for the Animal Sciences Group and the strategic plans that are currently in the making demarcate welldefined research foci. Communicate them clearly.

- Draw up a long-term facilities investment plan at the level of the Animal Sciences Group. Align it with the chosen research foci and the requirements posed by the statutory tasks that the institutes contribute to. Benchmark with other public research institutes or private companies and explore options for facility sharing. Prepare yourself for the political challenges of acquiring government funding for facilities. Invest in public affairs. Engage with NGO's.
- Review the implications of the reduced knowledge base budget compared to other groups within WUR. Consider whether the knowledge base budget for statutory tasks that has not been spent by the end of the year may be invested in much-needed capacity building to anticipate on future crises.
- Closely monitor your price-quality ratio and the way commercial offers are presented.

Wageningen Bioveterinary Research (WBVR)

The committee is enthusiastic about WBVR's scientific output. During the period under evaluation, there have been several high impact publications. WBVR researchers have every reason to manifest themselves in the international forefront as proud specialists in animal and human health. Nevertheless, the committee sees some unrealized potential. It thinks that the institute could have published more papers, given the volume of scientific work performed and the data acquired. More peer-reviewd and open-access publications will further enhance the overall quality of the research, increase the visibility of the institute and prevent useful scientific output from not becoming available for the international scientific community.

Research integrity is well protected. The only risk is that the selection of the projects taken on is sometimes opportunistic and not always a good match with the expertise present. The scientific area that WBVR operates on has expanded in recent years. It may not be feasible to achieve and/or maintain excellence in all areas covered. The committee sees great possibilities in a combination of research focus and partnerships. WBVR is already well connected, but it could further expand its working relations.

WBVR's work is extremely relevant, given the impact of contagious animal and zoonotic diseases in society, public health and on economy. However, it is the committee's opinion that the institute could contribute more to the debate on (1) the societal challenges related to animal and human health matters, and (2) how protecting animal health insures sustainable livestock farming.

WBVR has a stable market position because of the international obligations for disease control and an increase in outbreak threat. Funding therefore seems to be guaranteed for the future. However, it is problematic that government-funded research (including public-private partnerships) cannot sustain itself in the long term unless all costs are covered. This poses a threat to WBVR's viability. Due to its great variety in tasks, WBVR is a complex organization The research staff perceive a high administrative burden that takes up much of their time. Clients are highly satisfied with the scientific quality of WBVR's work, but do not always find that project leaders are capable of addressing their questions on for example financial or legal aspects of the research.

Recommendations for Wageningen Bioveterinary Research

- Develop a strategy encouraging staff to publish scientific output in peer reviewed and open-access journals (avoiding predatory journals).
- Focus the research themes to maintain excellence in the selected research areas, for instance by setting up a scientific agenda for the next four years.
- Starting from the selected research themes, develop a clear strategy to foster cooperation with Wageningen University, WLR and institutes outside WUR.
- When making the above strategic alliances, consider substantiating them in the form of parttime professorships of WBVR staff at universities.
- As the theme of next generation alternatives to animal models has the objective to decrease animal use, put indicators in place to assess the effect of setting up these new tools over time.
- Specify your internal and external narratives to fit the selected research foci and societal challenges. Develop a communication strategy to actively engage in the debate. Not only report what you are doing, but try set the agenda.
- Actively engage with your staff to embed the future direction and its strategy within the institute.
- Cherish your community and working atmosphere, but at the same time foster a more open culture to stimulate working with others inside and outside WUR and become more attractive for international staff.
- Unburden scientific staff from administrative tasks as much as possible to make them more efficient in the scientific work they are good at and at the same time increase the level of administrative service to your clients. Business developers could help negotiate the contracts.
- Engage with your (major) clients to identify how to make them long term partners.

Wageningen Livestock Research (WLR)

The committee found that WLR's research is of high and solid quality. It is appreciated by both clients and other scientists, and published in the top academic journals in the field of livestock research. However, it seems that some excellent WLR research goes unnoticed because it does not result in scientific publications or other means of communication. Whereas the research facilities for dairy cattle are excellent, the emphasizes that comparable high-standard facilities should also be kept available for research on other animal species, such as pigs, poultry, goats, fish and insects, whether self-owned or through collaboration.

WLR has good impact; its products, processes and services meet customers' wishes. A risk may be that whereas WLR strives for a transition to more sustainable farming systems, some private companies that it commercially depends on may not wish to change the system at all.

Even though over the past five years, WLR's research turnover has increased, the institute is facing major concerns, given the pressure on the role of animals in food production in the Netherlands. The committee sees that the institute has unique competencies to enable the use of livestock for food production in a robust and sustainable way. Many strategic options to use these competencies are feasible, as long as WLR retains focus and supports its strategic choices by good marketing and account management strategies.

WLR has identified five core research themes. They are well-chosen, very relevant to society and necessarily cross-disciplinary. However, it should not be forgotten that society also needs monodisciplinary animal sciences. The prevalence of a thematic approach should not lead to a dilution of expertise in these core areas of animal sciences.

The committee appreciates that at WLR, a large share of the research projects is performed by junior researchers and that WLR has the highest number of PhD candidates of all three institutes within the Animal Sciences Group. Enrolment in a PhD programme has great benefits, both for young academics and for the institute itself.

Recommendations for Wageningen Livestock Research

- Make more use of (scientific) publications to advocate your research and research interests. It will help to increase your impact and attract new clients.
- Develop a strategy to cope with the potential impasse that emerges when private companies you commercially depend upon do not share your ideals for transforming the livestock sector.
- Align the availability of facilities with your research ambitions and the choice of animal species that you aim to work on.
 - Make strategic choices to decrease your dependency on a limited number of parties, building on your unique competencies to help use animals for food production in a robust and sustainable way. Support your strategic choices by good marketing and account management.
 - Clearly identify your contributions to the transition to sustainable food production and build a strategic communication plan on this identification that targets diverse audiences.
 - While executing projects, stick to your core qualities and be proactive and timely in finding complementary expertise.

While working on multidisciplinary themes, do not forget to maintain your core monodisciplinary expertise at the highest academic level.

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Wageningen Marine Research (WMR)

The committee's overall impression is that WMR is an outward-looking institute with a good reputation and an excellent network, which produces peer-reviewed articles on a steady level and which in general creates and takes opportunities for generating high quality research. The content of publications reflects the shifting focus of WMR science from fish stocks and fishing techniques towards transitions in society and the marine environment,. This is a sign that WMR is admirably able to move with the times.

In the period under review, more staff members have become involved in peer-reviewed publications. However, project resources and duration presently restrict opportunities to further increase the pool of actively publishing PhD candidates. The institute is advised to assess whether the targets for peer reviewed publication could perhaps be more ambitious, to further strengthen the institute's national and international position as a significant marine science institute.

WMR is effectively connected to stakeholders through formal and informal channels of communications and public engagement. Its research is often conducted in close cooperation with the private sector, even if it is funded by the government. This provides a direct uptake route valued by clients. The committee congratulates WMR on its achievements in societal and economic impact. With unique and relevant expertise, good focus on what matters to society, excellent networks, pioneering collaborations, a clear stance on research integrity, high impact publications, valued advice and active contributions to public debates, WMR has done an excellent job.

With regard to funding, WMR has been operating strategically the past few years. It still excells in traditional fisheries research, while at the same time thinking ahead and remaining close to and needed by government and private clients on more future-oriented tasks.

Given demographical developments, keeping WMR sufficiently staffed, with personnel with both quantitative and qualitative skills, will be a challenge.

Recommendations for Wageningen Marine Research

Assess whether current targets for peer-reviewed publication are sufficiently ambitious for a nationally and internationally significant marine science institute and, if not, identify and adopt procedures that will accelerate growth in rates of peer reviewed publication, including consideration of time provided for writing and mentorship of early career authors.

Assess, with clients, whether reports are appropriately oriented to the audience and adequately communicated, and also if there are any opportunities to transition to a reporting model that comprises one or more peer reviewed publications alongside a more accessible policy-oriented executive summary and relatively short overview report.

- Further involve clients and other stakeholders in future strategic planning using WMR influence and convening power. Seek for close collaboration with clients and work towards 'Solving problems together'. Safeguard the specific achievements, visibility and functionality of the Yerseke facility since its revitalisation in 2016, especially in relation to the Delta Climate Center process.
- Ensure a constant flow of knowledge and information on fisheries and other science topics from WMR to the Ministry of Agriculture, Nature and Food Quality, to engage and support new personnel at the ministry and to help enable continuous and effective working relationships when personnel change roles.
- Develop pathways to provide opportunities for career progression of some scientists into senior science leadership and management roles with capacity to represent and facilitate broad and crosscutting areas of science and advice.
- Develop a documented continuity policy as a risk management measure, to enable rapid and effective responses, and business continuity, in the event of departures from the management team.
- Actively maintain a modern HR policy, recognizing the expected labour shortages in the coming decades.
- Invest in strategic acquisition, in addition to having individuals to pursue projects. What are the projects and who are the clients/partners for the future? Identify them and approach them.
- Assess where new technologies and cooperation with partners can increase the reliability and cost-effectiveness of data collection and work with partners to implement.

I. Introduction

I.I. Context and aims of the assessment

The executive board of Wageningen University & Research (WUR) asked a committee of peers to perform an assessment of the institutes within the Animal Sciences Group (ASG) of Wageningen Research over the period 2018-2022. ASG comprises three research institutes: Wageningen Bioveterinary Research, Wageningen Livestock Research and Wageningen Marine Research. Each of these institutes was subject of this assessment, as was the Animal Sciences Group as a whole. This assessment is a component evaluation exercise within the so-called TO2 evaluation of all five organizations for applied technological research in the Netherlands. It is formally commissioned by the Dutch ministry of Economic Affairs and Climate Policy. The basis of the assessment is constituted by the Terms of Reference for WR institute assessments (See appendix 7.1). According to these terms, the main goal of the assessment is to assess the institutes' (inter)national position and viability. The assessment thereby aids in the monitoring and improvement of the overall performance of the ASG and its long-term strategy development. In addition to assessing the research, the committee was also asked to offer recommendations to support the institute's strategy for the future.

Specifically, the committee was requested to look into the following assessment criteria

- Quality of the research (including statutory tasks)
- Societal and economic impact of the research
- Viability of the organization
- Performance of statutory tasks

While evaluating these three main criteria, the committee chose to look into certain aspects it considered particularly relevant, such as the publication record, research integrity and good reputation of the institutes (for research quality), stakeholder interaction and knowledge translation (for societal relevance), leadership aspects and infrastructure (for viability), and scientific soundness and timely reporting of results (for the performance of statutory tasks).

1.2. Composition of the assessment committee

The assessment committee consisted of:

- Renée Bergkamp, LLM (chair)
- Reinier v.d. Berg, MSc
- Prof. Simon Jennings
- Prof. Charlotte Lauridsen
- Hester Maij, MBA
- Prof. Arjan Stegeman

- Dr. Muriel Vayssier-Taussat
- Pim Visser, MBA

For brief curricula vitae of the committee members, see appendix 7.3.

The committee was supported by Mariette Huisjes, MA, who acted as secretary.

1.3. The assessment process

The committee first met online on 16 October 2023 to be introduced to each other, the assessment process, and the ASG.

Prior to the site visit, all committee members read the self-assessment report provided by the ASG and formulated first impressions and questions to be asked during the site visit. These were discussed within the committee on the afternoon of 21 November, after which the director of the ASG gave a brief presentation on the group and its challenges for the future. The actual site visit then took place from 22 November to 24 November. The first and last day were spent at the Wageningen campus. On the second day, delegations of committee members made excursions to three lab locations of the group: that of Wageningen Marine Research in IJmuiden, that of Wageningen Bioveterinary Research in Lelystad and the Dairy Campus in Leeuwarden. The committee was extremely satisfied with the lively, honest and open discussions held with all staff at all of the sites visited. For a full programme, see appendix 7.2. At the end of the site visit, the chair presented some first conclusions to the ASG.

This assessment report is based on both the documentation provided by the ASG and the information gathered from the interviews and exursions during the site visit. The committee members each contributed to the writing of the assessment report. The first draft of the report was compiled and edited by the secretary. The committee members then offered feedback, which was processed by the chair and secretary before a new draft was sent to the committee. Together, the committee members decided on scores for each of the institutes for the first three criteria. For an overview of the key criteria and scores, see appendix 4. The secretary sent a draft report to the ASG. The ASG then offered factual corrections and comments. In close consultation with the chair, the secretary used these comments to create the final report.

1.4. Quality of the information

Before and during the site visit, the committee received the following documents:

- terms of Reference for WR institute assessments
- introductory powerpoint presentations by ASG director and WUR rector
- self-assessment report 2018-2022 of the ASG
- strategic agendas of WUR from 2019 to 2025
- WUR at a glance

- multi-annual plans
- previous assessment reports of the research institutes (from 2018 and 2019)
- reactions to the previous assessment reports
- TO2 evaluation report (2021)
- bibliometric analysis 2018-2022
- impact report on online communication for each of the institutes
- customer satisfaction surveys 2019 -2022
- employee surveys
- strategic personnel plans
- brochure on entrepreneurship within WUR
- evaluation of the graduate school Wageningen Institute of Animal Sciences (2021)



2. Mission, structure, resources and strategy

2.1. Mission of the Animal Sciences Group

The mission of the Animal Sciences Group (ASG) is identical to that of Wageningen University & Research (WUR) of which it is a part: to explore the potential of nature to improve the quality of life. The group provides knowledge of the functioning and behaviour of animals at all levels of biological integration. In line with WUR's goals, the ASG collaborates with partners and aims to foster active dissemination of knowledge in society. The topics on which its researchers are active are central to important challenges and discussions, including climate change, biodiversity loss, nitrogen emissions, zoonoses, animal welfare in food systems, sustainable use of natural resources, and animal testing. The ASG is active throughout the entire field of wildlife and production animals, from animal ecology to fisheries and aquaculture, from animal nutrition to animal management and the role of animals in the ecosystem, from animal disease control to food safety.

2.2. Structure of the group and its position within WUR

Wageningen University and Wageningen Research

The ASG is part of Wageningen University & Research (WUR), a globally leading university and research organization active in the fields of agriculture, healthy food and the living environment, based in the Netherlands. WUR is a combination of two legal entities: Wageningen University and Wageningen Research. Wageningen University focuses on academic and fundamental research and the education and training of students and young researchers. Wageningen Research focuses on strategic, application-driven and applied research for government institutions, NGOs, industry and other stakeholders. Wageningen University and Wageningen Research have a joint executive board.

WUR has five science groups, of which the ASG is one. The other science groups are: Agrotechnology & Food Sciences, Environmental Sciences, Plant Sciences and Social Sciences. Every science group has a part that belongs to Wageningen University and a part that belongs to Wageningen Research. The combination of research in both fundamental sciences (at the university) and applied sciences (within Wageningen Research) is considered to be one of WUR's strongest assets. In recent years, the executive board has given a serious boost to the One Wageningen strategy, which is aimed at strengthening internal cooperation.

Internal structure of the Animal Sciences Group

The Animal Sciences Group consists of the Department of Animal Sciences at Wageningen University and three research institutes within Wageningen Research (ASG-WR). This assessment relates only to the Research part of the ASG. Its research institutes are Wageningen Bioveterinary Research (WBVR), Wageningen Livestock Research (WLR), and Wageningen Marine Research (WMR). Each of the institutes has a unique identity, an extensive network of stakeholders and long-term connections with clients. The research infrastructure of the ASG is dispersed over 7 different locations in the Netherlands. This is partly rooted in history, and important to foster regional connections. It also provides challenges with regard to the connections between the different parts of the ASG. In total, approximately 600 fte in staff work at ASG-WR.

The group is headed by a board of directors, which consists of a managing director and a director of operations. The board of directors has end responsibility for research, staff, facilities and finance. On a daily basis, the ASG-WR is led by a management team, consisting of the board of directors and three business unit leaders, one for each of the institutes. The ASG has an advisory board that consists of external parties who can provide solicited and unsolicited advice on strategic issues.

Statutory tasks

Wageningen Research carries out a number of statutory tasks for the Dutch government, in order to support the implementation of national and international laws and regulations. The statutory tasks that the ASG contributes to are: Transmissible Animal Diseases (at WBVR), Fisheries Research (at WMR), Genetic Research (WLR together with Wageningen Plant Research and Wageningen Environmental Research), and Nature and Environment (part of which is executed by WMR). The statutory task programmes within the ASG is assessed separately, commissioned by the ministry of Agriculture, Nature and Food Quality, but the committee was asked to touch briefly on these programmes.

2.3. Funding and strategy

Resources

In 2022, the ASG-WR had a total turnover of 110 million euros. Most of these resources come from research funding, targeted government subsidies and the biliateral market. The ASG institutes' clients include Dutch and international public authorities, private-sector businesses and NGOs. Each of the ASG institutes has its own specific business environment, coupled to its expertise and research areas.

A major client is the ministry for Agriculture, Nature and Food Quality. The research that the ASG-WR conducts for this ministry is financed through various funding streams. The statutory tasks described above are one of these, another one is 'policy supporting research', which directly supports the

development and implementation of policy via project funding on an annual basis. Crucial for the ASG-WR's strategic position is the 'knowledge base budget' provided by the ministry of Agriculture, Nature and Food Quality. This fund is made available to keep the group's knowledge base suitable for future demands. The so-called 'top sector and innovation policy' initiated by the Dutch government in 2012 is another important funding source. The aim of this policy is to stimulate industry involvement in research in terms of steering, agenda setting and initiating new research lines. Funding through the top sectors entails that a significant part of the research in the ASG institutes needs to be carried out in public-private partnerships.

Horizon Europe, the European Union's key funding programme, is another important funding source for each of the ASG's research institutes. Although the research topics within this programme are attractive from a societal and scientific perspective, the financial rules of Horizon Europe are not conducive for participation of the ASG. The eligibility of salary costs is based on an agreed tariff and an overhead of 25%, which is about 30–35% less than what is needed to carry out the work at ASG's institutes. Thus, unless additional matching budgets are sourced, participation in Horizon Europe comes at a loss, and can only be seen as a strategic investment.

Strategic choices

The ASG drew up a strategic plan for the period 2020 - 2023. It focusses on next-generation methodologies, working towards a more unified culture between the three research institutes within the ASG, and increasing collaboration within WUR, following the One Wageningen approach.

As part of this strategy, the ASG has started an innovation programme, called Next Level Animal Sciences. In this programme, researchers from the ASG work together with external partners to develop new research methods and technologies that will be pivotal for accelerating knowledge development and innovation in the domain of animal sciences in the coming decade. The programme is centered around three themes: sensor technology, complex cell systems (or organoids) and 'data and models'.

Another strategic aim in the past few years has been to create an open, professional and responsible culture based on trust, and setting clear expectations. The ASG recognizes that each of its institutes has its own identity, history and culture, but encourages cooperation between researchers of different institutes by taking down administrative barriers.

To foster the One Wageningen approach, the ASG has in several instances taken the lead in collaborating across the board on urgent societal challenges that appeal to its expertise. A prime example is the WUR-wide framework in which researchers from various disciplines collaborate to help build the scientific foundation for preventing future pandemics or to mitigating their impact: ERRAZE@WUR.

The ASG is aware of the fact that the position of animals in society is rapidly changing. This seems to be the result of three converging societal trends:

climate concerns, the nitrogen problem and the increased attention for animal welfare. As a consequence, meat consumption is expected to decline in the Global North. At the same time, in the Global South the demand for animal proteins is on the rise, caused mainly by increased prosperity and demographic growth. Against this backdrop, the ASG is currently working on a new narrative, one that showcases the entire breadth of its research field, with a focus on three themes: (i) animal welfare in sustainable livestock farming, (ii) human and animal health in mutual interactions, and (iii) biodiversity and ecosystems. Such a narrative will be part of the ASG's new strategic plan, to be developed in the immediate future.

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3. Findings and recommendations Animal Sciences Group

Although the assessment committee's assignment was to assess Wageningen Bioveterinary Research, Wageningen Livestock Research and Wageningen Marine Research, the committee found that there are some findings and recommendations applicable to the ASG as a whole. These are provided in this chapter.

3.1. One Wageningen

The fusion of fundamental science with applied research - alongside the presence of diverse disciplines within a single organization - serves as a unique selling point for WUR. The concept of One Wageningen embodies this idea. It presents a compelling vision, and WUR's strategic plan, *Finding answers* together, sets an admirable goal. However, in practice, collaboration proves challenging. The committee found that Wageningen University and Wageningen Research still operate as separate entities, each with their unique rules, budgets, and cultures. This is an obstacle to the full realization of the potential synergy between university and research. Numerous administrative and financial barriers hinder collaboration. The management's ambitions are clearly there and they have led to some successful and promising examples of cooperation, such as the appointment of co-supervised PhD candidates, the Next Level Animal Science innovation programme, and secondments of professors. The traineeship programme 'Integraal Gebiedsgerichte Aanpak', that allows young researchers to work at several Wageningen Research institutes over a period of two years, is another good example that enforces the One Wageningen concept. However, the committee found that - in general - if staff members from the university and from one of the research institutes wish to set up a shared project, they need to know their way around both organizations very well, be inventive, and have a large reserve of perseverance. This is a tall order, particularly for younger employees. The scattered locations of WUR across the country further complicate collaboration.

The committee is aware of the tenacity of historically grown structures and cultures. It concludes that in order for One Wageningen to become successful, a constant and strong effort will be necessary. The committee recommends the ASG management to identify and address barriers for seamless integration between fundamental and applied science in practice, and to incorporate tools and skills for optimizing internal collaboration into the human resources strategy. It is worth the effort to try and understand employee needs for better collaboration within WUR's complex structure, as it is inefficient to expect each employee to navigate this independently. Sharing success stories can be beneficial. Sometimes small changes can make a significant difference, such as favouring full-day workshops over brief lunch meetings for off-site employees.

Although challenging, it seems absolutely worthwhile to maximize WUR's unique selling point and make it work within the ASG.

3.2. A new narrative and strategic plans

The ASG management is crafting a new narrative, to guide the strategic plans for each of the institutes. This narrative aims to prepare the ASG and its institutes for future roles amidst rapid societal changes. The evolving societal view on animal usage in food production, animal testing, climate change, and animal welfare, particularly in the Global North, contrasts with increasing animal protein demands elsewhere. These debates and contradictions impact the positioning of the ASG institutes and their researchers. The committee appreciates that there is a high awareness within the ASG for the need of one or more coherent, future-oriented narrative(s). They are necessary for both internal and external, national, and international use. Ideally, the new narratives should offer focal points for further specialization and decisionmaking. The so-called focal areas mentioned in the narrative for the multiannual plan 2024 -2027 of the Animal Sciences Group are: animal welfare in sustainable livestock farming, human and animal health in mutual interactions, and biodiversity and ecosystems. These topics still cover a very broad scope. The committee fears that research questions and -areas are more likely to be added than to be dropped. However, it deems prioritization essential to maintain scientific excellence, which is vital for the institutes' sustainability. Standing out in a wide range of topics is simply impossible. If the area covered by ASG research is too broad, there is a serious risk that the expertise will be diluted, less distinctive and less recognizable. Therefore, distinct and possibly painful strategic choices must be made. The ASG can then collaborate with other institutes to gain complementary expertise, and retain its position at the international forefront for which it is so highly appreciated by public and private partners.

The committee concludes that the narrative for the ASG and the strategic plans that are currently in the making for each of the research institutes should demarcate well-defined research foci. This is a necessary step to enable coherent decision-making. The committee further recommends involving a wide range of societal stakeholders in the development of the narrative and strategic plans, in order to make them well-informed, broad-based, and feasible. Once the research foci for the ASG are defined, they should be clearly communicated. The committee understands that project leaders currently have great freedom in the selection of research topics. Stimulating them to align these with the shared research foci can promote true excellence in these areas.

3.3. Facilities and a public affairs portfolio

The ASG institutes may be proud of their impressive facilities, as the committee members observed during their visits to Lelystad, Leeuwarden, and IJmuiden. Some of these, such as the High Containment Unit at WBVR, the gene bank at WLR and the research vessels operated by WMR (hired from Rijkswaterstaat), are indispensable for supporting the Dutch government in living up to its responsibilities, such as risk management, crisis preparedness, and conservation of biodiversity. Obviously, huge costs are involved in some of the facilities. Given these costs, informed investment decisions are necessary, extending beyond the institute directors' purview. Therefore, alongside the challenge of finding research focus, there is the need for judicious investment choices in facilities. A long-term facilities investment plan at the level of the ASG is called for. Such a plan should be aligned with the chosen research foci and the requirements posed by the statutory tasks that the institutes contribute to. To work as efficiently as possible, the committee recommends benchmarking with other public research institutes or private companies and exploring additional options for facility sharing.

The need for major investment in facilities will require large sums of government funding. This funding needs to be won both at the level of the ministry of Agriculture, Nature and Food Quality, as well as in the national parliament. Societal changes will bring increased engagement of NGO's in the field of animal welfare, nature conservation, environmental protection and the energy transition. The ASG must align itself to work with these stakeholders. The committee recommends investing in public affairs in order to create support for investments in the facilities, starting with the development of a public affairs policy. The public affairs portfolio must be dealt with at management level, including dedicated support from an experienced in house public affairs officer.

3.4. Knowledge base budget

The committee draws attention to the knowledge base budget, which is an essential element in the ASG's research funding. The ministry of Agriculture, Nature and Food Quality makes 20 % of its total contribution to Wageningen Research available to keep the knowledge base up to scratch for future demands in the medium term (3 to 5 years). The ASG needs the knowledge base budget to prepare for its future tasks. The ASG can play a substantial part in helping society face significant challenges in areas such as animal health, human health, animal welfare, biodiversity, nature conservation, climate change, and the energy transition, among others. It is therefore to be expected that there will be a great demand for ASG research in the future. The knowledge base budget's advantage is that it constitutes relatively 'free' money, facilitating investment in the institutes' toolbox. However, it is noteworthy that within the ASG only 9% (instead of the 20% that is average within Wageningen Research) of LNV's total contribution is invested in the knowledge base budget, whereas for other groups this is significantly more. The committee finds this somewhat worrisome, given the need for the ASGinstitutes to invest in future capability. It suggests that all parties concerned review the implications of the reduced allocation.

There is a separate knowledge base budget for the statutory tasks, to maintain and develop key expertise in the research areas that serve the statutory tasks. Within the ASG, the number of proposals for spending this budget annually exceeds the available funds. This leads to the question: are there ways for the ministry or the ASG to elevate the knowledge base budget for statutory tasks? The committee heard that the budgets for the statutory task knowledge base has to be spent by the end of the year, whereas there is a contingency in which planned projects are actually executed, depending on other work that gets priority because of its urgent nature. A recommendation is to make sure that the money not spent by the end of the year may be invested in much-needed capacity building for future crises.

3.5. Hourly rates

Financial issues relating to hourly rates and costing of projects were raised several times during the site visit. Some clients noted that work executed by the Wageningen institutes is relatively costly, certainly in comparison with some other European countries. While it is impossible for Dutch research institutes to compete financially with lower-wage countries, the institutes should closely monitor their price-quality ratio. This issue may become of increasing importance, as the requirements of clients to be offered competitive rates will not diminish. In this respect, benchmarking with external parties regarding the methodology of pricing may be helpful. The committee recommends an investigation of possible alternatives to the way project costings are calculated and careful consideration of the presentation of commercial offers. It is vital that clients comprehend and accept the level of pricing and that they appreciate the value they receive for their money.

3.6. Statutory Tasks

The committee is impressed with the quality of work that is done on the statutory task programmes, including Transmissible Animal Diseases, Fisheries Research, and Genetic Resources. The ministry of Agriculture, Nature and Food Quality is ASG's main client for the statutory tasks. During the site visit, representatives of the committee spoke with staff members of this ministry, and heard of their high satisfaction with the implementation of the statutory tasks by the ASG.

The committee strongly recommends the ASG taking pride in and cherishing its statutory task programmes as critical national monitoring programmes and crucial components in its research portfolio. They bring a win-win situation to the ASG. The statutory tasks generate an enormous amount of data, arguably the country's most important data streams. They are not only valuable to the Dutch government, but also for decision-making processes on the EU-level and for acquiring research projects with other parties. The possession of these data positions all three institutes as attractive partners for scientific collaboration, both nationally and internationally. The fact that the ministry's rate for statutory tasks does not cover all costs might be a topic for future discussions regarding investment in facilities and/or the knowledge base budget. The risk for the ministry if it declines to give the ASG sufficient funds to invest in innovations is that it is penny-wise and pound-foolish. After all, without up-to-date facilities, the ASG will not be able to effectively carry out the statutory task programmes in the future. The committee recommends the ASG accommodating this fact in its new narrative.

Last but not least, the committee commends the Animal Sciences Group, particularly Wageningen Bioveterinary Research, for its contribution to human sample diagnosis during the Covid-19 pandemic. The investment of proceeds from this work into the ERRAZE@WWW programme demonstrates how a serious crisis can sometimes yield beneficial outcomes.

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4. Findings and Recommendations

Wageningen Bioveterinary Research

4.1. Introduction

Wageningen Bioveterinary Research (WBVR) is a leading research institute in the field of animal health and veterinary public health. Its mission is to contribute to welfare and prosperity by improving animal and human health. To this aim, WBVR studies, prevents and combats infectious diseases with top level veterinary and biomedical research. Its unique selling points are its interdisciplinary approach to research and its focus on innovative solutions for complex problems. WBVR's researchers are experts on pathogens, host responses, bioinformatics, pathology, epidemiology and diagnostics. WBVR is located in Lelystad and has a total of approximately 260 staff members (245 fte).

The Dutch government is WBVR's main funder, either directly through funds for policy support, knowledge base or statutory tasks, or indirectly through research grants acquired in competition with other institutes. WBVR also performs contract research for the pharmaceutical industry, biotech companies, the feed industry and other agricultural enterprises.

Next to being a research organization, WBVR is the national reference laboratory for notifiable diseases in animals, including livestock, fish, shellfish and wild animals. WBVR's expertise relates to - among others - avian influenza, BSE -'mad cow disease', foot-and-mouth disease, African swine fever, and bluetongue disease. In an outbreak situation or other veterinary crisis, WBVR performs the diagnostics and assesses the risks; it is an important consultant for the Dutch government. This work is organized via a crisis organization that responds 24 hours a day, seven days a week as part of WBVR's statutory tasks for the Dutch government.

4.2. Research Quality

Quality and quantity interrelated

In the period under review (2018 -2022), WBVR published 537 articles. These papers describe research on (veterinary) virology, bacteriology and epidemiology. In this period, five PhD candidates acquired their degree.

The committee is enthusiastic about WBVR's scientific output. The research benefits from collaboration with others, who may be less distracted by complementary tasks such as managing veterinary crises. WBVR is esteemed by academic peers. During the period under evaluation, there have been several high impact publications, e.g. on COVID-19 research, antibiotic resistance, avian influenza and bovine pneumonia (bRSV). The staff is highly committed and inclined to prioritize the scientific quality of their work. Private partners are very satisfied with this quality. The committee found that for them, WBVR's high level of expertise is a key factor in selecting the institute for their projects. All in all, WBVR researchers have every reason to manifest themselves in the international forefront as proud specialists in animal and human health.

Whereas the quality of WVR's scientific work is undoubtedly high, the committee thinks that there could have been more papers describing important results, given the volume of scientific work performed and the data acquired. It sees some unrealized potential, partly due to the types of work done at WBVR, such as diagnostics and projects for which clients require reports in Dutch. Little time is budgeted for writing peer reviewed publications. Another factor is the call upon staff during crisis situations, which can be a huge distraction (but also a great opportunity to get original results worth publishing). In addition, part of the work (particularly for pharmaceutical companies) is purposefully not destined for open publications. These factors combined, it is evident that a researcher's personal ambition and dedication determine whether their work will be published in peer-reviewed literature or not. The committee thinks it would be worthwhile to strive for more scientific publications. It is a matter of research quantity, but ultimately also research quality to ensure that useful scientific output becomes available for the international scientific community as much as possible. Therefore, the committee recommends WBVR encouraging and facilitating staff to publish more scientific output in peer-reviewed open-access journals, avoiding predatory journal and predatory publishers. This will further enhance the overall quality of the research and bring it to the highest level. It will also increase the visibility of the institute and correspond with the ideals of open science. The latter is even more important for in vivo animal experiments, as publishing results may prevent unnecessary repetition of experiments elsewhere.

Research integrity

The committee found that WBVR has good procedures in place to ensure the independence of its work. There is not a shred of doubt about the research integrity. The institute is highly reputable among stakeholders, who have no doubt that the produced results are solid. The only risk to research integrity that the committee sees is that the selection of the projects taken on is sometimes opportunistic and not always a good match with the expertise present. This opportunistic behaviour originates from pressure felt by the staff to have sufficient projects in the portfolio.

Focus and partnerships

The scientific area that WBVR operates on has expanded in recent years: coming from a focus on contagious animal diseases, it now also includes zoonotic infectious disease, preventive animal health and next generation animal models. Although the committee finds WBVR's ambition laudable, these areas are very large and the annual increases of the institute's budget does not guarantee that excellence can be achieved and/or maintained in all areas covered. This is even more so because the number of pathogens to be researched in the field of contagious animal diseases is expanding. The committee recommends bringing more focus to the research themes, in order to maintain excellence in the selected areas. This can for instance be done by setting up a four-year scientific agenda.

Once core research themes have been selected, the committee advises to use them as starting points to foster strategic cooperation with Wageningen University, WLR and institutes outside WUR. It sees great opportunities in such collaborations. The preventive animal health theme seems logical to liaise with WLR and Wageningen University. Research focusing on contagious animal disease might benefit more from a strategic partnership with Utrecht University. It could be a good showcase in the Eindhoven -Wageningen -Utrecht alliance. The human pathogen theme would benefit from cooperation with the National Institute for Public Health and Environment (RIVM) and the Erasmus Medical Centre. Such cooperations will make it easier for WBVR to stick to their core expertise while at the same time answering broader scientific and societal questions. In addition, scientific publications from cooperations on average have a higher citation impact, as was for instance the case with the SARS-CoV-2 work with animals. Cooperations will therefore enhance WBVR's scientific profile and make it a more attractive partner in contract research. Finding focus will of course mean that WBVR has to limit itself in project acquisition. However, in good partnerships this will be compensated by acquiring more projects in its core themes.

When making strategic alliances, the committee advises WBVR to consider substantiating them by arranging parttime professorships of WBVR staff at universities. This will not only consolidate the partnerships, but also further the careers of staff and increase their visibility as well as that of WBVR. Creating co-supervised PhD and postdoc positions is another way to strengthen partnerships. It will also enhance funding possibilities, e.g., through the acquisition of research grants. Although supervising PhDs and postdocs might not be financially the most lucrative option for WBVR, such junior researchers could do more fundamental work that will eventually end up in WBVR's applied pipeline and make the institute more competitive in the future. Cooperation between the ASG and other knowledge institutes in the field was also mentioned as a clear wish of the governmental stakeholder the committee interviewed. Such bridges will provide more continuity to research lines, more balance between long- and short-term projects and good focal points of actual (work place) cooperation.

Opportunities to create synergy

While the committee suggests developing strategic partnerships, it also found that WBVR is already well-connected with similar diagnostic and research labs across Europe. However, good working relations within WUR and with other institutes in the Netherlands are mostly based on personal networks and would benefit form a more strategic vision, in the committee's view. Also, cooperation within WUR and with other complementary institutes is not sufficiently incentivized by the current system, neither is the pressure on project acquisition helpful. After all, if one does a project by oneself (even though there is no perfect match with one's expertise) the profits do not have to be shared.

The wish of the management of WBVR to connect the team working on preventive animal health to WLR and Wageningen University and also the ambition to develop the next generation of complex animal models as an alternative to animal testing should be translated into practice with a clear strategy to strengthen links within WUR. The committee found that - apart from the epidemiologists – the team working on contagious diseases is as yet not well connected with Wageningen University. The reason is that complementary groups working on the more fundamental parts of these diseases are lacking; the relevant chair groups focus more on animal health, not on animal disease. The committee sees these cases as missed opportunities to create synergy. It is convinced that WBVR will benefit from strong complementary cooperation partners.

Research facilities

The committee found that WBVR has outstanding research facilities and the committee appreciates that it invested substantially in new technologies such as next generation (and alternative) animal models and next generation sequencing. These facilities are a great asset for WBVR. The facilities for *in vivo* studies are also an important asset, but the High Containment Unit will be at the end of its lifetime in 2034. This seems still far off, but given the huge investment needed the moment is nevertheless approaching rapidly. The High Containment Unit is crucial for supporting the Dutch government in notifiable disease monitoring, crisis preparedness and response. As stated in section 3.3, a timely and effective public affairs strategy at the level of WUR is called for to bring this into the spotlight of relevant parties.

The team working on next generation or alternative animal models has the objective to refine, replace and reduce animal use in scientific experiments. The committee finds this an important and laudable ambition. It could be made more visible and measurable if indicators are put in place to assess the effect over time of setting up these new tools for the animal facilities.

The committee observes that the distance between Lelystad and Wageningen is a barrier to use shared facilities. This may result in suboptimal efficiency of equipment and facilities, and drive up the costs of research. It deserves consideration whether something could be done to prevent such detrimental effects.

4.3. Societal and economic impact

WBVR's work is extremely relevant, given the impact of contagious animal and zoonotic diseases on society, public health, and economy and its importance for preserving sustainable livestock farming. The recent work on COVID (SARS-CoV2), and avian influenza and the current work on bluetongue (BTV3) are only three examples of many showing that the research of WBVR clearly addresses societal needs. The committee found that WBVR is actively involved in communication on animal and human health crises, and that this makes the institute highly visible, both in the classical media such as newspapers, radio and on television and in online social networks. Communication is mostly focused on showing what WBVR has achieved and what it contributes to solving a problem. This is an effective strategy to enhance WBVR's visibility. However, it is the committee's opinion that the institute could contribute more to the debate. Focus points could be the societal challenges related to animal and human health matters and the importance of taking into account animal health as a lever for sustainable livestock farming, decreasing environmental impact, preserving animal wellbeing, and safeguarding economic value. It seems that WBVR is still hesitant when it comes to setting the agenda in the debate on future disease challenges and their solutions, or animal experiments, whereas it would benefit society to have informed debates on such issues. WBVR is in an excellent position to take the lead here. The committee recommends WBVR being more proactive and developing a communication strategy to actively engage in public debates that would benefit from its expertise. It could be beneficial, for instance, to appoint figure heads for each of WBVR's core areas of expertise and train them well.

The institute is very well-connected to government institutions and pharmaceutical companies. Its knowledge is clearly used for the overall benefit for society. The number of publications for Dutch stakeholders such as farmers and veterinarians could be increased for maximum impact. The committee advises to develop targeted narratives for such groups on selected research foci and societal challenges and translate them into impactful communication messages.

4.4. Viability of the institute

Funding

WBVR is lucky to receive a constant stream of money from the government, due to the huge economic and societal impact of contagious diseases. This support is unlikely to disappear because of to the international obligations for disease control and an increase in outbreak threat. Funding therefore seems to be guaranteed for the future. The downside here is that the tariffs paid by the ministry do not cover all the costs. Also, the amount of knowledge base funds - important to foster innovation - is limited compared to other parts of WUR. In sections 3.4 and 3.5, the committee voiced some recommendations on these issues, that apply to all of the institutes.

Market position

Some clients perceive WBVR as expensive, the committee heard. The ministry of Agriculture, Nature and Food Quality is such a large client that it is in a position to pay a fixed rate, insufficient to cover all costs. Other clients are willing to pay the high fee because of the good quality and responsiveness of WBVR. It is a problem that government-funded research (including publicprivate partnerships) cannot sustain itself in the long term unless all costs are covered. This poses a threat to WBVR's viability. For contract research,

WBVR is operating in an international market and costs should not deviate too much from comparable partners. For animal experiments, this will become even more relevant in the future. A complete replacement of *in vivo* experiments by next generation animal models is not to be expected; some research questions can only be solved by using live animals. However, a reduction of animal experiments and more legislation on how they should be executed will likely increase the costs of experiments that still need to be done. The committee therefore recommends WBVR developing a long-term plan for the need of and demand on the animal facilities, in the light of replacement of in vivo animal experiments by new models and taking into account the international competition. In addition, WBVR is advised to engage actively with its major clients and to identify how the relationships with them can be made into long term partnerships, where both parties work together to develop new solutions.

Human resources management

The committee observed that WBVR realizes that its workforce is its most important asset, and that it has good human resources planning in place. The space that is generated by the natural outflow of tenured research staff and technicians is used to hire new expertise, in line with the multi-year plan and societal demands. A lot of young staff have come in recently and there are sufficient possibilities for career development. WBVR is aware of the importance of career and succession planning, even though not all factors are in its span of control. Due to the high level of specialization and market demands, a planned successor has plenty of opportunities to move to another organization. This is something WBVR has to take into account. It struck the committee that diversity in national versus international background of staff is limited: 95% has a Dutch background. This makes the onboarding of international employees and PhD candidates a challenge.

The research staff perceive a high administrative burden that takes up a lot of their time, which they cannot spend on research. Clients, on the other hand, are highly satisfied with the scientific quality of WBVR's work, but do not always find that project leaders are capable of addressing their questions on for example financial or legal aspects of the research. The institute has not yet been able to act as an entrepreneurial contract research organization in this regard. Therefore, the committee recommends unburdening research staff from administrative tasks as much as possible to make them more efficient in their core task, which is research. While doing this, WBVR can at the same time increase the level of administrative service to its clients. One solution would be to involve business developers at an early stage, and work with acquisition support teams who could also help to negotiate the contracts.

WBVR is an extremely complex organization, due to the combination of 1) diagnostics and research, 2) within research: statutory tasks with a separate reporting line, 'regular' research, and confidential research such as vaccine testing for the industry, 3) research groups focused on platforms such as bioinformatics or animal models and groups focused on pathogens, and 4) staff working on the research themes. Amidst this complexity, a shared vision on the future of the institute is essential. The committee found that the future

direction of the institute was not clear to all of the staff, neither did they have a clear perception of the research foci. The committee already advised to make active choices in this respect (see section 4.2) and communicate them clearly. This is necessary to embed the future direction - and the strategy to get there in the institute.

Organizational culture

The committee encountered a great sense of community among the staff and it found that researchers have a feeling of freedom in their work, which has a positive impact on their day-to-day satisfaction. The committee was impressed by the atmosphere in the lab. Young staff seem highly motivated, not defensive at all and they clearly reflect on the role of animals in society. The isolated location in Lelystad and the limited cooperation with partners - either from within WUR or external partners - has fostered a culture of self-reliance. Such a culture may become a problem in the future, if WBVR's portfolio expands, the costs of cutting-edge equipment increase and at the same time there is a trend of a reducing the livestock sector. The recommendation voiced in section 4.2 to foster more partnerships entails that WBVR is advised to cherish its sense of community and good atmosphere, but at the same time foster a more open culture. This will stimulate working with others inside and outside WUR and make WBVR more attractive for international staff.

4.5. Statutory tasks

The committee has a very favourable impression of how WBVR executes its statutory tasks. The institute has an outstanding reputation for it, and rightly so. WBVR has a long-lasting experience in the control and eradication of animal diseases, and a high impact on decision makers within the Dutch government. It is both proactive in its research and anticipation of new viruses, and reactive in its capability and preparedness to scale up to a crisis organization when needed. Tasks related to transmissible diseases are notably time-sensitive, as every hour is crucial when dealing with contagious diseases and zoonoses. The statutory task unit at WBVR coordinates diagnostics around the clock and can immediately escalate to a crisis organization when necessary. This is an exceptional and vital service. In addition, the way WBVR assisted in the COVID 19 pandemic and the investment of the revenues in the ERRAZE@WUR programme deserve great credit!

Scores for Wageningen Bioveterinary Research

Research quality	3 - 4
$rcsin \sqrt{5} = \frac{\pi}{2} 2x - \frac{\pi}{4} = (-1) \frac{3\pi}{2} + \pi n; 7$	$\lambda = 0; X = \pi n; Cos X$
Societal and economic impact	$3_{1-\frac{1}{2}} + \pi n_{1} + \frac{1}{2} = \frac{1}{2}$
Viability $(1+k^2) - 4k^2 \lim_{n \to \infty} \left(\left(2^n \right) \cdot \left(x^n \right) \right) $	$\frac{3}{(2\pi - 1)} ct_{0} x = 0; x = 1$

5. Findings and Recommendations Wageningen Livestock Research

5.1. Introduction

The mission of Wageningen Livestock Research (WLR) is to explore the potential of nature, to improve the quality of life through environmental, economic & social innovation in the field of livestock, aquaculture and agrifood. Its ambition is to offer science-based solutions for a sustainable livestock and aquaculture sector, solutions that safeguard animal welfare, protect the environment and promote animal and human health.

WLR is active in four main research areas: animal breeding & genomics, animal health & welfare, livestock& environment and animal nutrition. Each of these research areas has its own department. Within the departments, expertise teams are shaped around a core research area. WLR applies its wealth of knowledge and expertise to find innovative, market-oriented solutions to complex problems within an empowered and diverse society regarding food production. It works closely together with academic colleagues from Wageningen University and with other national and international partners.

WLR's home base is Wageningen, where it owns three labs: an air quality lab, a service lab for chemical analysis, and an omics and cell culture lab for the characterization of biological molecules. In addition to these labs, WLR has two experimental farms at its disposal. The largest of these is the Dairy Campus in Leeuwarden, an internationally unique facility with around 500 dairy cows, six cowsheds, training and meeting facilities and 300 hectares of land. At agro-innovation centre De Marke, with 85 dairy cows, research is done at farm system level. WLR has around 245 employees (215 fte).

WLR serves clients across the world and cherishes consortium building as a central method. The most important client remains the Dutch ministry of Agriculture, Nature and Food Quality. This ministry generates 30% of WLR's total income, through statutory task budgets, policy support research and knowledge base funding. Indirect funding also comes from the ministry via public-private partnerships funded through the Top Sector Agrifood, one of the key industries that the Dutch government concentrates its research investments. Other important clients are the organization of the Dutch Sustainable Dairy Chain (Duurzame Zuivelketen), a collaboration of the three northern provinces of the Netherlands, and some large private cooperations in the agricultural sector.

5.2. Research quality

The assessment committee found that WLR's research is of high and solid quality. This finding is based on personal research and experience of the committee members and on feedback the committee obtained from clients, partners, and collaborators. They hold WLR's research in high regard. Equally, WLR's research appears to be much appreciated by other scientists. The committee found that the articles published by WLR are in the top academic journals in the field of livestock research, such as *Animal, Journal of Dairy Research, Journal of Animal Science*, and *Poultry Science*. Following the recommendations of the previous assessment committee, WLR embedded the volume of scientific output as a parameter in its annual plans, and made it part of its monitoring and control cycle. In the period under review, WLR has met the key performance indicators for refereed articles and PhD-theses. Both these aspects are commendable.

WLR's research is mostly impact-driven; it is rooted in clearly defined ideals for transforming the livestock sector. A risk may be that whereas WLR strives for a transition to more sustainable farming systems, some private companies that WLR commercially depends on may not wish to change the system at all, from which they make their profits. WLR needs to develop a strategy to cope with this potential impasse. The ministry of Agriculture, Nature and Food Quality may be of assistance in developing such a strategy, since it shares the same ideals and challenges in the political arena. Above all, WLR's priority should be to maintain the high quality of its research in the 'perfect storm' it now finds itself in because of discussion on the role of animals in food production, animal welfare and animal testing. The committee advises that WLR's researchers focus on their strengths, and supplement them with competencies from others, such as colleagues from Wageningen University. One example is modelling. This is a highly specialized field. Therefore, modelling tasks should best be outsourced to the experts within WUR at an early stage, without WLR researchers losing time over them. In other words, the WLR researchers are advised to stick to their core qualities while executing research projects, to be proactive in finding complementary expertise where needed and involve such experts at an early stage of their projects.

Facilities

While visiting the innovative Dairy Campus, the committee was impressed by the facilities. It is obvious that they provide high-quality research and enable pioneer entrepreneurship. The planned expansion of the Dairy Campus will be a great asset for future dairy research. Whereas the research facilities for dairy cattle are excellent, the committee observed that WLR lacks comparable highstandard facilities for research on other animal species, such as pigs, poultry, goats, fish and insects. Facilities for pigs and poultry have been closed in recent years, the committee heard. This does not have to be a problem, but the availability of facilities has to align with WLR's research ambitions. So, if for instance WLR aims to study the use of insects for animal feed – a flagship element of future-proof agriculture – it needs to make sure it has access to good insect facilities. They could for instance be provided by entomologists at WU. For other types of research on monogastric animals, WLR could collaborate with feed industries and farmers' associations, who may be able to provide the required barns or laboratories.

5.3. Societal and economic impact

The committee assesses the overall impact of WLR as good. WLR's customer satisfaction survey shows that products, processes and services meet customers' wishes. The committee itself heard that stakeholders are very satisfied with their collaboration with WLR. The committee interprets this as a sign that WLR's research overall benefits society. The institute works on topical issues - such as animal welfare, sustainability, and biodiversity - that are currently of great relevance. It seems that some excellent WLR research goes unnoticed because it does not result in scientific publications or other means of communication. The committee recommends WLR making more use of scientific publications to advocate its research and its research interests. This may not only increase impact but also attract clients.

While the committee found that WLR researchers engage well with their stakeholders, stakeholders could perhaps be more involved in shaping WLR's narrative and strategy for the future. This will anchor the narrative and strategy and make them more feasible. Furthermore, WLR may profit from serving distinct audiences with distinct narratives. After all, national and global audiences have different priorities.

Some urgent research topics on which the national government demands more policy advice – such as nitrogen emissions, CO₂ reduction and water management – may draw WLR into political discussions. To anticipate this, the new narrative may help to proactively initiate debates, which may in turn help avoid being forced into a defensive position. The committee advises to clearly identify WLR's contributions to the transition to sustainable food production – why solutions will be developed based on its expertise – and build a strategic communication plan on this that targets a scientific audience, national and global stakeholders and public society.

5.4. Viability of the institute

Funding and strategy

Over the past five years, WLR's research turnover has risen from about 32 to around 40 million euros. Nevertheless, the committee understands that – given the pressure on livestock production in the Netherlands – WLR is facing major concerns about how to maintain societal and scientific relevance and keep up the exploitation of its facilities. It is also a concern that whereas the funding from public sources has been increasing over the past five years, funding from private partners has been gradually decreasing. Based on European and global challenges, it is to be expected that there will remain a demand for livestock research, but WLR wants to avoid being too dependent on a few parties. The committee substantiates this.

The institute collaborates with over 100 countries. One strategic option would be to choose other accents, veering away from the Dutch societal and political challenges that are currently dominant in the research themes. This would enable WLR to connect with other parts of the world, with different challenges. For instance, genetics may not be so relevant in the current Dutch situation, but elsewhere they are. Not only genetics in dairy farming as a way to produces more milk, but also as a way to produce robust livestock, able to withstand tough conditions caused by a changing climate. One strategic option may be to replace a potentially shrinking national demand for livestock research by expanding the international portfolio in regions where demand for protein-based food is increasing. For this, it would be advisable to engage international parties from such regions in WLR's strategizing. Equally, a business case can be built on the assumption that the transition to sustainable agriculture that the Netherlands is currently facing will eventually also arise in other parts of the world. In this business case, WLR needs to focus on what it is good at and stay ahead of developments. In order to do so, WLR should keep a sharp eye on other European countries that experiment with novel ways of sustainable regenerative food production. If other countries go faster than the Netherlands by making other choices, WLR should focus on the best practices in these countries rather than on the Netherlands. In this business case, WLR does not need to choose between the national and the global perspective, but can do both at the same time. Another strategic option is to in some cases to push forward the boundaries of conventional technologies towards more sustainability instead of replacing them altogether. The institute has unique competencies to enable the use of livestock (especially cattle) for food production in a robust and sustainable way. Many strategic options are feasible, according to the committee, as long as WLR retains focus and supports its strategic choices by good marketing and account management strategies.

Research focus

In recent years, WLR has moved away from animal studies towards more thematic research. In its most recent multi-annual plan (2017 - 2023), WLR identified five core themes: circular agrifood systems, climate smart agriculture, resilience in the face of disturbances such as climate change, improvement of animal wellbeing, humans & nature (OneHealth), big data, and precision farming & robotics. These themes are very relevant to society and necessarily cross-disciplinary. However, it should not be forgotten that society also needs monodisciplinary animal sciences such as animal nutrition, animal genetics, animal health, animal welfare, and animal production systems. The prevalence of a thematic approach should not lead to a dilution of expertise in these core areas of animal sciences. After all, the quality of crossdisciplinary research depends on the quality of its mono-disciplinary building blocks. Monodisciplinary expertise is vital for providing depth, rigor and a successful design, and for implementation and interpretation of thematic research. The core monodisciplinary expertise should therefore definitely be maintained at the highest academic level, or the thematic research will be

neither credible nor effective. The narrative and multi-annual plan that WLR is currently working on will help to set research priorities within the chosen themes, which are still very broad.

Organizational structure and culture

The committee found WLR's organization well-structured, and encountered a strong focus on professionalism. This is praiseworthy. The focus on professionalism is bound to have a positive impact on possibilities of obtaining external funding (e.g., EU-funding), and on WLR's attractiveness as a strategic partner. It is also conducive to maintaining a high level of research quality.

Human resources management

At WLR, a large share of the research projects is performed by junior researchers. The committee appreciates this. Young researchers are in possession of the most up-to-date knowledge and expertise, and by training them, WLR guarantees the next generation of livestock researchers. WLR also has the highest number of PhD candidates of all three institutes (23). The committee finds this laudable, since it considers doing a PhD the best way of learning to do high quality research. In addition, co-supervising PhDs together with the university helps to foster One Wageningen, and PhD projects generally lead to academic publications, which in turn lead to visibility of WLR (see section 4.2). For these reasons, the committee encourages WLR to make doing a PhD as attractive as possible for its employees. To keep the research at a high international level, enrolment of young potential researchers into well-structured PhD-programmes is important. It will also help to make the young researchers attractive for international universities and research institutes. Focus on academic career planning at an early stage may also strengthen the capability on quality of project leadership. Thus, the committee encourage WLR to collaborate with the WUR on early career researchers (PhDs and post docs), which may also have great benefits for the 'One Wageningen' approach. To strategize on human resources, a roadmap may be helpful. Such a roadmap will also help to monitor succession planning in alignment with WLR's narrative and multi-annual plan. Strategic succession planning is called for now that a number of senior scientists approach retirement age.

The committee observed that the senior researchers at WLR are in general innovative and competitive, which is an asset. However, the senior researchers seem to be sometimes distracted by administrative duties. In order to create time and energy for more overview and strategic thinking, the committee recommends reallocating administrative duties such as financial and legal management from project leaders to specialized supportive staff.

One Wageningen

Working with the university to broaden the research pipeline is one of the unique selling points of WLR and the committee has seen some promising examples of such collaborations. One such example is the Animal Breeding and Genomics Group, that spans across WLR and the university supporting education, fundamental and applied research, and consultancy. Nevertheless, the committee observed that between WLR and its university counterparts there is some confusion in the understanding of what scientists from Wageningen University versus WLR are doing in terms of fundamental and applied research. There does not seem to be a clear-cut differentiation of the roles of the researchers within both parts of the Animal Sciences Group. WLR's work is applied, but benefits from new methods and insights from fundamental science. On the other hand, the university's fundamental research may gain more impact through collaboration with WLR researchers. The committee advises WLR to harness synergy and optimize impact by collaborating with university chair groups and with other institutes within WUR, such as WBVR. WLR already initiated some temporary research projects together with university groups, the committee heard. This indeed seems to be the way forward. It is an asset that WLR is already well-equipped to foster One Wageningen, because most of its researchers work on the Wageningen campus. They told the committee that this physical proximity is an advantage.

Name of the institute

The institute's management team told the committee that it feels the name of the institute no longer accurately describes its activities. It may therefore be tempting to change the name into something with a narrower scope. In this respect, the committee warns the institute to be cautious. Its current name represents great brand value, which is not easily replaced. If WLR does change its name, it should make sure the new name last for a long time, even if the institute wants to change its research focus.

5.5. Statutory tasks

The assessment committee found that WLR's execution of statutory tasks is of high quality, and reporting of the project activities demanded by the ministries is timely. The committee heard of many positive experiences. Stakeholders find the work dependable and they experience a short distance between policy makers and researchers.

Scores for Wageningen Livestock Research

Research quality	3 - 4) - 2 - (2 -)
Societal and economic impact	$3-4\cos x + 2\cos x + 2$
Viability $-t_{1+1} c_{1} c_{2} (a_{1+b}) - t_{1} c_{2}$	$\frac{13}{19} \chi = -1; \chi = 5\pi, \pi = \pi$

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6. Findings and Recommendations Wageningen Marine Research

6.1. Introduction

The mission of Wageningen Marine Research (WMR) is to make a difference towards a sustainable, responsible use of ocean, coastal delta and riverine resources and towards their protection. It does so through scientific research, knowledge and advice. WMR works closely with its partners and stakeholders. It aims to contribute to public debates on nature protection and use, on the basis of its innovative knowledge and ideas. WMR is the leading institute advising the Dutch government on marine and freshwater matters. It is involved in several monitoring programmes and provides advice on policy and environmental issues to government, industry and wider society. WMR has around 215 staff members (175 fte). It operates from three locations: Den Helder, IJmuiden and Yerseke.

WMR's expertise covers five research areas: monitoring, exploitation & protection, food production, marine spatial planning & policy, and 'building with nature', i.e. developing nature-based solutions for the maritime economy. WMR's main clients are government agencies such as the ministry of Agriculture, Nature and Food Quality, and the ministry of Infrastructure and Water Management. The public funding streams come from statutory tasks such as monitoring, policy advice and knowledge base funds. WMR also takes part in Horizon Europe research programmes. Projects for industry are relatively limited: 9% of funding in 2022. Private clients are fisheries, offshore wind companies, ballast water and dredging companies.

6.2. Research Quality

Quality through collaboration

The committee found that the quality of WMR research is viewed positively by academic peers and private sector researchers; WMR has a strong national and international scientific reputation. WMR research is strengthened by its collaborative character, based on strong networks, in the Netherlands (especially with the Royal Netherlands Institute for NIOZ and Utrecht University) as well as in other European countries and further afield. WMR has a pioneering role in the increasing cooperation between science and the (fishing) industry. This cooperation is beneficial to industry and society, even though it means that both parties need to balance between the need to communicate the benefits resulting from the shared projects and the scientific independence, integrity and impartial working practices of WMR scientists (see also section below).

The committee holds the quality of WMR's research in high regard. The content of publications reflects the shifting focus of WMR science from fish stocks and fishing techniques towards transitions in society and the marine

environment, a sign that WMR is admirably able to move with the times. In the period under review, WMR has produced some highly cited papers and much downloaded reports. They addressed topical themes such as microplastic pollution, spatial planning and food and nature transitions as well as more traditional aquaculture and fisheries topics. WMR maintains quality and relevance of research through active engagement with Wageningen University on topics ranging from image analysis to fisheries and aquaculture in the food system. It further engages nationally and internationally on a range of themes through the International Council for the Exploration of the Sea (ICES) and - especially on aquaculture and fisheries topics - through the European Fisheries and Aquaculture Research Organisation (EFARO).

Commitment to peer-reviewed papers

Both junior and senior researchers generate scientific output in the form of peer reviewed papers (roughly 100 per year) and professional reports (between 200 and 250 per year). Compared to the publishing period 2017 -2019, during the publishing period 2020 - 2022 the number of employees who published at least one article in a peer-reviewed journal had risen from 134 to 154. This means that now most research staff is actively contributing to one or more peer-reviewed papers. Consequently, the output of peer reviewed papers has been relatively stable throughout the reporting period, despite the departure of some senior scientists. Also, the level of open access to peer-reviewed articles has increased over the past five years. These are welcome developments, favouring the impact of WMR's research.

The committee's overall impression is that WMR is an outward-looking institute with a good reputation and an excellent network, which produces peer reviewed articles on a steady level and which in general creates and takes opportunities for generating high quality research. The committee appreciates that WMR commits to the production of peer-reviewed publications alongside customer-focussed reports, that it has publication targets in place and that the institute provides some incentives and time allocations to encourage scientific writing. After all, scientific papers are the perfect way to realize WMR's ambition to 'make a difference' through scientific knowledge, to showcase its expertise to a wide audience, to stimulate new networks and collaborations, to attract new talent and to build in a continual process of quality control. However, the committee heard that some researchers regard the current time allocations as limiting, and project resources and duration presently restrict opportunities to further increase the pool of actively publishing PhD candidates.

More ambitious targets

Now that the practice of scientific publication has in a sense democratized, the committee advises WMR to assess whether the targets for peer-reviewed publication could perhaps be more ambitious, to further strengthen the institute's national and international position as a significant marine science institute and to maximize its potential. In the committee's view, it would benefit WMR to identify and adopt procedures that will accelerate growth in rates of peer reviewed publication. These could include a re-evaluation of the amount of time provided for writing, and mentorship of early career authors.

Another strategy could be to investigate if – when reporting about research to clients – there are any opportunities to transition to a reporting model that comprises one or more peer reviewed publications alongside a more accessible policy-oriented executive summary and relatively short overview report. Potentially, this would make the key findings from commissioned research more accessible to the clients, while at the same time providing a higher external profile for the commissioned research and WMR. In addition, WMR is advised to assess with clients, whether reports are appropriately oriented to the audience and adequately communicated.

Facilities

All WMR locations include lab facilities, with chemical labs in IJmuiden and Den Helder, mesocosm facilities in Den Helder; climate facilities in all locations and aquarium facilities in IJmuiden. Facilities are well suited for the tasks conducted.

The regional establishment in Yerseke was revitalized in 2016 is now considered important by stakeholders, owing to its visibility and functionality. This may be affected by the establishment of the Delta Climate Center in the summer of 2023, in which WUR is a partner. The committee's advice is to safeguard the specific achievements, visibility and functionality of the Yerseke facility, especially in relation to the Delta Climate Center. The facility is of regional significance for stakeholders and especially the aquaculture industry.

Although not discussed and not in control of the managament of WMR, the availability of research vessels is essential for WMR. The predominant vessel is in control of the Shipping Company (Rijksrederij) of Rijkswaterstaat. It is of vital importance for WMR that this facility continues.

6.3. Societal and economic impact

It is WMR's explicit ambition to make a difference in relation to societal debates on the use and protection of marine resources. Indeed, the committee found that WMR has a strong and sustained focus on issues that matter to society, especially in relation to nature, food and energy transitions linked to the marine environment. Its statutory tasks are directly addressing the needs of government and other clients and its researchers are valued as scientific advisers by clients. WMR is effectively connected to stakeholders through formal and informal channels of communications and public engagement.

WMR research is often conducted in close cooperation with the private sector, even if it is funded by the government. This is beneficial, because it provides a direct uptake route valued by clients. While the close collaboration with private parties is therefore a strength, it can also be perceived by external parties as a weakness, because of vulnerability to criticism for having excessively close links to industry. The committee discussed this vulnerability with the institute management and project managers within WMR. They presented a clear and convincing view on independence, and left the committee with no concerns on this aspect. Since the 2019 assessment, WMR has increasingly emphasized its societal relevance by developing and making available case studies that highlight the impact of WMR science and strengthen relationships and communication with clients. Clients have been appreciative of these initiatives, the committee found. WMR science and publications are frequently referenced in policy documents and WMR has maintained a respected scientific role while at the centre of societal debate on topics such as mussel culture and pulse trawling. Media coverage has grown significantly over last 5 years. The institute provides briefings on fisheries assessment and other topics to the ministry of Agriculture, Nature and Food Quality. This is an important role and enables the ministry to develop a knowledge base in spite of a high turnover of personnel. The committee's recommendation is to ensure a constant flow of knowledge and information on fisheries and other science topics from WMR to the ministry of Agriculture, Nature and Food Quality and possibly to the ministry of Infrastructure and Environment as well, to engage and support new personnel at the ministries and to help enable continuous and effective working relationships when personnel change roles.

Overall, WMR research and advice address some aspects of the uses and transitions in the marine environment that are not addressed by any other organization. It thus provides essential capability for private and government clients. In this regard, the knowledge and data collected and shared by WMR benefit society in the journey towards striking a desired balance between energy and food production on the one hand and nature conservation on the other. The committee congratulates WMR on its achievements in societal and economic impact in the period under review. With unique and relevant expertise, good focus on what matters to society, excellent networks, pioneering collaborations, a clear stance on research integrity, high impact publications, valued advice and active contributions to public debates, WMR has done an excellent job. The committee recommends continuing on the same path and involving clients and other stakeholders in future strategic planning. WMR should use its influence and convening power, seek for close collaboration with clients and work towards 'Solving problems together'.

6.4. Viability of the institute

Funding

WMR has been operating strategically the past few years. The committee found that the institute is still doing an excellent job in traditional fisheries research, while at the same time thinking ahead and remaining close to and needed by government and private clients on more future-oriented tasks. WMR is adapting to, and leading, change, especially in relation to the transitions occurring in the North Sea and affecting nature conservation, fishing and energy sectors. Client feedback, both written and spoken, shows a very high level of satisfaction with WMR, with any concerns relating solely to frequency of communication in a tiny proportion of projects. Overall, everyone agrees that WMR's work is timely and relevant.

There is strong and continued demand for WMR research and advice. This market situation fits well with WMR's ambition - as set in its 2020-2023

development plan - of achieving slow and sustainable growth. This ambition has been achieved in recent years. Since 2018, the organization has grown by 20.5 FTE. WMR's financial viability therefore seems up to par.

The committee advises WMR to invest in strategic acquisition, in addition to having individuals to pursue projects. What are the projects for the future and who are the clients interested in such projects? Future projects need to be identified, and future partners approached.

Management structure

In 2016, WMR was reorganized into a flat structure: a small management team with a shared responsibility in leading an institute of researchers, who organize themselves in 'theme-teams' to cooperate and focus their efforts on knowledge development and acquisition. The present management team shows dedication and enthusiasm. It is led by a committed director with a strong vision. The other three members of the management team have only very recently joined WMR. The theme teams report directly to the management team, although there is cross-cutting support for the administrative aspects of acquisition. Staff within the theme teams do not limit the scope of their work to the teams, but often work jointly on knowledge development and acquisition. WMR sees the flexibility and science focus of the theme teams as an operational strength in practice. Scientists value the support of the acquisition support team, which reduces their administrative roles when seeking funding.

The committee appreciates these advantages of the management structure, but also sees some risks. One result of the relatively flat management structure is that rather few scientists appear ready to represent and communicate the full range of the research taking place at WMR. The time managers can spend with researchers will necessarily be limited by the large numbers of researchers reporting to the management team. In addition, the structure makes the viability of WMR very strongly dependent on a small management team, and vulnerable to changes in that team. No trained successors will be available, since scientists in theme teams are largely unable to gain the experience that would prepare them to step up into these roles at short notice. Discussions the committee had during its site visit revealed that there was no formally documented continuity policy in case of loss of management team personnel. This exposes WMR to risks, that may to some extent be managed. The committee recommends WMR developing a documented continuity policy as a risk management measure, to enable rapid and effective responses, and business continuity, in the event of departures from the management team.

Human Resources

The age and tenure distribution of researchers at WMR is relatively even, and the institute has continued to deliver research and statutory tasks effectively over the period when senior scientists departed. Career progression is mostly determined by the recognition of science achievements within the theme teams. To some extent the theme-team structure limits the development of cross-cutting expertise, although meetings and other mechanisms are in place to encourage theme teams to interact. As stated above, the structure also limits pathways for career progression into senior science and management roles for those that wish to take this path. The committee recommends that WMR seek to identify and provide development pathways that would enable more colleagues to represent and facilitate broad and cross-cutting areas of science and advice.

Given demographical developments, keeping WMR sufficiently staffed, with personnel with both quantitative and qualitative skills, is a challenge. WMR operates in an international environment, and it may be expected that recruitment competition between institutes within the EU will remain fierce. Next to the need for a broader view and continuity in leadership, this is another reason why the committee considers it wise to develop pathways for career progression of some researchers into senior science leadership and management roles, with capacity to represent and facilitate broad and crosscutting areas of science and advice. More in general, the committee advises to actively maintain a modern human resources policy, recognizing the expected labour shortages in the coming decade(s).

Secondment opportunities – where staff members are temporarily transferred to positions at another institute within the ASG – are regarded as valuable by those researchers to whom they have been awarded. Even though the application process is open to all, the number of available opportunities is seen as limiting in practice. The committee recommends identifying and supporting mechanisms to provide more PhD positions and secondment opportunities within Wageningen University, to advance scientists' development, increase the scale and scope of scientific output and further strengthen operational links with Wageningen University.

6.5. Statutory tasks

WMR excels in its statutory work, with the 2022 evaluation of the fisheries research programme very positive and the EU data collection achieving the maximum score in the latest evaluation. The statutory work underpins essential advice on catch and harvesting options and meets national and international commitments. It also provides a valuable source of data used in research projects and publications. Continuous improvement in statutory work is achieved through automation of processes, development of new methods and toolkits, with rates of uptake dependent on the types of statutory work, e.g. national or international as formalized through the EU Data Collection Framework. There are ever evolving opportunities linked to this that will be advanced through cooperation on methods development (e.g. image recognition or cooperation in terms of vessels and other platforms). The committee recommends WMR assessing where new technologies and cooperation with partners can increase the reliability and cost-effectiveness of data collection and work with partners to implement them.

Knowledge base funding is essential to support continuous improvement in statutory tasks, but has remained static since 2009 despite the increasing scale and cost of statutory tasks. As stated in section 3.5, the committee therefore recommends reconsidering the percentage of the budget made available for

maintenance of the knowledge base. This is necessary, because renewal of methodology is a continuing requirement for effective conduct and improvement of the statutory tasks.

Scores for Wageningen Marine Research

Research quality	3 - 4
Societal and economic impact	4
Viability	3 - 4

7. Appendices

7.1. Terms of Reference for WR institute assessments

1. Introduction

Wageningen Research (WR) is one of five so called TO2 institutes (applied technological research institutes) in the Netherlands. Every four years, the TO2 organisations are assessed in their entirety, with sub-evaluation committees for each of the TO2 institutes, committeeed by the Ministry of Economic Affairs and Climate. As part of their quality assurance cycle, the individual research institutes that make up WR are additionally evaluated by a peer review committee every five years. The WR institute assessments are committeeed by the Executive Board of WR. The guidance for the institute assessments is derived from the national protocol for the TO2 evaluations.

The ambition for WR institutes is to conduct excellent research that addresses market failures, supports governmental policy, and finds solutions to problems in society or industry. Activities of WR research institutes alongside research include management of research facilities, acquisition, consultancy, public relations, and developing intellectual property.

The main goal of the WR institute assessments is to assess the institute's (inter)national position regarding research quality, economic and societal impact of the research, and viability of the organisation, in light of its own mission. The assessment thereby aids to monitor and improve the overall performance of the WR institutes and their long-term strategy development.

2. Process

The institute assessment is based on a self-assessment report provided by the institute and a site visit by the assessment committee, which will also include a thorough interaction with its clients. Performance over the last four years and future potential of the institute should both be assessed.

The evaluation criteria (research quality, economic and societal impact and viability, as described in detail in Annex A, with indicators in Annex B) should be assessed in light of the institute's mission, using a four-point scale (Annex C). The evaluation committee is asked to report their findings and offer recommendations to the Executive Board of WR and to the Management Board of the Institute. In response to the assessment committee's recommendations, the Management Board will make an action plan, which will be discussed with the Executive Board. The implementation of this action plan will be monitored in the institute's planning and control cycle. The assessment report and action plan will be submitted to the Ministry of LNV, after which they will be made publicly available.

3. Objective

The overall objective of the assessment is to get an accurate view of the institute's (inter)national position with respect to research quality, economic and societal impact of the research, and viability of the organisation. This assessment will be used internally to make improvements within the organisation, and externally for our accountability to Government and other stakeholders.

4. Result

The committee is requested to report its findings in an assessment report according to a format that will be provided by the secretary, including the scores for each of the criteria with underlying argumentation. Committee members are expected to provide the texts for the assessment report, with secretarial support from the secretary. In cases where the assessment committee's judgment is not unanimous, different views should be stated explicitly.

5. Terms of reference

The committee is requested to concentrate on the following criteria:

- a. Quality of the research
- b. Societal and economic impact of the research
- c. Viability of the organisation

Research quality and societal and economic impact demand a retrospective assessment with special attention to historical data such as volume and sources of income, societal visibility, customer orientation, and scientific output and citations. The viability of the organisation demands a focus that is more directed towards the current and future situation with special attention to market attractiveness and research management.

The sub-criteria to qualify these key-criteria are presented in Annex A, with indicators detailed in Annex B. The background information, necessary for the assessment, is provided in the institute's self-assessment report.

Quality of the research

The first key question for the WR institute evaluation is: What was the quality of the institute's research in the evaluation period?

The quality of WR research must be assessed in a different way from the quality of academic research. This is due to the different roles that WR institutes and academic knowledge institutes (e.g. universities and KNAW/NWO institutes) play in the research and innovation system. Typical WR research is: (1) research for building and maintaining their strategic knowledge base, (2) precompetitive research in collaboration with private and public parties, (3) Programmatic research for policy-making knowledge, (4) contract research, (5) statutory research tasks (separate criterion).

The output of WR institutes is diverse and comprises more than scientific publications. The evaluation therefore also takes into account how the institute's various stakeholders rate the research quality. This is measured via direct questioning (through customer satisfaction and knowledge utilisation surveys, interviews with customers, partners and users, or focus group sessions). Indications for the quality ratings can also be recognised through revenues from diverse funding sources, repeat customers, partnerships with prominent knowledge institutions, participation in national/international research consortia and research networks, etc.

Societal and economic impact of the research

The second key question for the WR institute evaluation is: What impact has the WR institute's research had in the evaluation period?

WR institutes can realise different types of impact with their research, with distinction between: 1. Type of knowledge user: business unitsinesses versus non-profit organisations including public sector

2. Type of domain in which impact is realised:

- Contribution to the achievement of societal themes in national policy
- Contribution to European or international policy agendas and themes
- Contribution to innovation agendas of the Top Sectors in the Netherlands.

Viability of the organisation

The third key question about the WR institute evaluation is: What is the viability of the institute? How well is the WR institute equipped and positioned for

the future in light of developments in their specific environment? 7.2. Programme of the site visit

Tuesday 21 November 2023

Location: Wageningen, Hotel de Wereld

Time	Activity	12
17:00-19:00	Internal Committee meeting	zπn,
19:00-21:00	Informal diner with Management Team ASG	+ <i>T</i> h

Wednesday 22 November 2023

Location: Wageningen Campus, Zodiac (building 122)/ Room A0107

Time	Activity
13:15-14:15	Meeting with the Management Team of Wageningen Livestock research

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14.15- 14.45	Reflections committee
14:45- 15:45	Meeting with the Management Team of Wageningen Bioveterinary research
15:45- 16:15	Reflections committee
16:15- 17.15	Meeting with the Management Team of Wageningen Marine Research
17:15- 17.45	Reflections committee

Time	Activity
09:00-09:15	Welcome by Arthur Mol
09:15-10:15	Meeting with the Management Team of the Animal Sciences Group
10:15-10:45	Meeting with a delegation of the Works Council of the Animal Sciences Group (Online)
10:45-11:15	Coffee-break and reflections committee
11:15-12:00	Meeting with professors linked to work of the institutes
12:00-13:15	Lunch and reflections committee
13:15-14:15	Meeting with the Management Team of Wageningen Livestock research
14.15- 14.45	Reflections committee
14:45- 15:45	Meeting with the Management Team of Wageningen Bioveterinary research
15:45- 16:15	Reflections committee
16:15- 17.15	Meeting with the Management Team of Wageningen Marine Research
17:15- 17.45	Reflections committee

Location: Wageningen, Hotel de Wereld

Time	Activity
18:15- 19:45	Simple one-course committee dinner
19.45 - 21.45	Transit to: Leeuwarden/Lelystad /IJmuiden

Thursday 23 November 2023- Wageningen Bioveterinary Research Sub- committee:

- mr. Renée Bergkamp (chair)
- prof. Arjan Stegeman
- dr. Muriel Vayssier-Taussat

Location: Lelystad, Houtribweg 39/ Wensingzaal

Time	Activity	n, n e
08:45 - 09:00	Welcome at location by Annemarie Rebel	I + Th: (sin.
09:00 - 10:00	Meeting with team leaders	
10:00 - 10:30	Coffee break	$\frac{\cos x}{-1} = 1 ; x = 2 $
10:30 - 10.50	$(1)^n \pi \pi \pi (1)^n \pi (1)^n \pi (1)^n \pi$	$J = \frac{J}{L} + \pi L$
10:50 - 11:10	Online meeting with clients	
11.10 - 11.30	$4x^{2}$ lim ((2 ⁿ). (x ⁿ) / sort ((2 π -1) to x-1	
11.30 - 13.00	Site visit and tour	$\frac{1}{2}$
13.00 - 14.00	Informal lunch with employees	$= \frac{1}{2} \times \frac{3}{4} + JLR;$
		'sin(al,

14.00 - 15.00	Reflections subcommittee
15.00 - 17.00	Move back to Wageningen

Thursday 23 November 2023- Wageningen Livestock Research Sub- committee:

- prof. Charlotte Lauridsen
- Hester Maij, MBA
- drs. Mariette Huisjes (secretary)

Location: Leeuwarden, Boksumerdyk 1, Dairy Campus/Dairy Room

Time	Activity
08:45 - 09:00	Welcome at location by Kees de Koning
09:00 - 10:00	Meeting with team leaders
10:00 - 10:30	Coffee break
10:30 - 10:50	
10:50 - 11:10	
11:10 - 11:30	
11.30 - 13.00	Site visit and tour
13.00 - 13.30	Lunch
13.30 - 15.15	Transit to Wageningen

Location: Wageningen Campus, Zodiac (building 122)/ Room A0107

Time	Activity
15.15 - 16.00	Reflections subcommittee
16:00 - 17.00	Informal drinks with young scientist and PhD's

Thursday 23 November 2023- Wageningen Marine Research Sub- committee:

- drs. Pim Visser
- ir. Reinier van den Berg
- prof. Simon Jennings

Location: Ijmuiden, Haringkade 1/ Noordzeezaal

Time	Activity
08:45 - 09:00	Welcome at location by Tammo Bult
09:00 - 09:30	Meeting with Theme-team leaders
09:30 - 09:50	$\int (1)^n \pi \pi \pi \pi (1)^n \pi (1)^n \pi (1)^n \pi (1) = \frac{\pi}{L} + \pi (1)^n \pi (1$
09:50 - 10:10	Online meeting with clients
10:10 - 10:20	Coffee break
10:20 - 10:40	2 1 1 1 1 1 1 1 1 1 1
10:40 - 11:00	$\underbrace{\text{Online}}_{2} \text{ with clients} \underbrace{\text{Online}}_{2} \text{ with clients}$

11.00 - 11:30	Meeting with WU-secondment employees
11:30 - 13:00	Site visit and tour
13.00 - 14.00	Informal lunch with employees
14.00 - 15.00	Reflections subcommittee
15:00 - 17.00	Move back to Wageningen

Location: Wageningen, Hotel de Wereld

Time	Activity
17.30 - 21.00	Dinner committee: VLOGs and wrap-up

Friday 24 November 2023

Location: Wageningen Campus, Zodiac (building 122)/ Room A0107

Time	Activity
12:00 - 14:00	Working lunch: Drawing conclusions
14:00 - 14:15	Optional meeting for final questions
14:15 - 16:00	Writing draft report
16:00 - 16:15	Presentation provisional results (<u>Hybrid)</u>
16:15 - 17:30	Drinks and snack
17:30	Departure

7.3. Brief curricula vitae of the committee members

Renée M. Bergkamp LL.M (chair of the review committee)



Renée studied Law at the free University in Amsterdam. She started her career in 1983 at the ministry of Agriculture and Fisheries, were she held positions as deputy director for Legal Affairs and International Affairs. In 1999 Renée joined the ministry of Justice, where she worked as director of Enforcement and as director for Immigration. From 2002 until 2011 she was first director-general

at the ministry of Agriculture, Nature and Food quality and later director-general of Enterprise and Innovation at the ministry of Economic Affairs. From 2011 until 2013 Renée was chairman of the arable product boards. After that she became director of Vewin, the Association of Dutch Water Companies. From 2016 until 2023 she was Provincial Secretary and General Director of the Province of Noord-Holland. Currently she holds various supervisory positions in the sectors food, organic farming, energy and water.

Ir. Reinier van den Berg



Training and degree: Chemical Technology at the Technical University Delft (department of General and Applied Microbiology).First job was at the Netherlands Fisheries Institute, Ijmuiden, working on the biodegradation of chemicals in the marine environment (1977-1986). Then I changed to the National institute for Public Health and the Environment (RIVM) in Bilthoven (1986-2008). In this period I have worked on

a lot of projects, with as common thema fate of chemicals in the environment. Most memorable/remarkable: pesticides research, assessment of risks of soil contamination (intervention values), biological soil clean-up, storage of nuclear waste, denitrification, design of the Environmental Balance and Environmental Outlook, dioxins, evaluation of the manure policy, EUdecision support system for admission of pesticides, cost-benefit analysis of soil clean-up. Besides project manager, in 1995 I became head of the Laboratory of Soil and Groundwater Research. In 2008 the PBL National Environmental Assessment Agency was constituted from parts of the RIVM (already named National Environmental Assessment Agency) and the National Institute for Spatial Research. I moved to PBL and from 2009-2017 I worked as the deputy director of the institute, with a focus on the internal processes.

Prof. Simon Jennings



Marine scientist and science adviser with interests and responsibilities spanning ecosystem, environment, food web and fisheries topics. Current split role as Theme Lead for 'food from water' at the Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, UK and vice-chair of the Advisory Committee at the International Council for the Exploration of the Sea (ICES). Past roles have included

Science Committee chair at ICES, Technical Advisory Board chair for the Marine Stewardship Council, as well as various research scientist positions and Honorary and Visiting Professorships at the Universities of East Anglia and Newcastle.

Hester Maij, MBA



W.Hester Maij, MBA has professional work experiences on executive board/non-executive supervisory board. She was director Public & Regulatory affairs at Royal Friesland Campina (okt 2019 - nov 1st 2023). In this role she was among others member of NZO, ZuivelNL and represented the dairy industry in national Climate, Nitrogen, and Agriculture-agreement tables. She chaired the national taskforce on earning capacity in agriculture (April 2019 - September 2019). She was a member of the

executive board of the province of Overijssel (April 2011 - June 2019), responsible for nature and agriculture. As a member of the European Committee of the Regions she was a rapporteur on a policy package and action plan for biological production in the EU.

Drs. Pim Visser



Studied at the Nijenrode Business School BBA (1978) and the Rotterdam School of Management MBA (1981) Pim Visser started his career in the IT Consultancy from 1981 to 1982. From 1982 to 2002 he worked at Projects and Sales in Shipbuilding for the Dutch and International Fishing Industry. Since 2002 Pim Visser is manager of Fish Auctions Northern Holland. In that capacity he was president of EAFPA

(European Ports and Auctions 2004-2010). Now Pim Visser combines the management of the fish auctions with several positions:

- Chief Executive VisNed, association of Dutch Producer Organisations (2010-2021);
- Member North Sea Advisory Council (2004-2022);
- President of EAPO (European Fish Producer Organisations 2014-2021)
- Advisor to Regional Fish Producer Organisations (2021-now)

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Prof. Charlotte Lauridsen



Head of Department, Department of Animal and Veterinary Sciences, Aarhus University Charlotte Lauridsen is a professor in nutritional immunology, and her research through 25 years has focused on nutrient absorption and the impact of food and feed on gut health and disease mechanisms. Major research focus has been on lipids, fatty acids, and micronutrients for pigs and other monogastrics. She is coordinator of PIG-PARADIGM, which was funded with

150 mill DKK by the Novo Nordic Foundation in 2021. She is professor in experimental nutrition at the Department of Clinical Medicine at Aalborg University, where she played a key role in the establishment and management of the Danish Nutrition Science Center. In 2021 she became Head of Department at the Department of Animal and Veterinary Sciences, which is hosting two new educations (Veterinary Science and Animal Science), which will start up with students at the campus AU Viborg in 2024.

Prof. Arjan Stegeman



Arjan Stegeman is professor of Farm Animal Health at Utrecht University, The Netherlands. He is a veterinarian by training and a diplomate of the European College of Veterinary Public Health. His research is focused on the epidemiology of infectious diseases in farmed animals aiming to unravel the mechanisms that

determine the transmission and spread of infections in animal populations, and establish the effectiveness of intervention measures. For that goal his research group carries out controlled experiments, field studies and mathematical modelling. In addition to research and teaching Arjan is very active at the science-policy. https://www.uu.nl/staff/JAStegeman/2

Dr. Muriel Vayssier-Taussat



Muriel Vayssier-Taussat is the head of the team vectorborne bacteria at INRA. Her areas of interests include tick-borne bacteria. Since many years, she has developed molecular tools dedicated to identify pathogens in ticks and animal reservoirs, and identify molecular mechanisms of infection. Her laboratory is located in France at the National Veterinary School Campus of

Maisons). On April 1, 2017, she was appointed head of the animal health department of the National Institute of Agricultural Research. She is also associate editor of the journal *Frontiers in Microbioly* and has taught in the Master's cycle at the Pasteur Institute since 2005. In 2020, during the coronavirus disease pandemic, she was part of the Committee for Analysis, Research and Expertise (CARE), bringing together 12 scientists and doctors to advise the government on treatments and tests against SARS-CoV-25.

7.4. Key criteria on a four-point scale

Score	1	2	3	4
	Unsatisfactory	Satisfactory	Good	Very good
Quality	The group's research has clear weaknesses and is insufficiently appreciated by its stakeholders.	The group's research shows some weaknesses but is generally of good quality. The research is respected by most stakeholders.	The group conducts good and respected research for its stakeholders.	The group conducts very good and highly respected research for its stakeholders. The research is highly respected world-wide.
Impact	The group is insufficiently connected to its stakeholders. Also the utilisation of its research products is insufficient. The strategic importance for the economy (or policy-making / agenda setting) is minimal.	The group has good connections to stakeholders in general but falls short on some aspects. Also the utilisation of its research products is generally good but falls short in certain places. The strategic importance of this knowledge utilisation for the Dutch and European economy and/or resolution of societal challenges is generally substantial, but not in all respects.	The group has good and substantial connections with its stakeholders. Its research is used by its stakeholders. The utilisation of its research products has strategic influence on the economy (or policy- making and agenda setting) in the Netherlands and Europe and / or is of great use for challenges that society has to face nowadays.	The group has very strong structural connections to stakeholder groups. Its research products are used on a large scale. The utilisation of the research products is of great strategic importance for the economy (or policy-making and agenda setting) in the Netherlands and Europe and / or is of great use for challenges that society has to face nowadays.

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