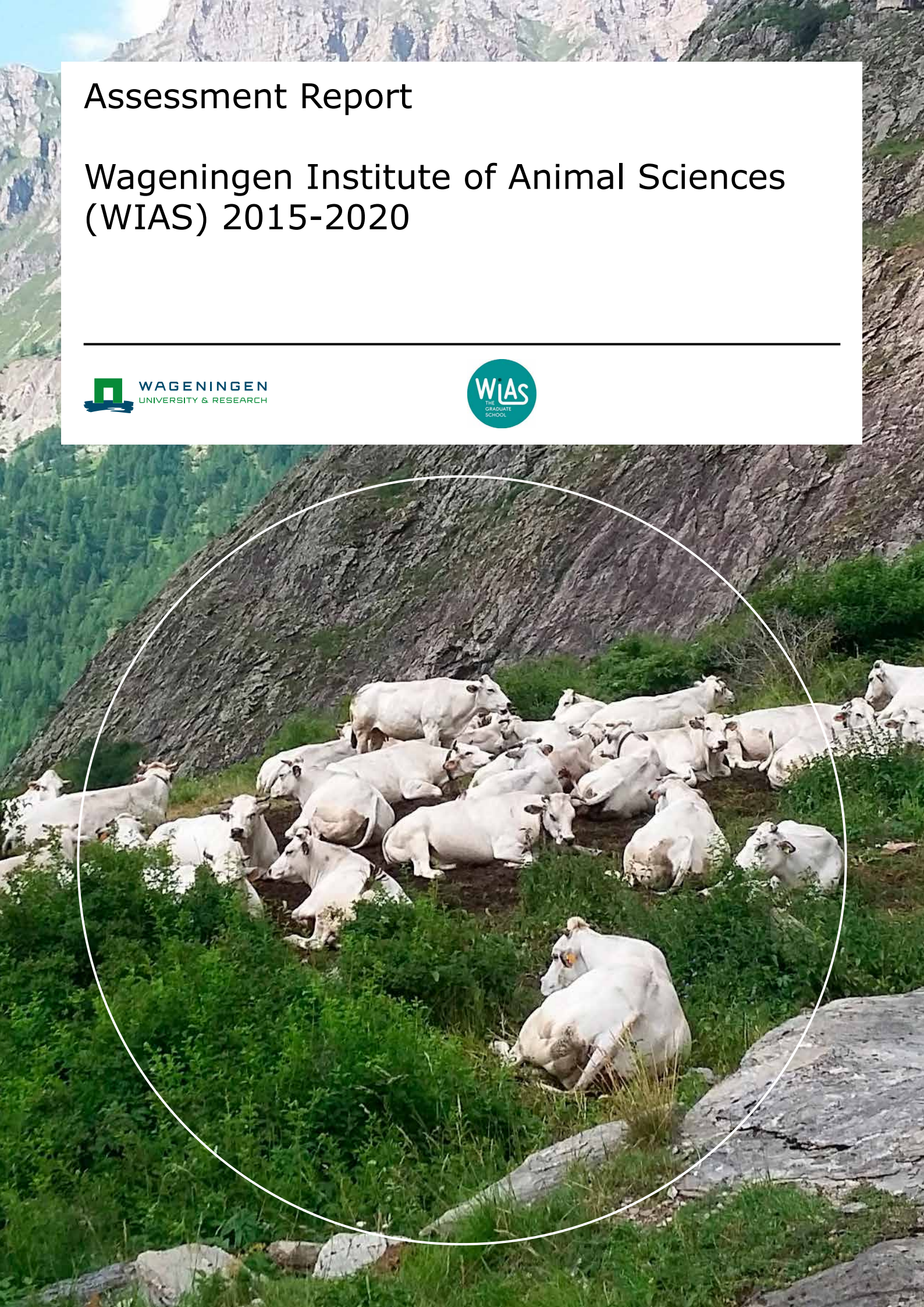
Assessment Report

Wageningen Institute of Animal Sciences (WIAS) 2015-2020



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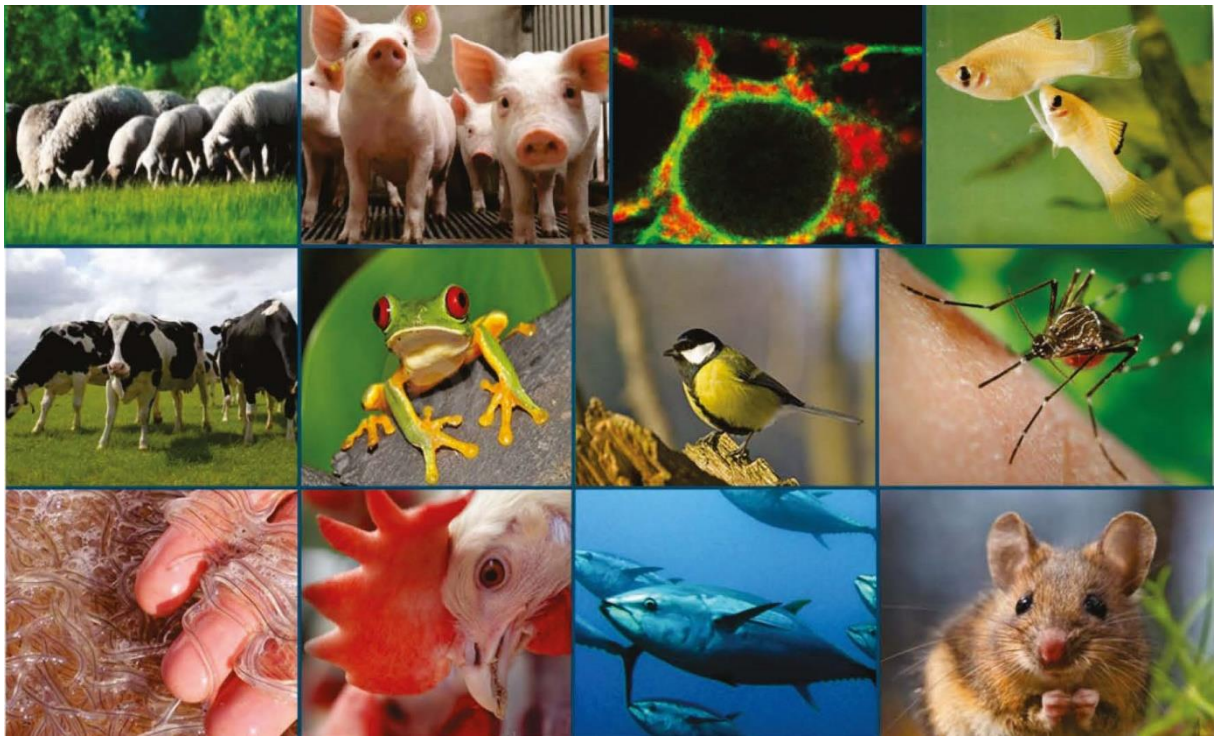

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Preface

This report presents the findings and recommendations of the international peer review committee that evaluated the Wageningen Institute of Animal Sciences (WIAS) and its three clusters Future Food Systems and Society (FFS), Population Dynamics and Genomics (PDG) and Integrative Biology (IB), each consisting of several chair groups. The evaluation has followed the (new) Strategy Evaluation Protocol 2021-2027 (SEP) for the assessment of academic research units in the Netherlands, as developed by VSNU, KNAW and NWO. The review was based on a self-evaluation report provided by WIAS and Wageningen University & Research (WUR), and a four-day site visit (October 11-14, 2021).

The committee would like to thank and compliment WIAS management for the excellent and efficient organisation of the site visit. We also appreciated the efforts the three clusters put into preparing the interview sessions, which were very informative. Our discussions with WIAS staff members were stimulating and touched on many important issues, including the institute's vision, ambitions, and strategy. Everyone we spoke to, formally or informally, radiated enthusiasm, involvement, dedication and even pride – This applied to scientists in all stages of their academic career. We greatly enjoyed this.

The committee hopes that its recommendations will be useful to WIAS and its three research clusters, as well as to the Animal Sciences Group and Wageningen University, in the evolution of the research organisation, vision and strategy in the animal sciences and in realizing its ambitions.

Prof. dr. ir. Hans Heesterbeek
Chair, peer review committee WIAS
December 2021

1 Executive summary

This report describes the findings of the independent external committee that evaluated the research of the Wageningen Institute of Animal Sciences (WIAS) over the period 2015-2020, following the guidelines of the Strategy Evaluation Protocol 2021-2027.

The focus was on the quality, societal relevance and viability of the research carried out in three relatively young clusters, composed of thirteen chair groups: Future Food Systems and Society (FFS, four chair groups), Population Dynamics and Genomics (PDG, three chair groups), and Integrative Biology (IB, six chair groups). Chair groups are the basic organisational units of Wageningen University (WU), contributing to both its research and teaching. Clusters were formed in response to recommendations by the previous (2015) external and the 2018 mid-term reviews, followed by internal discussion and reflection. The current clustering is operational since 2019.

In addition, the committee was requested to provide feedback on the added value of WIAS, besides its main function as Graduate School. WU has charged its six Graduate Schools not only with doctoral education and training, but also with safeguarding and stimulating the coherence of the research programme within the school's mission, as well as the quality and progress of its research staff, postdocs, and PhD candidates.

Wageningen Institute of Animal Sciences
The Terms of Reference explicitly asked whether WIAS has a sufficiently proactive innovation process to guarantee continuous improvement of its three main tasks. Regarding the education and training of PhD candidates and early career researchers, the answer is affirmative. WIAS has developed and implemented good practices that are exemplary. However, it is also advised to be more outward looking. For effective safeguarding and stimulating quality and coherence of the research, the current mandate, and formal responsibilities of WIAS appear to be too limited.

With respect to the organisation of the research, the committee recommends continuing the present three clusters as organisational entities that have excellent potential to stimulate synergy, interdisciplinary collaboration, and addressing societal challenges in an effective manner. It is recommended to also maintain the identity and autonomy of the chair groups, to allow them to remain at the forefront of their individual research fields. However, the current research organization seems too complex and should be simplified and better aligned with the current SEP. That defines basic units of assessment as entities with sufficient critical mass and their own goals and strategy. The committee thinks the latter requires the units to have corresponding mandates, responsibilities, and operating space to be held accountable.

In addition, the committee sees scope for greater synergy with the contract research of Wageningen Research, and with the faculty of Veterinary Medicine of Utrecht University.

So far, the new specific aspects Open Science, Academic Culture and Human Resources (HR) policy, have apparently been addressed mainly at WUR-level. Better alignment of Open Science ambitions and actual implementation by the clusters and chair groups, will require thorough discussion and identification of possible challenges and impediments. Likewise, to align better with the Dutch Recognition and Rewards programme, WIAS will have to move away more quickly from the strictly quantitative performance indicators for tenure track positions. Similarly, it is recommended to revisit its evaluation system for personal chairs, including granting permanent status after the first positive evaluation, and to improve diversity in terms of gender, disability, cultural background, and nationality.

Future Food Systems and Society
The FFS mission is "to develop knowledge for the transition towards a sustainable role of animals in food systems and society". Its focus on food systems is an internationally recognised strength. However, the aspired wider role to support animals in society outside food production is missing from its strategy and self-evaluation and needs re-evaluation. The aim and strategy of FFS strongly focuses on the theme of circularity, a clear international success with world leading research. However, this over-riding theme may hide previous success and plans to tackle other critical global food system challenges for which FFS is well equipped. FFS is recommended to reappraise its aims and to better exploit the collaborative strength of its chair groups for a multi-disciplinary approach to address well-articulated societal challenges in the livestock sector.

The quality, societal relevance, and viability of the FFS research are very high. Suggestions for further improvement, in addition to those mentioned above, are to define performance indicators that will help assessing its impact on different stakeholder groups, to increase external visibility, to strive for growth of expertise and capacity in less well covered niches, and to draw up a concrete succession plan for current chair holders.

Population Dynamics and Genomics
The PDG mission is "to generate knowledge and provide education and advice on the sustainable management of animal populations for the benefit of animals, humans and nature". PDG is well positioned for interdisciplinary approaches addressing highly relevant topics related to wild and farmed animals, genetics and artificial intelligence, population dynamics and epidemiology. However, to strengthen its coherence and visibility as a new entity, the cluster is advised to formulate a joint research mission and strategy with shared aims and priorities, including new interdisciplinary approaches and cross-chair group research lines and projects.

Quality, societal relevance, and viability of the PDG research are very high. Suggestions for further improvement, in addition to those mentioned above, are to consider a new name for the cluster that better reflects its shared interest and goals and will increase its external visibility, to precise research activities beyond social interactions and animal welfare, to set up collaborations focused on socio-agro-ecosystem modelling of environmental impacts of renewed breeding strategies and farm practices, to differentiate more clearly between societal impact ambitions and targets tailored to its major stakeholder groups, and to align its research ambitions and available funding better with projects led by chair groups.

Integrative Biology
The IB mission is "to improve the understanding of how animals develop, function, interact and evolve in different environments", using a multispecies approach and by focusing on a fundamental understanding of the effect of environmental factors on performance and resilience of individuals, populations, and ecosystems, underpinning strategies to address global challenges. The research of the six chair groups spans all levels of biological organisation, from molecule to ecosystem. This wide scope, and the fact that it is not restricted to farm animals, provides opportunities for broadening the WIAS-mission. However, the chair groups seem to have embraced the joint cluster vision and strategy only recently. These need elaboration, to realise the potential for application of its fundamental expertise in coordinated multidisciplinary collaboration to address major societal challenges.

Quality, societal relevance, and viability of the IB research are very high. Suggestions for further improvement are to elaborate the cluster's future vision and strategy, to fully exploit the opportunities of coordinated multidisciplinary collaboration for addressing major societal challenges, to improve the balance between teaching and research, including time compensation for PhD candidates involved in teaching, and to reflect on how IB can pro-actively contribute to the introduction of an agro-ecological approach, a sustainable production system integrating high-end technology, rational husbandry and production systems with diversity and coexistence of humans, wildlife, and domestic organisms in rich, resilient, and vivid landscapes. Finally, in response to an additional question in the Terms of Reference,

requesting advice on how to strengthen its subthemes and enhance the research links between them, it is recommended to start more projects like the recent 'bee' example, requiring collaboration between subthemes and contributions from all chair groups across levels of biological integration. Successes here will be important for cluster coherence, cross-fertilisation, and the way new PhD candidates, postdocs and staff view scientific collaboration as a sound basis for future assessments of the cluster as a viable and necessary research unit.

Overall, we found the animal science combined in WIAS to be thriving, strong, healthy internationally renowned, and leading in several areas. All three of its clusters harbour innovative research of very high, occasionally even excellent, quality. The assessment committee believes that the clusters will help WUR to maintain its world leading position in agriculture by becoming a front runner in more sustainable and circular systems. This will require directed research efforts in the clusters but will also benefit from (unanticipated) results emerging from the more 'blue sky science' within the clusters.

WIAS produces work of high societal relevance. Some of this work has had immediate societal impact, other lines of investigation are likely to generate such impact on a longer term. Collectively, the research of the three clusters is relevant to industry, to policy makers, and to the public.

We are convinced of the viability of the chair groups, and that of WIAS. The institute's scientific staff has grown steadily, and it has been successful in attracting a substantial amount of funding from a good variety of sources. It is too early to judge the viability of the current clusters that should be allowed time to mature; they will have to prove their added value in the next six years.

2 Introduction

2.1 Aim of the assessment

All academic research in the Netherlands is evaluated by an independent committee of external peers at six-yearly intervals, along the guidelines laid out in the national Strategy Evaluation Protocol 2021-2027 (SEP). The SEP itself is evaluated periodically and updated by the organisations endorsing it, the Association of Universities in the Netherlands (VSNU), the Dutch Research Council (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW).

The purpose of a SEP evaluation is threefold:
- to assess a research unit in light of its own strategy and aims, including the sufficiency or appropriateness of the aims and strategy;
- to evaluate and help improve the quality, societal relevance and viability of the research;
- to be accountable towards government and society.

New in the SEP 2021-2027 is that in the assessment of all three main criteria, special attention should be paid to four specific aspects: Open Science, PhD Policy and Training, Academic Culture, and Human Resources Policy. The main criteria are defined in the SEP as follows:
- Research quality: the quality of the unit's research over the past six-year period in its international, national or – where appropriate – regional context, and considering its own aims and strategy. Central here are the contributions to the body of scientific knowledge. Moreover, the academic reputation and leadership within the field is assessed.
- Societal relevance: the societal relevance of the unit's research in terms of impact, public engagement and uptake of the research is assessed in economic, social, cultural, educational or any other terms that may be relevant, also considering its own aims and strategy. Where applicable, the peer review committee also reflects on the teaching-research nexus.
- Viability: the extent to which the research unit's goals for the coming six-year period remain scientifically and societally relevant. The committee also assesses whether the aims and strategy of the unit as well as the foresight of its leadership and its overall management are optimal to attain these goals, and whether the plans and resources are adequate to implement this strategy. The committee also reflects on the unit's viability in relation to the expected developments in the field and societal developments, as well as on the wider institutional context of the research unit.

According to the Terms of Reference (ToR) of the current assessment, WIAS is the highest unit to be evaluated. WIAS consists of three clusters: Future Food Systems and Society (FFS), Population Dynamics and Genomics (PDG) and Integrative Biology (IB). The committee bases its evaluation on a self-evaluation report written by the units, and a site visit consisting of interviews of representatives from the units and other relevant persons. In the self-evaluation, the units reflect on their aims, strategy, and achievements over the past six years, as well as their aims and strategy for the future.

The site visit and, particularly, the interviews enabled elaboration and fuller explanation, and provided the committee a deeper understanding of impressions from the self-evaluation report.

In line with the ToR, this report presents its findings with the performance and strategy of the main unit WIAS, followed by that of the three main research clusters within WIAS.

The assessment at the level of WIAS focuses on its three main tasks (as described in the ToR): doctoral education and training, ensuring a coherent research programme, and assuring the quality and progress of the research. In addition, the ToR requests the committee to address the following:

> *Does the graduate school have a sufficiently proactive innovation process (e.g., exchange of best practice between graduate schools) to continuously improve the quality of its three main tasks?*

As the research within WIAS takes place at the cluster level, the main assessment criteria (Q, R, V) are being assessed separately for each of its three clusters (FFS, PDG, IB). Each of these also had the opportunity to add a specific question to the ToR. The only cluster that did so, IB, has asked the committee to address the following:

> *The IB cluster focuses on two subthemes. Can the committee give its opinion on how we can best strengthen either subtheme, and enhance research links between them?*

2.2 The assessment process

The peer review committee comprised the following members (see Annex 2 for brief CVs):

- Prof. dr. ir. Hans Heesterbeek, Utrecht University, NL, Faculty of Veterinary Medicine (Population Health Sciences, Epidemiology)
- Prof. dr. Michael Lee FRSA, Harper-Adams University, UK, (Sustainable Livestock Systems, Nutrition)
- Prof. dr. Tjeerd Bouma, Royal Netherlands Institute of Sea R Sea R S IOZ, (Coastal ecology)
- Dr. Pauline Ezanno, National Institute for Agriculture, Food, and Environment INRAE, FR (Biology, Epidemiology and Risk assessment in animal health)
- Dr. Claire Rogel-Gaillard National Institute for Agriculture, Food, and Environment INRAE, FR (Animal genomics, Microbiome, Immunology)
- Dr. Carl-Gustaf Thulin, Swedish University of Agricultural Sciences SLU, SW (Evolutionary genetics, Fauna restoration and rewilding)
- Prof. dr. Raoul Van Damme, University of Antwerp, BE (Ecology, Evolutionary biology)
- Drs. Marina Meester, Utrecht University, NL, Faculty of Veterinary Medicine (PhD candidate, Farm animal health, Veterinary public health)

Secretarial support was provided by Dr. Jules van Rooij, University of Groningen, NL.

The committee members were appointed by the WU Executive Board and signed a statement of impartiality and confidentiality to ensure a transparent and independent assessment process. They received the documentation end July 2021, after which a division of labour was agreed upon for a preliminary assessment of the self-evaluation, such that three members primarily focused on one cluster. The general parts of the documentation were read by all members. The written preliminary assessments of all committee members were compiled by the secretary and discussed on October 6th, during an online kick-off meeting, where the preliminary findings and the detailed schedule for the interviews were discussed. See Annex 1 for the programme of the site visit.

2.3 Quality of the information

This assessment is based both on written documentation provided in advance, and on interviews, presentations, and discussions during the site visit with chair group leaders representing the three clusters, researchers (including PhD-candidates, postdocs, and young researchers in a tenure track position), WIAS management and representatives of the WIAS Board, the Rector of Wageningen University, and the Director of the Animal Sciences Group.

The committee received a self-evaluation report of 110 pages (including appendices) containing an overview of the organisational structure, past performance, strategy and plans at the level of WIAS and at the level of each of the three clusters. Supplemental documentation (about 80 unnumbered pages) contained information about WUR-level organisation and policies, Wageningen University (WU) PhD policy and a bibliometric analysis for WIAS as a whole and for its three constituting clusters separately. The written documentation was received by the committee well in advance of the site visit, giving the committee ample time to prepare and reflect before the site visit.

The written documentation gave a relevant and high-quality overview of graduate school performance and strategy. At the level of the three clusters, the self-evaluation report was informative but lacked coherence; a more coordinated effort could have led to a more uniform and standardised exposition across the clusters. The documents failed to inform the committee on the shared missions of the respective clusters, their joint vision, or any anticipated synergetic effects. To a large extent, this was to be expected because the present evaluation is carried out in a period of transition in which separate chair groups have been joined in three clusters. Past performance is still very much a chair group-level issue. The written documentation provided sufficient information to assess past performance, scientific quality, and societal relevance. According to the ToR, viability and future plans are to be evaluated at the level of the cluster. Clusters in their present form are, however, relatively young, effectively only existing since 2019. The restrictions imposed because of the SARS-CoV-2 pandemic possibly strongly limited initial interaction and cluster-level discussion and coordination. All this was reflected in the quality of the cluster-level documentation. The committee was extremely pleased to see that the clusters painted a much clearer picture of shared vision and synergy during the interviews and the ensuing discussions with the chair group leaders. This significantly improved the committee's understanding.

According to the SEP, the research unit to be assessed is asked to reflect on four 'specific aspects': Open Science, Academic Culture, HR-policy and PhD-policy and training. Likely because PhD-policy and training is organised at the level of the WIAS (the primary unit of evaluation here), the self-evaluation report was more informative on this subject than on the other three. The information concerning the other three specific aspects was by contrast quite limited. The self-evaluation report only touched upon these aspects in the Supplemental documentation at the level of the University. The committee was supplied with a description of WU-policy and ambitions but did not receive a reflection about the way these policies and ambitions are implemented by the research unit (WIAS level and cluster level) that is being assessed, or of the challenges and strategies specific to this implementation. The absence of a written reflection made it impossible to have an informed in-depth discussion on the three aspects.

3 Structure, organisation, and mission of WIAS

3.1 Organisation of WIAS and position in WUR

The Wageningen Institute of Animal Sciences is one of six graduate schools of Wageningen University & Research (WUR). WUR is a collaboration between Wageningen University (WU) and the contract-based research organisation Wageningen Research (WR). The joint WUR mission is 'to explore the potential of nature to improve the quality of life'.

WUR is organised into five administrative units called Sciences Groups. Within each Sciences Group, a WU department and at least one WR institute are functionally integrated (see Figure 1). The head of the Sciences Group is the General Director, who reports to the Executive Board of WUR.

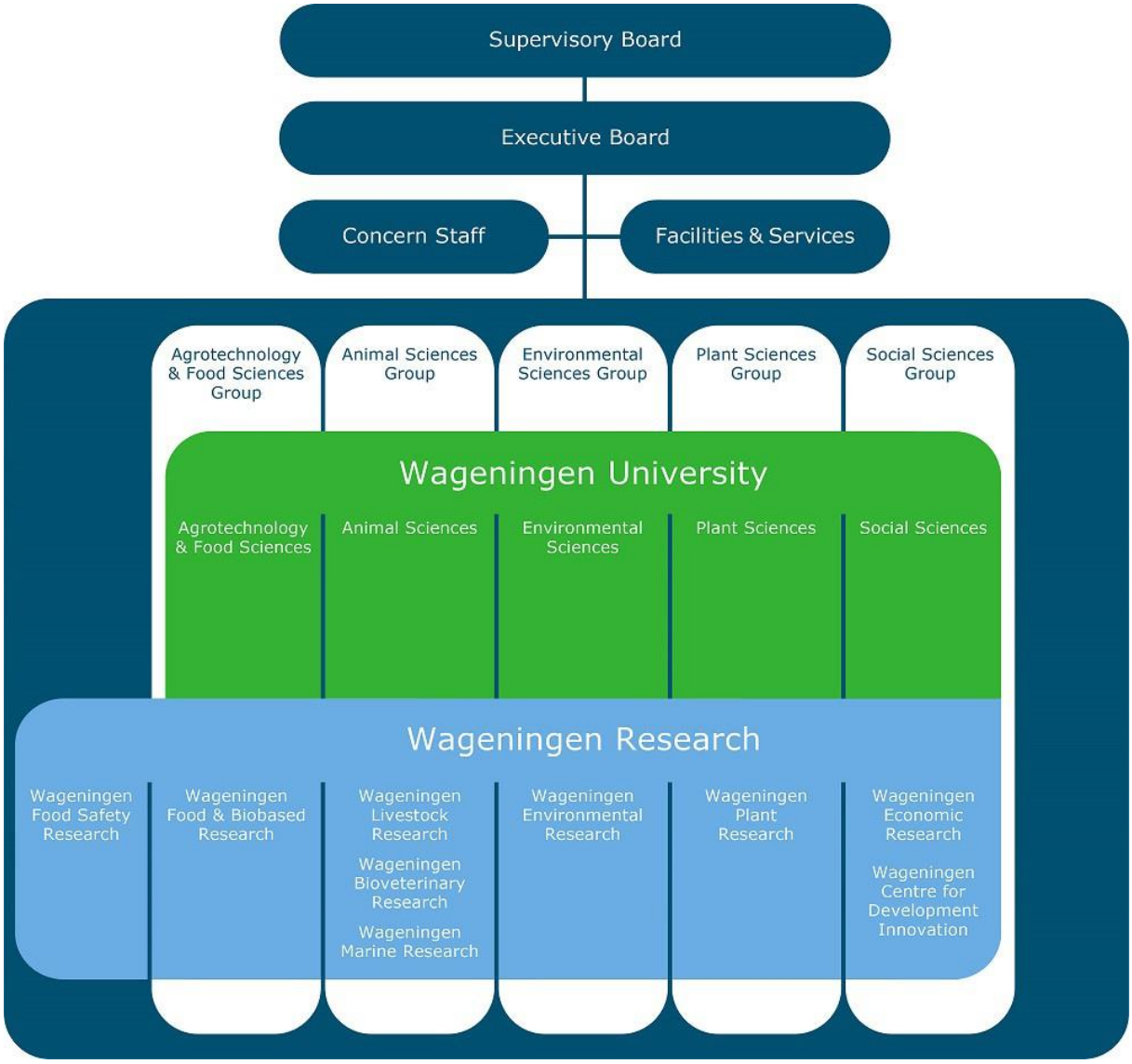

Figure 1 *Organisational scheme of Wageningen University & Research.*

The Executive Board is responsible for the overall management of WUR. The Board is accountable to a Supervisory Board, appointed by the Ministers of Education, Culture and Science, and Agriculture, Nature and Food Quality. The Rector is vice-president of the Executive Board and holds the responsibility for education, student affairs, and research.

In the matrix structure of WU (see Figure 2) the mandate for managerial, HR or financial issues is organised vertically, within the Sciences Groups and chair groups. The graduate schools operate horizontally within this matrix structure, i.e., across Sciences Groups, and do not have a mandate on these issues. Each Graduate School has a board, consisting of Graduate School professors, a PhD candidate and optionally an external member. The board members are appointed by the Executive Board. The Board of the Graduate School is in charge of the development of the general policy and strategy of the Graduate School and decides on the budget. The Scientific Director is responsible for the daily management of the Graduate School. The Director and Secretary prepare and attend the meetings of the Board. They prepare its long-term vision, its scientific direction, and an action plan, together with committees and participating groups.

The Scientific Director and Executive Secretary meet once every year with the General Director(s) of their Sciences Group(s), the Dean of Research, and the Rector to discuss the quality and any emerging issues in the graduate school. In addition to the internal quality cycle, graduate schools are advised on strategy and research quality by their International Advisory Board. Each graduate school has a PhD Council with representatives in the Wageningen PhD Council.

Each Graduate School receives a core budget for the financial compensation of the Scientific Director and the appointment of support staff. In addition, each Graduate School receives a budget for PhD education and training, a budget for research fellowships and a strategic research budget. These budgets scale with the research revenues generated by academic staff within their graduate schools.

The six graduate schools together constitute Wageningen Graduate Schools (WGS), led by the Dean of research. Their task is to stimulate the quality of research and doctoral education, to stimulate collaboration between the graduate schools and to address matters of common interest. The Dean is also advisor of the Executive Board of WUR and represents the Rector in national fora.

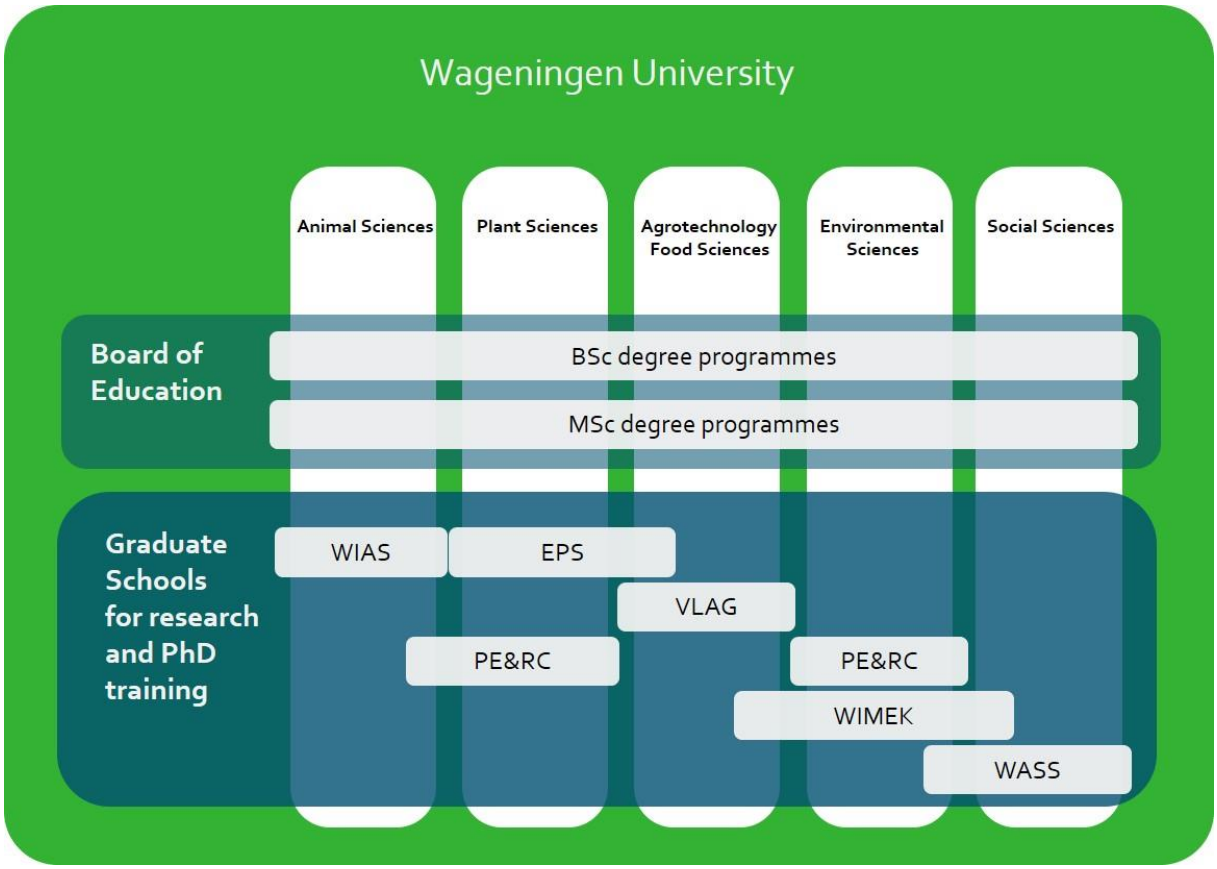

Figure 2 *Organisational scheme of Bachelor (BSc), Master (MSc), and PhD programmes in the five Sciences Groups and the six Graduate Schools (Wageningen Institute of Animal Sciences (WIAS), Experimental Plant Sciences (EPS), Production Ecology & Resource Conservation (PE&RC), Wageningen School of Social Sciences (WASS), Advanced Studies in Food Technology & Health (VLAG)).*

WIAS is largely embedded in the Animal Sciences Group (ASG) of WUR, as part of the WU Department of Animal Sciences, together with three WR institutes: Bio-veterinary research (WBVR), Livestock research (WLR) and Marine research (WMR).

Following recommendations made during the 2018 mid-term review, and subsequent internal discussions, the 12 chair groups of the department of Animal Sciences, together with one chair group from the department of Environmental Sciences were arranged into three clusters in 2018/2019. As a result of internal discussions, the original arrangement was later amended to reach the current grouping. The clusters cover three related, and partly overlapping, core areas: 'Future Food Systems and Society', 'Integrative Biology', and 'Population Dynamics and Genomics'.

WIAS staff amounts to approximately 30 research FTEs (headcount 130) tenured staff, 15 research FTEs (headcount 30) Postdocs and 90 research FTEs (headcount 240) PhD candidates. For comparison, the total WU headcount is 3540 staff[1] and 2000 PhD candidates.

[1] Source: WUR Jaarverslag 2020.

Table 1 *Current composition of the three WIAS clusters.*

Cluster	chair groups	WU Department
Future Food Systems and Society (FFS)	Adaptation Physiology (ADP)	Animal Sciences
	Animal Nutrition (ANU)	Animal Sciences
	Animal Production Systems (APS)	Animal Sciences
	Aquaculture and Fisheries (AFI)	Animal Sciences
Integrative Biology (IB)	Cell Biology and Immunology (CBI)	Animal Sciences
	Experimental Zoology (EZO)	Animal Sciences
	Human and Animal Physiology (HAP)	Animal Sciences
	Host-Microbe Interactomics (HMI)	Animal Sciences
	Behavioural Ecology (BHE)	Animal Sciences
	Wildlife Ecology and Conservation (WEC)	Environmental Sciences
Population Dynamics and Genomics (PDG)	Animal Breeding and Genomics (ABG)	Animal Sciences
	Marine Animal Ecology (MAE)	Animal Sciences
	Quantitative Veterinary Epidemiology (QVE)	Animal Sciences

3.2 Mission and Ambitions of WIAS

The mission of WIAS is:

> *'To improve our understanding of animals and their various roles for mankind through fundamental and strategic research and training of early-stage researchers (PhD and postdoc)'.*

WIAS has three main tasks:
1. Develop, coordinate, and facilitate the education and training of PhD candidates.
2. Safeguard and monitor the quality of the research programme.
3. Facilitate and stimulate the development of early-stage researchers.

WIAS research aims to contribute to sustainable animal production systems, where animal health and welfare are guiding principles. It focuses on the performance and well-being of animals in nature and in food production systems, and on transforming the latter systems (both terrestrial and aquatic) to become more nature inclusive, climate smart, healthy, and circular. To that end, WIAS researchers investigate the biological mechanisms of animal functioning in an evolutionary and ecological context at multiple levels, from molecule to (production) system.

WIAS research is aligned with the overarching strategic investment themes of WU, in particular *Global One Health* and *Connected Circularity*. At a global level, WIAS research aims to enhance the contribution to the UN 2030 Agenda and to mitigate barriers to achieving specific Sustainable Development Goals (SDGs).

3.3 WIAS Governance and Budget

WIAS Board
The Board consists of three professors representing the three research clusters within WIAS, the chair of the WIAS-associated PhD council (WAPS) and one external board member. The Board decides on the strategy of the research and education programme. Board members are appointed for four years and can be reappointed once. The Board is advised by the International Advisory Board and decides on proposals put forward by the WIAS bureau, supported by the Education Committee, the Research Committee and the WAPS. The WIAS Board also advises the Executive Board of WUR on the appointment of the new scientific director every four years.

Scientific Director and Executive staff
The scientific director and executive staff (hereafter, WIAS office) are responsible for the execution of the research and education programme. The scientific director is selected from the WIAS-associated professors, appointed for four years and can be reappointed once. The scientific director has an appointment of 0.4 FTE. The scientific director is supported by the WIAS office, consisting of an executive secretary (0.8 FTE), education coordinator (0.5 FTE), administrator (temporary position; 0.8 FTE) and management assistant (0.5 FTE).

International Advisory Board (IAB)
The IAB advises the Board and scientific director on research and education programmes and policies. The IAB consists of six renowned scientists in the WIAS domain. They visit Wageningen once per year.

Education Committee (EC)
The EC advises the WIAS bureau on the PhD training programme. The committee evaluates the PhD courses organised by WIAS and provides input and advice concerning PhD training within WIAS. The six-member EC consists of three staff members and three PhD candidates. The three staff members are representatives of the three clusters.

Research Committee (RC)
The RC advises the WIAS bureau on the research strategy and programme. The committee evaluates the PhD project proposals and PhD literature surveys, based on peer review reports. They also advise on the selection of WIAS grant applications. The RC consists of five staff members, recruited from the WIAS-associated tenure track personnel and associate professors. RC members are appointed for three years and can be reappointed once.

WIAS-associated PhD (WAPS) Council
The aim of the WAPS is to act in the interest of all WIAS PhD candidates by active participation in the WIAS EC, Wageningen PhD Council and the WIAS Board. WAPS organises course evaluation surveys on a regular basis and is responsible for organising the annual WIAS conference. The WAPS also organises a minimum of four social events per year. The WAPS consists of a minimum of one representative per chair group.

Personal development coach
The personal development coach provides guidance to PhD candidates regarding their personal learning goals and how to reach these. The coaches are not part of the WIAS office but rather are voluntary members of the WIAS chair group community. The chair groups they are representing receive reimbursement for their efforts.

Confidential PhD advisors
WIAS has two PhD advisors for PhD candidates who wish to consult an impartial member of the community on (personal) issues related to their PhD programme. The PhD advisor advises the PhD candidate on how to deal with the situation and how to discuss the matter with their doctoral thesis supervisor, daily supervisor, or chair holder. These advisors work confidentially.

Annual budget
WIAS operates on a budget that is proportional to the number of WIAS PhD candidates graduating each year. WIAS receives a basic funding of 1.8 FTE for running the WIAS office. Funds are available for organising PhD courses and seminars (90k€/year) and strategic PhD and postdoc projects (~280k€/year). There is also an annual budget of 35k€ for fellowships to enable external researchers to visit the university and to enable WIAS PhD candidates to visit a lab or institute abroad to gain international experience.

4 Findings and recommendations

4.1 WIAS-level assessment

General remarks
Since the previous peer review in 2015, the chair groups in WIAS have been reorganised to form three clusters. Following the recommendations of the mid-term review in 2018, there has been renewed discussion and reflection by the chair groups, resulting in several changes. The current clustering is operational since 2019 and seems stable with all chair groups expressing to be happy with their position. The clusters are: Future Food Systems and Society (FFS), Population Dynamics and Genomics (PDG), Integrative Biology (IB).

The committee strongly supports clustering as a structuring principle. We see very good opportunities for synergy and signs that this is starting to be realised. If fully embraced by the chair groups, the clustering is bound to trigger multi- and cross-disciplinary thinking, discussion and interaction from which new opportunities will arise. Most societal and many scientific problems need multidisciplinary interaction for real progress in understanding and application. We found that all chair groups were committed to the current arrangement and were enthusiastically starting to explore and harvest the benefits. The whole can clearly be much larger than the sum of its parts. However, we feel that within the clusters, chair groups should maintain their identity and autonomy. This way they can stay at the forefront of their specific research fields and as such live up to their role as members of the interdisciplinary teams formed within and across clusters. The clusters have been chosen as the unit of assessment in the six-yearly cycle. Therefore, WIAS needs to make clearer what exactly it expects from the clusters. The clusters then must define their ambitions and strategies and how these align with those of the constituting chair groups.

The Next-Level Animal Sciences (NLAS) investment programme is an ambitious and commendable initiative to bring in new technology, tools, and expertise in several key areas for future developments and new opportunities for the next six years. The NLAS initiative will augment research potential, attract societal attention, and open avenues for new national and international collaboration and funding. We recommend reflecting carefully to also use the investment as a tool to stimulate and support the strategies and ambitions of the clusters and to not only focus on benefits at the level of the chair groups.

Identifying WIAS at the unit of the research evaluation is an unusual choice. In other Dutch universities, the body responsible and accountable for the quality of the research is the same as that holding the mandate to improve standards. In the WUR-system, things are more complicated. Mandates from WUR-management lie with chair group holders, with a high degree of autonomy, with the directors of the Animal Sciences Group (ASG), overseeing both the academic department of Animal Sciences and the three institutes of WR in the animal sciences, and ultimately with the WUR Executive Board. Operational and strategic possibilities at the level of WIAS rely heavily on interactions and discussions with the chair groups, ASG management and the WUR Executive Board in this matrix structure. While this may work well in practice, the operating space and influence of the WIAS Board and WIAS scientific director then stand or fall with shared values, ambitions, and strategic visions between all levels of organisation. The committee recommends the WUR Executive Board to simplify the current research organization and to update the executive rules and regulations (BBR 2018), to better align them with the new SEP requirements. In particular, the current division of tasks, responsibilities, and operating space between the management of the ASG, the chair holders and WIAS management appears to the committee to be too complex.

The choice of clustering the chair groups, while applaudable for many reasons as described earlier, may complicate future research evaluation. The reason is that one would not want to introduce an additional management layer with mandates, yet WIAS and the clusters are being assessed and held accountable, rather than the individual chair groups, the ASG or the department of Animal Sciences. The committee recommends that WUR-management considers whether the current choice and/or management structure is still a good match with the demands of the SEP and the abilities of the units and clusters to decisively act on all aspects on which they are evaluated.

The close relation between the WU and WR part of the ASG has a great potential to benefit both parties. In its SWOT-analysis, WIAS has characterised this interaction as both a strength and an opportunity. The committee expresses some surprise that, after approximately 20 years, it is still seen as 'an opportunity', i.e., a potential synergy not fully realised. It was particularly surprising to hear that the institutes were not fully aware of, or strongly involved in, the research undertaken within WIAS. WUR, ASG and WIAS should develop collective aims, vision and strategy to strengthen connections. There are some important achievements in joint facilities, close collaboration and even co-habitation for some disciplines, and several part-time professorships and part-time appointments. It is unclear, however, what the overall aim and strategy are and how perceived mutual benefits can best be achieved.

The WUR and WIAS animal research facilities, and the staff running them, are of high quality and endorse internationally competitive research. However, whilst there is a clear requirement for robust ethical evaluation for the use of animals in research, the committee is worried that internal processes, procedures, and costings negatively impact research advancement through layers of internal bureaucracy. Because of this ineffective system, researchers fail to get access to the facilities in time, which thus fail to reach their full potential. The committee recommends a WUR-, WIAS-, and cluster-level reflection on these areas.

The committee recognises that excellent opportunities exist for collaboration, both in research and in education, between WIAS-clusters and the faculty of Veterinary Medicine at Utrecht University. Various initiatives seem to be active, mostly at the personal level, but also at a more institutional level (for example regarding experimental facilities for research with pigs, animal welfare and regarding expertise in nutrition). In light of this, it is surprising that the self-evaluation report has little to say about the potential for future collaboration. There seem to be many opportunities – for example within the area of animal health and welfare aspects in future food systems and circular agriculture, methodology to study population dynamics, and fundamental research in animal biology –, but these are hardly mentioned in the SWOT-analyses of WIAS or the clusters. What is missing is a joint vision, strategy, and ambition with respect to collaboration with the faculty of Veterinary Medicine in its broadest sense. The committee recommends having a wider strategic discussion regarding this collaboration.

The research environment for the PhD programme

WIAS continues to attract an impressively high number of PhD candidates and is taking good care of them. There is a family feeling, students feel welcome, connect to each other, and help each other. They are taken seriously and are proud to work in WIAS and in Wageningen. WIAS has developed clever procedures to promote and monitor quality, but also innovative active policies to increase a sense of 'ownership' by the PhD-student of their research, recognizing them as equals, providing them with confidence, and trusting them with responsibilities. The PhD candidates we talked to, all expressed enthusiasm to work in WIAS and the opportunities available to them.

The committee was also impressed by the infrastructure and physical environment in which WIAS operates and recognises its role in determining the mindset of employees: the high quality animal and laboratory research facilities available to the PhD-candidates (together with enthusiastic and expert support staff), the new-look campus, the atmosphere and 'the campus vibe' all seem highly stimulating and conducive to good research and training.

PhD training and education programme
WIAS by itself and in combination with other WU-graduate schools, has an impressive catalogue of courses for the PhD-candidates, supplying them with great options to both improve personal and technical skills and knowledge. There is an active policy of adding new innovative courses regularly. We applaud the inclusion of courses specifically conducted for postdocs, and we encourage WIAS to investigate the specific needs of this group and acting upon the outcome. One area of attention is keeping the postdocs adequately informed of the possibilities. WIAS has shown to be flexible during the pandemic, organising courses online and keeping the educational effort at the desired level.

Specific aspects to be addressed in the SEP 2021-2027
As described in section 2.3, the information supplied about Open Science, Academic Culture and HR-policy comprised the ambitions and policies at WU-level rather than a reflection at the level of the unit or its sub-units (the clusters). The committee has therefore chosen not to address these aspects at the level of the clusters and can only do so in the most general of terms. The committee strongly recommends bringing the self-evaluation report for future assessment in line with what the SEP requests of the unit being evaluated.

Open Science
All clusters report a substantial increase in open access publications over the reporting period, with currently 75-83% of papers published open access, depending on the cluster. This is close to the 84% that is reported for WU as a whole. It is unclear what the WIAS- and cluster-level ambitions and strategy are to increase the proportion of papers published open access even more. The strong connections with industry partners within several of the clusters can pose challenges here. No information was provided to the committee to judge the quality standards of open access publication. Although several important aspects of Open Science (e.g., FAIR data policies, interactions with stakeholders) were only briefly considered, our discussions with the three clusters made clear that they subscribe the WUR-level ambitions on Open Science. Still, we recommend organising a thorough discussion on all aspects of Open Science to better align the clusters' strategies with the ambitions of WUR and to identify possible challenges and impediments.

Academic Culture
WIAS is privileged in employing a good number of competent and enthusiastic young scientists in a tenure track appointment. These researchers hold WIAS' key to the future and their scientific and educational efforts should be cherished. However, the committee learned that several of the tenure-tracked researchers are experiencing excessively high workloads and struggle to meet the high expectations placed on them. The committee recommends that WIAS moves away more quickly from the strictly quantitative performance indicators and adopts an evaluation system more in line with the new Dutch Rewards and Recognition approach. The increased flexibility and broader view of achievements and quality in this approach is strongly recommended. In addition to this, it also seems clear that calculative behaviour has evolved to satisfy criteria, and this leads to undesired suboptimal and opportunistic decisions by the young scientists about which connections and scientific problems to pursue.

Such calculating behaviour could also apply to personal chairs at 'the other end' of the tenure track system. While it is an important recognition for a scientist to achieve the status of full professor, the five-yearly evaluation and performance assessment create an undesired inequality in the valuation at this highest academic level, compared to other full professors. The committee recommends revisiting this policy and awarding personal chairs a permanent status following a single positive evaluation after five years. Moreover, the committee recommends that this evaluation is brought in line with the new Rewards and Recognition approach.

WIAS pays adequate attention to ethics and integrity, with two courses on these aspects being mandatory for all PhD candidates as of 2020. It is unclear whether actions are being undertaken to promote these aspects for postdocs and WIAS staff in the clusters.

HR policy
From the quantitative information provided in the written documentation, the composition of WIAS' (permanent) staff is predominantly white, Dutch, and male. Clearly, the transition towards a more equal gender balance has begun, currently most noticeable in the more junior (permanent) staff positions. WIAS and its chair groups are aware that more effort is required. For example, policies have been put in place to actively remedy unconscious and unintended bias in job descriptions and search/selection committees. At WIAS, there is great potential and diversity, in various dimensions, at the PhD- and postdoc-level while diversity at tenure track-level is increasing. This will not automatically translate into diversity (including and beyond the female/male balance) in tenured research staff even with attention for job descriptions and selection. Explicit action is recommended, to also include, in addition to gender, disability, cultural background and country of origin. This should start with reflection on (other) potential biases in processes of hiring, or potential unconscious and unintended obstacles that lower attractiveness to a more diverse range of candidates, preventing them to apply for positions beyond the PhD- and postdoc-level. WIAS is succeeding very well in making a diverse group of PhD-candidates feel 'at home'. Reflection on the aspects that have created this desirable situation may yield policies that can promote diversity at higher academic levels. This could, for example, include a more pro-active attitude of HR-staff in anticipating needs of non-PhD staff in temporary positions and offering free Dutch language classes for young researchers considering a career at WIAS.

Additional question in ToR
The committee was asked whether WIAS has a sufficiently proactive innovation process to guarantee continuous improvement of its three main tasks. The committee has the impression that the answer is affirmative where the education and training of PhD candidates and other young researchers are concerned (task 1 and 3). WIAS has initiated new courses and activities that have been copied by other WU Graduate Schools and has in place innovative procedures to stimulate 'ownership' of their research for the PhD candidates. However, the committee feels WIAS could also be more outward looking and obtain inspiration from (other and/or additional) good practices of Graduate Schools outside WU with respect to education and training of PhD candidates and development of early-stage researchers. Other Graduate Schools could also learn from good practices at WIAS. Regarding its task (task 2) to monitor the quality and to stimulate the coherence of research within its mission, proactive innovation is less clear. This is not necessarily because of limited ambitions or ideas. The committee doubts whether its current limited mandate and responsibilities suffice for WIAS to bring into practice substantial innovations for this task.

Major recommendations
- To continue the use of clusters as a structuring principle, providing excellent opportunities for synergy, multi- and cross-disciplinary collaboration and to address societal challenges. But also to maintain the identity and autonomy of the chair groups should be maintained, allowing them to remain at the forefront of their individual research fields.
- To simplify the current research organization and to update the executive rules and regulations (BBR 2018), to better align them with the new SEP requirements. To clarify and simplify the division of tasks, responsibilities, and operating space between the management of the Animal Sciences Group, the chair holders and WIAS management.
- To reconsider, in light of the above, what is taken as the basic unit of evaluation under the current SEP to ensure that this unit has the mandates, responsibilities, and operating space, and can hence be held accountable.
- To determine and implement what is expected from the clusters. These must then define their own ambitions and strategies in light of that expectation and in alignment with those of the participating chair groups.

- To use the NLAS investment programme as a tool to stimulate and support the strategies and ambitions of the clusters, rather than focusing primarily on chair group benefits.
- To strengthen the WU-WR synergy by formulating a shared ambition, vision, and strategy at the level of WUR, ASG and WIAS.
- To strengthen the synergy between WIAS and the faculty of Veterinary Medicine by formulating a shared ambition, vision, and strategy at the level of WIAS and the clusters.
- To align the self-evaluation reports better with SEP requirements for future evaluations and to include descriptions of how Open Science, Academic Culture and HR ambitions are implemented by the units being evaluated besides those at WUR-level.
- To organise a thorough discussion on all aspects of Open Science (beyond open access publishing) to further align the clusters' strategies with the WUR ambitions and to identify possible challenges and impediments.
- To move away more quickly from the strictly quantitative performance indicators for tenure track positions and adopt an evaluation system more in line with the Dutch Recognition and Rewards programme. Similarly, the committee recommends revisiting the evaluation system for personal chairs and award them permanent status after the first positive evaluation.
- To improve diversity in terms of gender, disability, cultural background, and nationality. For example, investigate potential bias in hiring and unconscious obstacles potentially reducing attractiveness to a more diverse range of candidates.

4.2 Cluster-level assessments

4.2.1 Future Food Systems and Society (FFS)

Aims and strategy
The mission given in the self-evaluation report was 'to develop knowledge for the transition towards a sustainable role of animals in food systems and society'. This mission clearly focuses on food systems, which is an internationally recognised strength of the cluster and chair groups, but it also acknowledges a role of the cluster to support animals in society outside food production i.e., ecosystem services, livelihood support, companionship, and leisure. However, this wider role is missing from the strategy and self-assessment, so much so that 'and Society' is often omitted from the clusters name. Clearly, this needs to be addressed and re-evaluated. The strategy focuses on three research lines: i) The role of animals in future food systems; ii) Animal health and welfare in future food systems; iii) Interactions between biomass characteristics, animal production and food; to be addressed through collaboration of four chair groups (Adaptation Physiology (ADP); Animal Nutrition (ANU); Animal Production Systems (APS) and Aquaculture and Fisheries (AFI)). The aim and strategy of the cluster can be summarised as building on from the theme of circularity, which has been a clear national and international success for the cluster with world leading research. However, this sole over-riding theme may hide previous success and plans to tackle critical global food system challenges for which the group clearly has the track record, capability, and ambition for further investigation (e.g., nitrogen and phosphorus use efficiency in livestock systems; enteric methane mitigation; social views of livestock within the food chain; fish stocks and aquaculture development and of course the wider aspect of animals in society).

The committee recommends a reappraisal of the aims of the cluster to address the collaborative strength of the chair groups, so that they build multi-disciplinary delivery to major challenges facing the livestock sector. In addition, the major challenges the cluster will address the next six years deserve clarification and clear articulation in the mission, building on the combined strengths of the chair groups, in particular regarding societal aims.

Research quality
The committee had no concerns regarding the research quality of the cluster with an impressive list of achievements in driving the connected circular system for the future of livestock in food security, which is a clear focus and success of the cluster. There were also examples of high-quality research outside the direct focus of the 'circularity theme' including the Tier 3 model of estimating methane production feeding into the greenhouse inventory; emotional state welfare work; and the critical work on addressing the 'nitrogen crisis'. However, given the obvious vital nature of these high-calibre, high-impact pieces of work, especially in relation to nitrogen pollution, it was surprising to not see more examples of these successes especially in relation to plans for the future. The committee saw the submission by the cluster and therefore the quality and results of the past six years as the summed results of its four chair groups, rather than the combined collaborative efforts of the cluster. In future one would hope to see more examples of synergism and multi-disciplinarity coming from the cluster, which will have even greater potential to address many of the growing issues around future food systems and society. The cluster has presented a coherent vision, with three research lines that appear well designed but still must prove their added value / viability for the next appraisal at cluster level. The FFS cluster appears to be too modest about its leading position in many topics, as reflected by many high impact publications. The cluster is clearly driving many of the University wide strategic themes, for example NLAS, which shows the quality and strategic relevance of the research.

The committee recommends a reappraisal of the FFS role in tackling wider aspects to animals in society (eco-system services, livelihoods, companionship, and leisure) – is this a target for this cluster or through connections to other clusters? We also suggest formulating clearer ambitions and to differentiate between different stakeholder groups (e.g., economy/industry, policy/government, outreach/public

support). Defining key performance indicators would facilitate assessment of the true impact and further potential of the cluster's research.

Societal relevance

There is clear evidence of high societal relevance and impact for the FFS cluster as a whole. This was, however, not equally apparent to all chair groups from the self-evaluation report. The Dutch policy switch towards circularity, largely based on the policy paper "Re-rooting the Dutch Food Systems" by Prof. de Boer and Dr. de Olde, that received two international awards (EAAP Leroy Fellowship, Rockefeller Food System Vision Prize 2020), is testament to this high level of societal relevance and impact. Presence in and influence on international activities and debates, e.g., in FAO, EU and Horizon 2020 are great successes of the cluster as well as the high level of industry funding. However, the committee thinks that the cluster should distinguish more clearly between different stakeholder groups and impact aims (e.g., economy/industry; policy/government; outreach/public support); this would make it easier to assess the true impact and further potential of the cluster's research. Relevance to society would have been better assessed through a clear articulation of how the outcomes of the research influenced policy and practice directly. A clear identification of these influences, rather than just a list of outputs, would have been greatly received by the committee. The alignment to UN sustainable development goals was a useful approach adopted by the cluster. The focus of the cluster not to maximise animal production, but rather to maximise sustainability is highly relevant not only to the Dutch context, but globally; although how this message is being applied so that industry is working in concert with the cluster and WIAS was not so clear. The role of the scientists within the cluster to influence and inform also needs to be more clearly defined and targeted given the impact of the research on the future of the planet. What is missing in the FFS mission / long term vision are ambitions to address the most pressing societal challenges, climate change, biodiversity, wildlife conservation. Clearly the cluster has huge potential to address these but the 'new' strategy building on from the previous six years came across as 'business as usual', which critically undervalues the potential of the four chair groups working together to tackle these issues collectively within the cluster.

The committee recommends FFS to increase its external visibility, and to emphasize common themes, shared mission, vision, and collaborations, to present the chair groups outside WIAS as a functional entity.

Viability

The cluster is clearly viable as a powerhouse for addressing the major challenges (climate change, N, P & C pollution, resource use efficiency, food vs feed competition etc.) which faces livestock agriculture and their role in delivering human and planetary health. This view of the committee is built from the clear international quality and performance of the individual chair groups and the high-quality facilities at their disposal (although the cost of facilities and wider animal-research ethical approval concerns have been noted and are addressed at the WIAS-level assessment). For the full potential of the cluster to be realised and therefore its viability, greater collaborative cross-chair group strategic thinking needs to be delivered. This higher-level strategic mapping focusing on addressing these major world threats to sustainability, the committee has no doubt, will realise even greater potential for WIAS and WUR to be leading in this vital area of research, a whole truly greater than the sum of its parts. Clearly social science is vital around consumer perceptions of livestock to tackle these major challenges, and this will require more of a focus within the cluster. Whether this cluster should also consider the wider aspects of human-animal interaction as articulated in its mission to include the role of animals in eco-systems, livelihood support, companionship, and leisure or to deliver this through collaboration with other clusters and groups is something that the cluster and chair groups need to urgently address and re-focus on accordingly. The committee recommends FFS to strive for growth of its expertise and capacity in niches less well covered at present, allowing realization of its broad mission that has huge potential for impact and strong viability. This calls for more concerted cluster actions and less thinking in terms of chair group priorities, but this needs to have bottom-up support as well as top-down instigation. In addition, to

secure continuation of their research lines, FFS is advised to have a clear succession plan for the current chair holders.

Recommendations

- To reappraise the aims of the cluster to address the collaborative strength of the chair groups so that they build multi-disciplinary delivery to major challenges facing the livestock sector.
- To clarify and clearly articulate in the mission the major challenges the cluster will address for the next six years, building on the combined strengths of the chair groups, in particular regarding societal aims.
- To make clear whether tackling wider aspects to animals in society (eco-system services, livelihoods, companionship, and leisure) is among the primary ambitions of this cluster or whether this can be achieved through connections to other clusters or groups outside WIAS.
- To define specific KPIs which assess impact between different stakeholder groups (e.g., economy/industry, policy/government, outreach/public support), this would make it easier to assess the true impact and further potential of the cluster's research.
- To increase the cluster's external visibility, and emphasize their common themes, shared mission, vision, and collaborations so the clusters are shown to be a functional entity outside WIAS.
- To strive for growth of the cluster's expertise and capacity in niches less well covered at present, allowing realization of its broad mission, and further strengthening its potential for impact and its viability. This calls for more concerted cluster actions and less thinking in terms of chair group priorities, but this needs to have bottom-up support as well as top-down instigation.
- To draw up a concrete succession plan for the current chair holders, to ensure that the common vision for the cluster is maintained.

4.2.2 Population Dynamics and Genomics (PDG)

Aims and strategy

The PDG cluster comprises the three chair groups Animal Breeding and Genomics (ABG), Marine Animal Ecology (MAE) and Quantitative Veterinary Epidemiology (QVE). The overall achievements of the cluster are of high quality with scientific and societal impacts across all chair groups. The cluster started working in this new format in January 2020, the aims being on the one hand to share secretary, equipment, and facilities, and on the other hand to start common scientific and social activities such as seminars and meetings. The cluster has shown a strong potential to promote original and relevant programmes across the three chair groups by combining issues relating to wild and farmed animals, genetics and artificial intelligence, population dynamics and epidemiology. The alliance between veterinary sciences and computer vision and data sciences is promising. The cluster has strong assets to find the appropriate opportunities for its scientific strategy to thrive in the near future. However, to strengthen its coherence and visibility as a new entity, the cluster is advised to formulate a common scientific strategy with shared aims and priorities. In line with new approaches suitable for crosscutting programmes, we recommend the cluster to develop research and training actions aimed to stimulate interdisciplinary expertise and culture. For example, a potential joint aim that came up during the interview and seems to fit all chair groups, could be: 'Understanding variation between individuals and how interaction between these individuals and with their common environment shapes population phenomena', or vice versa 'Understanding population phenomena from variation between individuals and their interactions with each other and their common environment', depending on whether the ultimate focus is at the individual-level or the population-level. This, or a similar, shared aims could be pitched more clearly and may inspire the cluster to find another name that better reflects its shared interest.

Research quality

The scientific research is of globally competitive high quality and of high impact. The main research objectives in the past and for the future are clear, with focus on the one hand on big data, sensor technology, and artificial intelligence, and on the other hand on integration with social sciences. However, the cluster's overall objectives could be better motivated and specified in the broad context of global climate change, and the need for adaptation and mitigation. The top 20 collaborating institutes are in Northern Europe including France and UK, in USA and in Australia, but a global research strategy appears to be missing. Our committee recommends highlighting more explicitly the current and aspired positioning compared to international teams with related research questions, allowing PDG to sharpen its focus and better present its unique position. To that end, it would help to elaborate an international research strategy that prioritizes collaborations, either to be continued or to be initiated (e.g., with low-income countries). The committee wonders whether there is a plan to strengthen collaboration with countries from Southern and Eastern Europe, as well as with other parts of the world. We advise to be clearer on how much international collaboration is aspired and regarded manageable. In addition, research activities related to diversification of breeding goals beyond social interactions and animal welfare, deserve more focus, although we recognize their importance. We foresee problems regarding environmental impact assessment of renewed breeding strategies and farm practices. Therefore, it would be interesting to start collaboration with groups working on the modelling of impacts at the level of socio-agro-ecosystems. The committee also advises to highlight practices regarding open software (in addition to open data). We also see potential for phylodynamics approaches, currently receiving growing interest in the field. Finally, the cluster's investment in research relating to microbiomes and pathogen diversity deserves further explanation.

Societal relevance

The committee is confident that the societal relevance of the cluster is high. The actual societal impact of the cluster is harder to assess. The impact is shown mainly by the number of publications mentioned in policy documents and news media, and by the involvement of chair group members in expert panels. The number of publications aimed at the wider public is limited (0-1 per year except for six in 2019). Judging from the additional information presented during the interviews, the committee is confident that there is

a high potential for impact. This could be enhanced, for example by more targeted classification of ambitions and strategy to achieve impacts for distinct stakeholder groups, distinguishing between livestock industry (e.g., genomic selection), citizens (e.g., SARS-CoV-2 project), policy makers (e.g., capacity to contribute to the red list statistics of endangered species), et cetera. In addition, implementation of a systematic way to keep track of all impact events, beyond media and public-targeted publications, would allow a richer representation to be provided for the next SEP assessment. The committee feels PDG is currently underselling its actual societal relevance. A final recommendation is to increase outputs and activities aimed at the general public, which would further diversify PDG's impact.

Viability

Interactions between the three chair groups already exist and seem very promising for the future. PDG is very viable, given their strategic plans and most recent investments and appointments. The chair groups are clearly attractive to young scientists and PhD candidates, and PDG staff also supervises many Master students. Although many examples are mentioned, it remains somewhat difficult to obtain a clear view of strategic funding projects, alliances, topics or PDG skill development. The ambitious investment programme NLAS is expected to increase interactions between the chair groups within the cluster, as well as with other clusters. It could also greatly strengthen the connection with WR and is expected to strongly contribute to the viability of the cluster. We recommend explicit discussion of shared goals and opportunities, and further precision of the links between research ambitions and available funding for projects led by the chair groups. The appointments of honorary professors are well chosen but the cluster would benefit from a clear overall strategy and ambition in connecting to WR. A potential worry for viability of the cluster is the retirement of key chair group holders in the coming evaluation period. We recommend preparing in a timely fashion for new appointments to be able to realize the cluster's joint ambitions and to continue the research lines into the future.

Recommendations

- To consider the cluster as a new entity for promoting a common strategy on shared research aims and priorities.
- To formulate a focused joint mission and to consider renaming the cluster to reflect this shared interest and goals and increasing PDG's external visibility. A mission covering the joint research interests is for example: 'Understanding variation between individuals and how interaction between these individuals and with their common environment shapes population phenomena'.
- To reflect the above by a number of cross-chair group research lines and projects, for example aimed at the study of responses and adaptations to environmental conditions and hazards at population level, considering genetic variabilities and phenotypic plasticity at individual level.
- To precise research activities related to the diversification of breeding goals beyond social interactions and animal welfare. To initiate collaboration with groups working on socio-agro-ecosystem modelling of environmental impacts of renewed breeding strategies and farm practices.
- To diversify societal impact classification according to ambitions and targets for different groups of stakeholders in livestock, citizens, policy makers.
- To strengthen coherence and viable collaboration by further clarification of anticipated NLAS benefits.
- To better align PDG's research ambitions and available funding with projects led by chair groups.

4.2.3 Integrative Biology (IB)

Aims and strategy
The IB cluster is focussed on a fundamental, mechanistic understanding of animal biology. This includes aspects of human biology, and therefore IB's research, uniquely within WIAS, also has medical relevance. Together, the research of the chair groups spans all levels of biological organisation, ranging from the molecular to the ecosystem levels. The wide scope of the cluster, and in particular the fact that its research is not restricted to farm animals, realises opportunities for broadening the WIAS-mission. While the unsatisfactory self-evaluation report fails to reflect this, during the in-situ interview it became clear that the chair groups have embraced the new cluster, and in their interview, they provided the committee with an enthusiastic joint vision. By further increasing the interaction among groups, they strive to create the interdisciplinary platform that is required to tackle many fundamental and societally relevant problems.

The committee feels that the future vision and strategy of the cluster needs further elaboration. In particular, the committee sees great potential for application of the cluster's fundamental knowledge and expertise in coordinated multidisciplinary collaboration (WUR-wide and beyond WUR) to address major societal challenges, see below.

Research quality
The chair groups constituting the IB cluster have an impressive and consistent track record with striking research accomplishments and innovations during the assessment period. The assessment committee also acknowledges that the members of the IB cluster vividly strive for freedom and creativity and provide expertise useful to many other groups in- and outside WIAS. The cluster is highly attractive for undergraduate and graduate students (including PhD candidates), and as such, it also provides added value to WIAS and WUR. The committee encourages the IB cluster to adopt an agro-ecological approach; a production system that integrates high-end technology, rational husbandry and production systems with diversity and coexistence of humans, wildlife, and domestic organisms in rich, resilient, and vivid landscapes. We believe that the cluster could benefit from additional collaborative efforts along these lines both in terms of scientific output and societal impact.

Societal relevance
Due to its fundamental nature, the societal impact of the cluster's research is both widespread and difficult to gauge directly. However, the topics studied are clearly highly relevant and the research activities of the cluster will allow tackling fundamental and practical questions in the long term. The bee project, the malaria mosquito trap project and the work on health and metabolism constitute examples of joint initiatives that, given appropriate funding and continued collaboration, are likely to generate both fundamental insights and direct short-term benefits. As mentioned above, the cluster's fundamental knowledge and expertise offers great opportunities for addressing highly relevant societal challenges. Examples include: 1) changes towards more sustainable and circular production systems, 2) experimental findings that facilitate better understanding of natural environments 3) sustainable co-existence wildlife – livestock – humans (e.g. wolves in NL), 4) global and regional biodiversity decline and the issue of conservation imperialism, 5) optimize CO_2 neutral biomass production to feed the planet, 6) knowledge necessary for society to sustainably coexists with wildlife and biodiversity in sustainable ecosystems, and 7) opportunities of biomimetic approach.

Viability
The IB cluster is certainly very viable, given its high quality, relevant research, its high success in the acquisition of competitive national and international funding, the great interest of Master- and PhD candidates in its research topics, as well as that of postdocs, representing the next generation of professors. A great asset for IB's viability is the potential to combine different fields of expertise that will allow the start-up of other important interdisciplinary and multi-level projects. In addition, the wide scope of its research (taxonomically, with respect to the levels of organisation) and the obvious societal

relevance (health, ecosystem services) will prevent the cluster to become obsolete (e.g., if interest in agribusiness would fade).

The committee is confident that the chair groups will continue to flourish and stay at the forefront in their fields of research. The cluster is fully aware of the limited realisation of its integration ambitions so far and is addressing this. The formation of the cluster has triggered new ideas and traverses the fields of the constituent chair groups, but at the same time it has sparked innovative thinking within the respective disciplines. However, the committee perceived that the ambition and efforts for setting up genuinely integrated research projects has begun recently and urges the chair groups to continue working on an overarching research vision and strategy.

Regarding academic impact, a major focus of the IB cluster appears to be resilience in terms of human health, while the overall global challenge of ecosystem resilience, long term coexistence of organisms and impact of a changing climate receive less attention. Although the IB cluster is aware of the urgency of the latter, as apparent from the recently started integrated bee research project that also addresses sustainability at ecosystem level, the committee feels more research along these lines would further increase IB's viability.

The fundamental nature of the expertise in this cluster may result in IB staff contributing disproportionately to teaching, attracting large student numbers, also with courses not aimed at animal sciences. The staff does so with great enthusiasm and in joint teaching programmes that prove to be an important additional stimulus for collaboration. However, care must be taken that the burden remains manageable and proportional. The high teaching load is especially worrying for tenure track staff, in which it competes with other essential requirements, such as generating research output and applying for funding. As a result, they tend to be less involved than tenured staff in developing a shared mission and strategy. This is undesirable as the tenure track staff are seen as the future of the clusters. PhD candidates are highly motivated to take up teaching tasks, but at risk of delay. The committee suggests an introduction of a system with time compensation (extension) for PhD contracts that are involved in teaching.

Additional question in ToR
In the ToR, the committee has been asked to give an opinion on how the cluster could best strengthen the subthemes and enhance the research links between them. Given the future evaluation at cluster level, the latter is particularly important. The committee is convinced that to advance the cluster, the constituent chair groups must keep operating at the forefront of their respective disciplines. However, there are good opportunities for selected projects where collaboration between the subthemes is essential for progress, stimulating scientific innovation in both (as exemplified above for the 'bee project'). The committee recommends pursuing several such themes such that collectively the themes combine all chair groups. Successes here will be important for cluster coherence, cross-fertilisation, and the way new PhD candidates, postdocs and staff view scientific collaboration as a sound basis for future assessments of the cluster as a viable and necessary research unit.

Recommendations
- To further elaborate the future vision and strategy.
- To fully exploit the opportunities of coordinated multidisciplinary collaboration for addressing major societal challenges.
- To introduce a system allowing a better balance between teaching and research, in particular for tenure track staff, and to provide time compensation (extension) for PhD candidates involved in teaching.
- To reflect on introducing an agro-ecological approach, a sustainable production system integrating high-end technology, rational husbandry and production systems with diversity and coexistence of humans, wildlife, and domestic organisms in rich, resilient, and vivid landscapes.

Annex 1 Site visit programme

Monday 11 October

18.30	Arrival of committee-members in Wageningen and dinner with WIAS-representatives

Tuesday 12 October

09:00-09:30	Welcome by the Rector Magnificus of WU
09:30-09:40	Introduction to ASG/DAS
09:40-12:00	WIAS session
12:00-13:00	Lunch with WIAS staff, WIAS board and chairs RC & EC
13:30-15:30	Tour at selected animal facilities (location Carus)
15:30-17:00	Discussion with PhDs/postdocs/ Tenure trackers
17:30-18:30	Drinks with WIAS staff, PhD candidates, postdocs & TT
19:00	Dinner (committee only)

Wednesday 13 October

09:00-12:00	Cluster session FFS
12:00-13:00	Lunch with representatives from FFS and PDG clusters
13:00-14:30	Lab tour (location Zodiac)
14:30-17:30	Cluster session PDG
17:30-18:30	Open-office hour
19:00	Dinner (committee only)

Thursday 14 October

09:00-12:00	Cluster session IB
12:00-13:00	Lunch with IB
13:00-14:30	Internal discussion of the committee
14:30-15:30	First feedback to WIAS and the rector on findings committee
15:30-16:30	Wrap-up with drinks

Annex 2 Bio-sketches of the peer review committee members

Prof. dr. ir. J.A.P. (Hans) Heesterbeek, Utrecht University, NL
Faculty of Veterinary Medicine, Department of Population Health Sciences
Chair: Theoretical Epidemiology
Areas of expertise: Dynamics of Complex Systems, Infectious Diseases, Population Dynamics, Theoretical Ecology, Mathematical Modelling

Hans Heesterbeek has a broad research interest on the interface between biology/medicine and mathematics. His focus is on the dynamics of infectious disease, currently in particular on the interaction between (wildlife) ecology and (human disease) epidemiology, with an overall emphasis on the development and use of mathematical tools to generate relevant biological and public health insight, most often in close collaboration with others. One of the methods he contributed to is the method, now used worldwide, to define and calculate the reproduction number of infectious diseases for epidemiological models (his PhD-thesis from 1992 was titled: R_0). He has co-authored several books on mathematical modelling of infectious diseases. He is the founder and initial Editor-in-chief of the journal *Epidemics* (2008-2020) and editor of *Proceedings of the Royal Society B* (2011-present). He is the main organiser since 2011 of the bi-annual conference for researchers in the field of infectious disease dynamics/modelling (called *Epidemics#*, edition #8 in 2021). He has held positions as head of various departments of the faculty of Veterinary Medicine (Farm Animal Health, Animals in Science and Society, Clinical Sciences of Companion Animals) from 2011 to 2020. From 2020 he chairs the Committee for Research Integrity of Utrecht University and the University Medical Centre Utrecht. He also chairs the Open Competition funding programme of the Dutch medical research council.

Professor Michael Lee, Harper-Adams University, UK
Interim Vice Chancellor Harper-Adams University
President of the European Federation of Animal Science, Livestock Farming Commission
President of the British Society of Animal Science
UK Representative on Animal Task Force - EU
Advisor for the Food, Farming and Countryside Commission
Member of Animal Science Group - Royal Society of Biology
Area of expertise: Sustainable Livestock Systems and Nutrition

Professor Michael Lee is an expert in sustainable livestock systems, defining their role in securing global food security at the same time as protecting environmental health (Livestock's role in human and planetary health). He graduated with first class honours in Animal Science from University of Wales, Aberystwyth in 1997 and gained a PhD in ruminant nutrition (protein and energy metabolism) from the University of Aberdeen in 2001 followed by Post graduate certificate for teaching in higher education from Aberystwyth University in 2012. He worked for the Institute of Grassland and Environmental Research from 2001-2008 (with his first post-doc on ruminal lipid metabolism), before the merger with Aberystwyth University where he stayed as a Principal Scientist and Senior Lecturer in animal nutrition and rumen biochemistry until moving to the University of Bristol, School of Veterinary Science (Bristol Veterinary School) in 2013 as a Reader in Sustainable Livestock Systems. In 2015 he took a joint appointment between Rothamsted Research and the University of Bristol as Head of Site at North Wyke and was promoted to Chair in Sustainable Livestock Systems later that same year. In November 2020 Michael moved to his current position as Deputy Vice Chancellor of Harper Adams University, England's Premier specialist agriculture and land use University, before taking on the interim role of Vice Chancellor for three months prior to the arrival of the new Vice Chancellor in November 2021. He has published

over 300 research articles and papers including recent articles in Nature and Science. He was awarded the Sir John Hammond Memorial Prize in 2015 for services to Animal Science. In August 2016, he was elected as Vice President of the European Federation of Animal Science Livestock Farming Systems Commission and in August 2019 became President of the commission. In April 2018 he was elected as Vice President of the British Society of Animal Science and took on the Presidency in April 2021.

Prof. dr. Tjeerd J. Bouma, Royal Netherlands Institute of Sea Research NIOZ, NL
Department Estuarine & Delta Systems, Yerseke
Lector at the University of Applied Sciences, Vlissingen
Professor at the Department of Physical Geography, Faculty of Geosciences, Utrecht University, the Netherlands
Honorary Professor at the University of Groningen
Areas of expertise: Ecological restoration, Nature based flood defence, Biophysical interactions, Bio-geomorphology, Coastal vegetation, Benthic ecosystems, Managing Ecosystem Services

Tjeerd Bouma studied biology at Utrecht University, did a PhD in the field of Plant Physiology at the Wageningen University (i.e., quantifying maintenance costs in agricultural crops), followed by a postdoc in the field of Plant Ecology at Pennsylvania State University USA (i.e., quantifying drought stress on energy use and root longevity in fruit trees). Since then, he has worked at the NIOZ-Yerseke (former NIOO-CEME) on the ecology of tidal wetlands in estuaries and deltas.

During the last 10 years, he focussed his research on bio-physical interactions between the forces originating from tidal currents and waves, and species that alter these forces and thereby the environment (i.e., ecosystem engineers). Biophysical interactions by ecosystem engineers (e.g., vegetation like salt marshes, mangroves, seagrass, aquatic water plants, reef forming animals, bioturbating animals) can have major consequences for the functioning and development of the estuarine and coastal landscape. He is interested in obtaining a better understanding of ecosystem engineering as a strategy (fundamental ecology), the thresholds ecosystem engineers encounter in establishing (overcoming bottle necks in ecosystem restoration), the influence ecosystem engineers have on ecosystem functioning by altering resource fluxes, biodiversity, ecosystem resilience and landscape evolution (management implications) and especially the opportunities this offer for benefiting from ecosystem services (e.g. nature based coastal defence, food provisioning, maintaining biodiversity, recreation, etc.).

Dr. Pauline Ezanno, National Institute for Agriculture, Food, and Environment INRAE, FR
DYNAMO team leader: "Modelling in population dynamics and animal epidemiology"
Senior Researcher (DR2) INRAE, HDR UMR 1300 BIOEPAR
Areas of expertise: Stochastic mechanistic modelling, Epidemiology and population dynamics, Multi-scales, Numerical analyses of simulation models, Assessment of targeted control strategies

Pauline Ezanno defended her PhD (MontpellierSupAgro & Univ. Montpellier) in Integrative Biology in 2002. She was recruited in 2003 as an INRAE permanent researcher in BIOEPAR, Nantes. With skills in mechanistic modelling, animal epidemiology, and population dynamics, her research focuses on better understanding and predicting the multi-scale spread of pathogens and the spatiotemporal dynamics of host and vector populations. She obtained her HDR (Habilitation à Diriger des Recherches) in 2010. Research director since 2015, she leads the DYNAMO team gathering BIOEPAR modellers. From 2012 to 2017, she coordinated a project investment for the future (www.inrae.fr/mihmes/) involving INRAE, Oniris, ANSES, INRIA, IRMAR, and a team from the Swedish Veterinary Institute (SVA). She contributed to the development of two software programmes dedicated to health managers, each of which received an innovation award (Innov'Space 2015 & 2016). She is currently co-leading a work package (WP) in a H2020 project (DECIDE, 2021-2026), and leading 1 INRAE project and 2 WPs in French national projects.

She has led the first international modelling challenge in animal health (ASF-Challenge, 2019-2021). She has led WPs in 4 other French projects and has obtained funds for PhDs and post-docs. She has organised the first and the second international conference in modelling in animal health (ModAH, 2017 and 2021). She is member of the editorial board of Veterinary Research, recommender for PCI animal science, and member of INRAE boards (scientific council of animal health division, DigitBio metaprogramme, scientific specialised commission). She trained students and mentored junior scientists (6 post-docs, 12 PhD, 8 engineers, 15 masters), and contributes to higher education in her field of expertise. She is author of over 80 peer-reviewed scientific articles.

Dr. Claire Rogel-Gaillard National Institute for Agriculture, Food, and Environment INRAE, FR
INRA UMR 1313 Génétique Animale et Biologie Intégrative
Research Team: Genetics, Immunity, Health (GIS)
Areas of expertise: Genetic Control of the Immune Response, Comparative Biology of the Major Histocompatiblity Complex, Structural and Functional Genomics
Species studied: pigs (main species) and rabbits

Claire Rogel-Gaillard obtained her degree of Agronomic Engineer from INA-PG (class of 1984), her Doctor-Engineer Degree from INA-PG (1992), and Certification to Direct Research (University of Versailles Saint Quentin en Yvelines, 2008). She is Director of the joint unit GABI and co-coordinator of gene annotation for the immune response in the pig, within the framework of the international consortium for genome sequencing (together with Christopher K. Tuggle, USA). She teaches Structural and Functional Genomics, and occasionally lectures the European Master (AgroParisTech/France, University of Wageningen/NL) and the BIO202 Master of UVSQ. She has been active as Scientific counsellor for the CRB GADIE, member of the Specialised Rabbit Commission of INRA, member of the Immunogenetics Commission and the Committee for Nomenclature of the Porcine MHC of the International Society of Animal Genetics, and member of the editorial board of the journal *Animal Biotechnology.*

Dr. Carl-Gustaf Thulin, Swedish University of Agricultural Sciences (SLU), SW
Researcher (Associate Professor) and Head of Department of Anatomy, Physiology and Biochemistry
Areas of expertise: Evolutionary genetics, Fauna restoration and rewilding.

Carl-Gustaf Thulin obtained his MSc Biology and his PhD Genetics at Uppsala University and did a Postdoc at the University of Tennessee (2001-2002, 2004) before acquiring his Doctor of Science degree at Uppsala University and finding a tenured position at SLU since 2008. He has been teaching graduate and undergraduate courses at SLU and Uppsala University since 1995. His current main three research projects are: "Gotland Pony Grazing - A mean to support biodiversity and preserve an endangered regional breed" Funding: WWF & SLU (assistant project leader); "Polymorphism in PrP and its relevance for moose and public health" Funding: Formas (researcher); "Is the Native Subspecies the Heath Hare (Lepus timidus sylvaticus) Going Extinct?" Funding: SLU, KSLA, Naturvårdsverket (project leader). He participated in more than 100 national and international conferences, organised 55 public meetings / conferences, gave 13 presentations as invited speaker, 10 presentations and 16 posters at academic conferences, and 40 public presentations. He has published six book chapters, 33 peer reviewed academic articles, 21 reports, 31 debate articles, 33 strategic proposals and 18 evaluations, and participated in the public debate through 28 debate articles and several media-appearances (press, radio, TV).

Prof. dr. Raoul van Damme, University of Antwerp, BE
Department of Biology
Research team Functional Morphology
Areas of expertise: Ecology, Adaptive Evolution, Morphometrics, Conservation, Climate Change, Herpetology, Zoology, Evolutionary Biology

Raoul van Damme's main research focuses on adaptation of 'complex' systems in animals, specifically reptiles and amphibians. 'Complex' should be read as: consisting of several bodily parts, employed to perform several tasks, and likely contributing to the survival/reproduction. Examples of functions studied include thermoregulation, chemoreception, locomotion, feeding, cognition. Study of the relationships between (1) morphological/physiological variation; (2) variation in performance (e.g., speed, power, cognition) and (3) survival and reproduction. Analyses are performed at the individual, the population, and the species level (in the latter case: using phylogenetically informed statistics).

(Ecology, Evolutionary biology). He has over 220 academic publications and contributes to 38 undergraduate and graduate courses.

Marina Meester, MSc., Utrecht University, NL
Faculty of Veterinary Medicine, Department of Population Health Sciences
Area of expertise: Veterinary medicine, Epidemiology of Infectious Diseases

Marina Meester is a veterinarian who started her PhD project ("HEVention": Risk identification and control of Hepatitis E virus infections in pig farms) in 2019, after obtaining her MSc degree in Farm Animal Health and Veterinary Public Health at Utrecht University. She is particularly interested in the transmission of zoonotic diseases between animals and from animals to humans. In her work her purpose is to limit zoonotic infections in animals, to prevent human disease. She is always open for international collaborations with professionals in the veterinary and human domain.

Dr. J.M. (Jules) van Rooij University of Groningen, NL (secretary committee)
Strategy department Education & Research
Sections: Research & Funding, Research Intelligence Services
Areas of expertise: Assessment of Research Quality, Research Strategy, Institutional Research, Responsible metrics, Benchmarking, University Rankings, Scientometrics, Open Science, Current Research information Systems (CRIS)

As senior advisor to the Executive Board of the University of Groningen, one of Jules van Rooij's main responsibilities is to provide 'SMART' information to support the University's research policy and strategy. Since 2005 he coordinates the Assessment & Control of Research Quality as well as the University's Institutional Research (i.e., 'business intelligence'). As such, he is closely involved in the provision and control of data for QA at the one hand, and in analysing the results of QA for policy and strategy support at the other. Since 2000 he has played an active role in the formulation, evaluation, and actualisation of national QA protocols (SEP) and underlying definitions and databases for research in- and output. He successfully initiated national collaboration to improve the visibility of Dutch Universities in international university rankings. His belief in 'evidence-based policy' stems from his roots in academic research. Before his switch in 2000 to the policy domain, he was postdoctoral fellow at Wageningen University, the Netherlands Institute of Ecology and at the University of Groningen, where his research career started in 1987 with a PhD study on the ecology of parrotfish at a Caribbean coral reef.

Annex 3 Staff composition and funding

Table A3.1 *Composition research staff Clusters.*

	FFS		PDG		IB	
	Sum 2015-2020		Sum 2015-2020		Sum 2015-2020	
Academic staff	**#**	**FTE**	**#**	**FTE**	**#**	**FTE**
Professors	60	11.1	48	11.3	53	16.2
Associate profs	71	24.1	13	5.1	36	13
Assistant profs	59	17.4	52	16.6	62	24.7
Other researchers	94	34.2	50	17.7	9	2.7
SubTot Staff	***284***	***86.8***	***163***	***50.7***	***160***	***56.6***
Postdocs	61	36.9	19	12.3	48	30.9
PhD candidates	818		462		411	
Total	**1163**	**123.6**	**644**	**62.8**	**619**	**87.3**

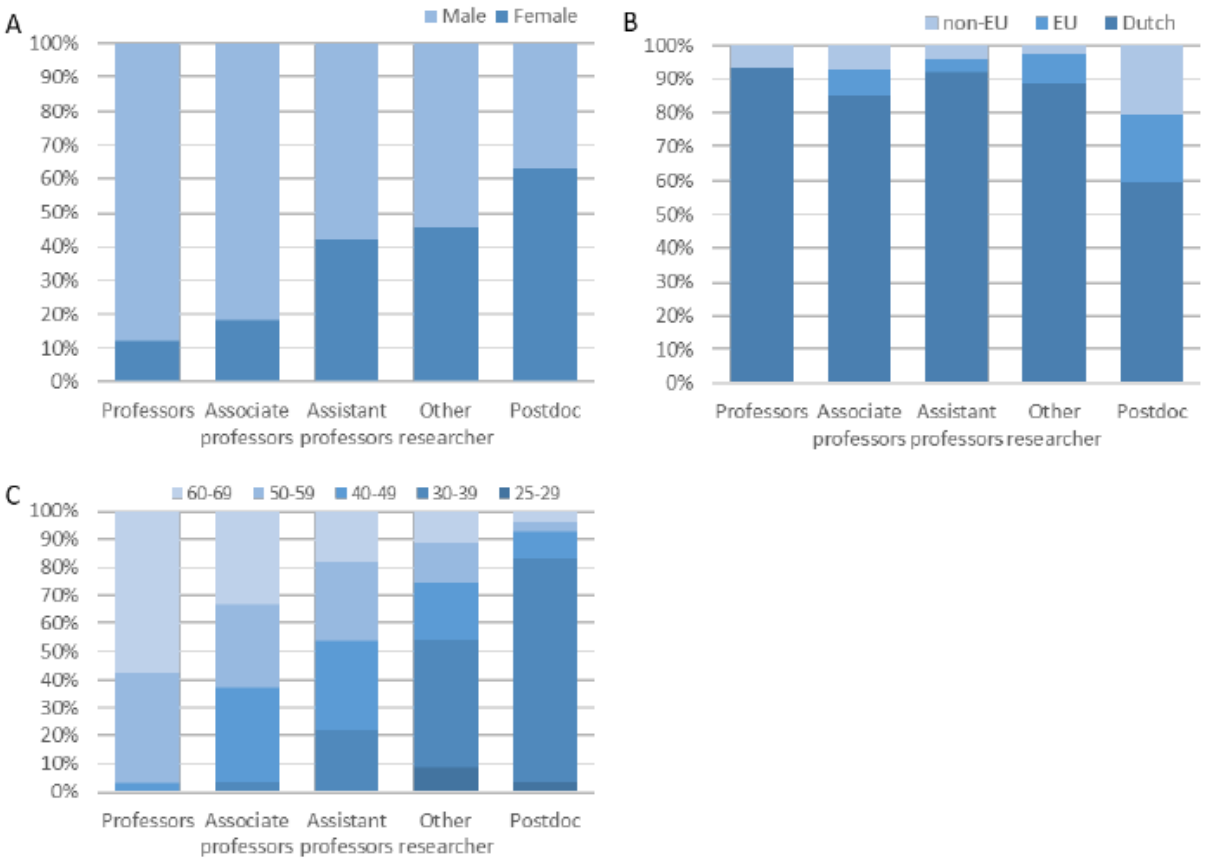

Figure A3.1 *Composition of WIAS associated staff members in terms of gender (A), nationality (B), and age (C) over the past 6 years.*

Table A3.2 *Research funding of staff, postdocs, and PhD candidates*.*

Unit	WIAS		FFS		PDG		IB	
	Sum 2015-2020		Sum 2015-2020		Sum 2015-2020		Sum 2015-2020	
Funding source	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding[1]	259,4	32,8%	122,8	31,1%	68,3	27,0%	91,9	36,8%
Research grants[2]	140,5	17,7%	56,2	14,3%	47,7	18,8%	68,8	27,6%
Contract research[3]	392,0	49,5%	215,3	54,6%	137,4	54,2%	89,0	35,6%
Total	**791,9**	**100%**	**394,3**	**100%**	**253,4**	**100%**	**249,7**	**100%**

[1] Direct funding by the University.

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

[3] Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations.

* PhD candidate: Research capacity amounts to 75% of the appointment/fellowship (all categories except external PhD candidates).

To explore the potential of nature to improve the quality of life

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,800 employees (6,000 fte) and 12,900 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.