

Report of the International Peer Review
of the
Graduate School
Wageningen Institute of Animal Sciences

June 2009

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Preface

This report embodies the findings and recommendations of an international peer review of the Wageningen Institute of Animal Science (WIAS) Graduate School undertaken over three days from June 9 to June 11, 2009. The review is both prospective and retrospective and has relied on quantitative as well as qualitative analysis of the school and its activities. The report presents findings on the Institute as a whole and on the individual Chair groups making up the school, and the review has resulted in a set of specific recommendations and some more general observations.

The Review Committee gratefully acknowledges the preparatory work undertaken by WIAS academic staff and management before the review. The bibliometric data, Chair group self assessments and SWOT analyses were particularly useful. We also thank the staff, post-graduate scholars and various WIAS stakeholders that we interviewed during the review for their informative and candid discussions. This has allowed us to form a balanced view of WIAS.

The results of this evaluation are intended to help WIAS, the leaders and management of the research units and the individual researchers to make better decisions about future research, research management and research strategy and policy. This is an integral part of an exercise of continuous development.

June, 2009

Prof. Paul J. Moughan
Chairman, International Peer Review Committee

Executive summary

1. This report presents the findings, conclusions and recommendations of an International Peer Review of the Wageningen Institute of Animal Sciences (WIAS) Graduate School, undertaken during 9 June – 11 June 2009.
2. The evaluation was conducted according to the nationally recommended protocol as adopted by Wageningen University. The focus of the evaluation was on the criteria: quality, productivity, relevance, and vitality and feasibility. The review was both retrospective and prospective and was directed towards improvement in the programmes of work, research management and leadership and to provide general accountability. Both the research programmes and the post-graduate education programmes of WIAS were evaluated.
3. The Review Committee was able to form a balanced view of WIAS's performance and concluded unequivocally that WIAS has a strong sense of identity and that the staff and students understand and pay a strong allegiance to the Institute's mission and vision. The Institute demonstrates a united cohesive approach to its research and teaching. The standard of management and leadership of WIAS is very high.
4. WIAS is highly regarded internationally as a leading centre of research and higher education. The work of WIAS is relevant both scientifically and to society in general and some of its work falls in the category of being world leading. The vision and research themes of WIAS have been carefully chosen to ensure a relevance to Dutch agriculture and society. WIAS is clearly greatly appreciated by Industry.
5. The overall quality of WIAS research is generally very good to excellent, with productivity generally being good to excellent. Relevance of the work has been adjudged to be high and in most cases the vitality/feasibility of the Chair groups is sound if not very good.
6. The prospects for the Institute are excellent. The institute has some very strong Chair groups that are assured a positive future. At the same time, however, there are Chair groups that are very small in size by international standards and a lack of critical mass poses a threat.
7. WIAS has already greatly benefited from a new enlarged Wageningen UR and there is much evidence of collaboration between university staff and the contract research organisations (CRO). It is the view of the Review Committee, however, that the full potential of the new alignments is yet to be realised. We note and support the strategic initiative to create six ASG-centres, a step that has the potential to greatly enhance collaboration
8. The Committee believes that it will be particularly important for WIAS over the coming years to retain its special character and to focus on its core business of animal science, while at the same time judiciously developing skills in aspects of the more fundamental sciences and building bridges to strategically critical areas such as plant science, environmental science, food science and human nutrition, and marine science.
9. The Graduate School has a well developed and well organised system for the research training and education of PhD-scholars. The Training and Supervision Plan (TSP) of the PhD-programme is particularly impressive, as is the opportunity afforded candidates to study abroad as part of their overall PhD-studies.
10. The report records observations and comments on various aspects of WIAS and its performance over the period of the review. In some instances the Review Committee has made specific recommendations. These appear in the body of the report in italics and are also listed as follows.

Recommendations

1. The review in 2004 commented on the complexities of the matrix of management within which WIAS lies. This has been addressed with overall control lying with Mr. Martin Scholten and regular discussions taking place with the Director of WIAS. This appears to be working well but its success relies in large part on there being a successful working relationship between the individuals involved. The interface between WIAS and the Animal Sciences Group retains the potential for future misalignment should the personalities involved change, and the University should keep this under scrutiny.
2. The small size of a number of the Chair groups within WIAS produces a number of major challenges for the ASG management including overall management and strategic planning, succession planning, career development of individual staff, collaboration between areas and critical mass, vulnerability and vitality of the groups. The Committee felt that these challenges would be best met by combining the Chair groups into larger managerial entities whilst retaining the Chairs and some clustering into subject areas. If this clustering proved not to be possible then the Committee would recommend the clustering of some of the smaller Chair groups into larger entities on the basis of similarity of subject areas.
3. The Review Committee felt that there were opportunities for improved profiling of WIAS. The Committee recommends that the University provides a budget to WIAS to improve their profiling. This should be allied with the development of a capability statement for WIAS to clearly identify its position and capabilities in research and teaching.
4. WIAS's Chair groups are dependent for a considerable part of their funds on the University, with further income from a range of contracts and relatively little income from NWO funding (although approximately the same as WU-average). WIAS acknowledges this situation and is working to increase NWO funding. The Committee recommends that WIAS develops a cross-chair group strategy and plan to increase NWO and EU funds in an integrated and comprehensive fashion.
5. WIAS's Chair groups appeared to have relatively little involvement in commercial exploitation of research through avenues such as their own patents and joint commercial ventures. Although the Committee recognises that the financial benefits can be over emphasised it felt that there should be greater emphasis on intellectual property and its exploitation and that the University should put mechanisms into place to aid researchers in the protection and exploitation of their research. The Committee recommends that WIAS reviews best practice in knowledge exchange at other Dutch Universities and adopts the approach that suits them best.
6. It was clear that there had been significant progress in collaboration and integration with the CRO based groups including collaborative research and initiation of research centres. The Committee felt that there was additional benefit to be gained by even greater collaboration, exchange of staff and expertise with the CRO. The greatest benefit would be realised by the amalgamation of the groups onto a single site if that could be achieved by the ASG management.
7. The Committee felt, and as already identified by WIAS management, that there is also scope to extend research activities beyond classical livestock species: two possible areas include companion animals and also the development of animal models for humans. The Committee considered that the Chair groups have scope for greater emphasis on the

development of strategies to explore increased knowledge transfer, patentable products and industrial outcomes.

8. The Review Committee noted the recommendation of the 2008 Assessment Report for the Animal Sciences Group (Contract Research) that there should be a research strategy for ASG as a whole (Recommendation 2, page 6). We support this in principle but recommend to the ASG management that any joint strategy should reflect differences in the goals and aspirations of the university and CRO staff.
9. The Director WIAS has recently initiated a Talents and Topics programme which encourages cross-group collaboration. This has been very well received and fits well with the strategic development of the institute. This programme is funded through a one-off initiative from WUR, but the Committee felt that continued support from the University for activities such as “Talents and Topics” would be very beneficial to WIAS.
10. Start up funds for new Chairs are, by international standards, very modest. The new Chair in Host-Microbe Interactomics for example appeared to have received only K€ 90, which, in the Committee’s view, falls well short of needs. The Committee recommends to the University that the level of resource provision for new Chairs should be revised.
11. Alongside staff development policies the Committee recommends to the ASG management and the University that there should be more comprehensive succession planning. The smaller groups in particular are very vulnerable to the loss of key individual scientists and there was little evidence that strategic planning took into account the risks of losing key individuals.
12. The Review Committee recommends to the University careful discussion of the pros and cons of performance indicators resulting out of various bibliometric assessments practised in the science system as measures of relevance.
13. The Committee also noted that the report placed much greater emphasis on outputs rather than outcomes and recommends to the University that future reports consider ways to incorporate measures of the wider impact of WIAS research.
14. The Department should record the number of applications to places and the numbers interviewed as such information will provide a valuable record of demand for doctoral placements and selection intensity and is a measure of the perceived quality of the PhD program.
15. It is recommended to Wageningen Graduate Schools that the Introduction and the Discussion to the Wageningen PhD thesis should be substantial independent pieces of work that can be assessed as the student’s own. In addition it is recommended that Wageningen Graduate Schools considers that the student includes their own comprehensive literature review in the thesis.
16. The supervisory load where around 60 staff are supervising around 140 students needs to be monitored. Before any further expansion in PhD numbers the availability of staff to act as daily supervisors and members of supervisory teams should be determined by WIAS.
17. The PhD students interviewed spoke flatteringly about the “Science meets Society” events which the students organise themselves. WIAS should consider broadening this to include all animal science research within the University.

1. Introduction

1.1 The evaluation

All publicly funded university research in the Netherlands is evaluated at regular intervals, as agreed by the Association of Universities in the Netherlands (VSNU), the Netherlands Organisation for Scientific Research (NWO) and the Netherlands Academy of Sciences (KNAW). The evaluation process, which is applied at the research unit level, consists of an external peer review conducted every six years and a three-year interim review undertaken through self-evaluation.

The evaluation system aims to achieve three objectives:

- *improvement* in the quality of research through an assessment carried out according to international standards of quality and relevance;
- *improvement* in research management and leadership; and
- *accountability* to the higher management levels of the research organisations and to the funding agencies, government and society at large.

At Wageningen University, the Graduate Schools are the organisational entities on which the research evaluation is based. These Schools comprise groups of researchers with an articulated shared mission in research and training, operating under a common management and focussing on four main objectives:

- to coordinate and develop post-graduate education;
- to safeguard and stimulate the quality of academic research by PhD students, post-doctoral staff and academic staff;
- to stimulate the development of a coherent university research programme within their mission; and
- to monitor the quality and progress of the research programmes.

The intention is that these responsibilities of WIAS are evaluated in this peer review with the overall aim of achieving an accurate view of the performance of WIAS and in particular the position of its Chair groups within the (inter)national science and education arena (retrospective) and to find ways for further improvement (prospective). Therefore the peer review takes into account not only the quality of the work conducted and the ways that the results are communicated, but also the institution's broader mission. This includes evaluation of the arrangements and programmes for PhD students, who conduct much of the scientific research, and also of the relevance, quality and effectiveness of the work in terms of the institution's wider mission and public accountability.

1.2 The assessment procedure

The evaluation procedures followed by the Review Committee were those set out in the NWO/VSNU/KNAW "Standard Evaluation Protocol 2003-2009 for public research organizations" as adopted by Wageningen UR (version March 2009).

This Standard Evaluation Protocol entails two main characteristics:

- *Two levels of assessment*: The assessment takes place at two levels of research organisation, i.e. the level of the Graduate School (A-level) and the level of Chair groups (B-level);
- *Four main criteria*: The assessment entails four main criteria, i.e. quality, productivity, relevance, and vitality & feasibility.

The evaluation committee was requested to report its findings in line with the four main criteria. With respect to evaluation of the institute as a whole the findings should be reported in qualitative terms with a focus on policy and management questions. For the assessment of the Chair groups, the verdict should be cast in both qualitative and quantitative terms. In the text, the most important considerations of the committee should be clarified, while the conclusion should be summarized in a single term according to a five point scale, "excellent" meaning world class research, and "unsatisfactory" meaning below standard (annex 1). Checklists were provided (annex 2) as a tool for assisting in assessment.

The assessment was based on and supported by three main components of evidence:

- a substantial self evaluation report (parts A and B), detailing the operation, management, research activities, outputs, and SWOT analysis of the WIAS Graduate School and its Chair Groups;
- copies of the selected papers from each Chair Group and dissertations, to allow the Committee to examine in detail examples of published work;
- visits to facilities and discussions with researchers, postgraduate students, academic staff and research managers about the details and conduct of the programmes of work and the operation of the WIAS Graduate School.

The site visit was undertaken during the period 9 June - 11 June, 2009 and consisted of a number of components, which can be summarised as follows:

- a plenary introduction to Wageningen UR and WIAS by the Rector of Wageningen University and the Scientific Director of WIAS;
- a site-visit of facilities, and discussions with WIAS staff and WIAS PhD students
- syndicate sessions separately with the WIAS Education Committee, PhD Students' Council and PhD Students' Confidants;
- syndicate sessions separately with the Research Themes Coordinators, Chairman of Animal Sciences and Chairman of the International Advisory Board;
- sub-committee sessions with individual Chair Groups;
- sub-committee visits to laboratories and experimental facilities at Wageningen;
- sub-committee sessions with PhD students;
- a Committee session with the Scientific Director;
- a Committee session with the Scientific Director and Heads of WIAS Chair Groups;
- a debriefing meeting with WIAS representatives and the Dean of the Wageningen Graduate Schools.

The Peer Review Committee comprised six peer members and a secretary (annex 3). Despite a full programme (annex 4) and a tight schedule the Committee was able to complete all the plenary interviews and site visits. Consequently the final report with the conclusions and recommendations was formulated by the Committee as a whole and unanimously agreed by its members. The draft report was presented to the director of WIAS to redress any factual errors.

1.3 Results of the assessment

This report summarises the findings, conclusions and recommendations of an international peer review of the Wageningen Institute of Animal Sciences (WIAS) Graduate School undertaken in June 2009.

The written and oral information permitted a good understanding of the organisation by the Committee. The assessment of WIAS and its Chair Groups was subsequently based and weighted according to the rationale explained in annex 1. The conclusions, as given in chapters 3 and 4 of this report, follow the structure and the criteria which are formulated in

the Terms of Reference, annex 1. Chapter 3 gives an impression of the performance of the Graduate School WIAS as a whole and Chapter 4 elaborates on the performance of its individual Chair groups.

1.4 Quality of the information

The Self Assessment Report “Documentation over 2003-2008 for the Peer Review of the Graduate school WIAS” was well structured, but the Review Committee did note that there was some variability in the manner in which material describing the Chair groups was presented. Information tended to be only output orientated as opposed to output and outcome orientated. We also missed information on the international university ranking of Wageningen UR.

The SWOT analyses that were included proved to be candid and transparent and therefore most helpful for the discussions. The presentations during the site visit were in general well prepared and delivered at the right level of detail. The interviews were also organised in a good manner. All discussions and interviews were helpful. In general, it needs to be said that the arrangements made for the peer review exercise were excellent. The Review Committee was highly appreciative of the openness and frankness of the management, research staff, PhD scholars and other stakeholders during the discussions. All aspects of WIAS activities were explored leading to a highly informed analysis.

We believe that during the evaluation, the Review Committee was able to achieve a full and fair impression of the qualities, strengths and weaknesses of the WIAS Graduate School.

2. Structure, organisation and mission of the Graduate School

2.1 Organisational structure

Wageningen UR has been conceived and established as a leading international knowledge institute in the fields of nutrition and health; sustainable agricultural systems; environmental quality; and the processes of social change. Its corporate motto is 'For Quality of Life'. It has been structured to build jointly on the CRO's strength in strategic, applied and practical research for industry, government and other stakeholder groups, and on the University's strength in fundamental and strategic research and the education and training of young researchers.

It encompasses five Sciences Groups: Plant Sciences; Animal Sciences; Agrotechnology and Food Sciences; Environmental Sciences; and Social Sciences. Within each Sciences Group a Department of the University of Wageningen and a Contract Research Organisation counterpart (formerly a DLO-institute) are linked. In this way it brings together a wide range of specialist facilities and expertise, on a multi-site basis, but under a management structure for research, operating within the Science Groups and providing an integrating framework for both the University Departments and the CRO.

The Animal Sciences Group comprises the Wageningen University Department of Animal Sciences and the CRO Business Units, Central Veterinary Institute and ASG-Livestock Research, covering respectively the research on infectious diseases and research on animal production and husbandry. Besides, Wageningen IMARES, the CRO institute for marine research, is also partly linked to the Department of Animal Sciences.

WIAS is one of the seven Graduate Schools of Wageningen University. It was established on the 25 May 1993 and was first accredited by the KNAW in 1994 and was re-accredited in 1999 and 2004. Its research area and purpose is in animal sciences and related fields, encompassing fundamental and strategic research and the training of young researchers. All ten Chair groups of the Department of Animal Sciences participate in WIAS. Within this area WIAS bridges the organisational structure with links to the CRO business units and to other university departments. It also has formal cooperative relationships with other national and international research organisations, including the Graduate School in Animal Health of the Faculty of Veterinary Medicine, University of Utrecht, other Graduate Schools of Wageningen University, and the various Clusters of the Animal Sciences Group of Wageningen UR. Another important partner for WIAS in Wageningen UR is Wageningen IMARES

2.2 Mission and research themes

WIAS operates under its mission:

'The Graduate School WIAS aims to improve our understanding of animals and their various roles for mankind, through fundamental and strategic research and training of early stage researchers'.

To assist in the creation of a coherent research programme, the research projects being undertaken in the School have been focused around three themes:

- *Animal Health and Welfare*: understanding and improving the health and welfare status of terrestrial and aquatic farm and companion animals.
- *Healthy and Safe Products*: production of sufficient, safe and healthy, high quality food of animal origin and other "products" such as company and recreation.
- *Sustainable Systems*: animal systems that function optimally with regard to their role in society, the environment, ecology and use of resources.

Taken with the disciplines and specialisms provided through the Chair Groups the research themes create a programme matrix, providing an overview of the distribution of research activity within the School and illustrating how some Chair Groups make project contributions under more than one theme (see Table 1 below).

2.3 Responsibilities, governance and funding

WIAS's main responsibilities as a Graduate School are to:

- coordinate and develop post-graduate education;
- safeguard and stimulate the quality of academic research by PhD students, post-doctoral staff and academic staff;
- stimulate the development of a coherent academic research programme within its mission; and
- monitor the quality and progress of the research programmes.

Reflecting this role the Graduate School has several distinctive features, and its governance and organisation are subject to a number of interrelated structures and influences operating at different levels.

Table 1 Contribution of Chair groups to the WIAS themes and collaboration in the themes

(the ●● indicate the approximate size of the contribution)

Chair group holder	Chair	Animal health and welfare	Healthy and safe products	Sustainable systems
Adaptation Physiology	Bas Kemp	●●●		
Cell Biology and Immunology *	Huib Savelkoul	●●●		
Experimental Zoology	Johan van Leeuwen	●		
Human and Animal Physiology *	Jaap Keijer	●		
Host-Microbe Interactomics *	Jerry Wells	●	●	
Quantitative Veterinary Epidemiology	Mart de Jong	●	●	
Animal Nutrition	Wouter Hendriks	●●●	●	●
Animal Breeding and Genetics	Johan van Arendonk	●●●●	●●	●
Aquaculture and Fisheries	Johan Verreth	●		●●
Animal Production Systems	Akke van der Zijpp	●		●●
Farm Technology **	Peter Groot Koerkamp	●		●
Business Economics **	no Chair in WIAS			●

* these groups also participate in the graduate school VLAG (Nutrition, Food and Agrotechnology, Health)

** only a small part of these Chair groups participate in WIAS; these groups are included in the peer reviews of other graduate schools

- Governance responsibilities at the Graduate School level rest with the WIAS Board and the WIAS Scientific Director, acting in an executive capacity on its behalf; advice to the Board is received from an International Advisory Board consisting of five distinguished scientists, the majority from abroad.
- For education and student matters there is an Education Committee, advising the Education Coordinator.
- The interests of the PhD students are represented by the WIAS-associated PhD Student Council.

- WIAS has two PhD Student Confidants to which individual students may refer on any problems that they cannot solve themselves with their supervisors.
- Under the law of The Netherlands the Professor holding the Chair in each Chair Group has a responsibility for the disciplinary development of research and education within the Chair Group, but in the development of the University's 5-year 'Chair Plan' and in decisions on the scientific interests of Chair appointments/replacements, the advice of the Graduate School is taken into account.
- The allocation of funding and resources is according to an output based model, with the University/Wageningen UR providing core funding for undergraduate teaching and research activities, and additional research funding being gained on a competitive basis from public organisations such as NWO, the European Union and other bodies, and from contract research.

2.4 WIAS Research organization and input

During the period of review ten Chair groups of the Department of Animal Sciences participated in WIAS, providing a complement of some 60 members of staff, 25 post-doctoral scientists and 150 PhD students.

	2003	2004	2005	2006	2007	2008	average 1999-2003
Tenured staff	18.6	16.4	16.7	15.8	16.2	17.5	17.7
Non-tenured staff	14.8	10.9	10.7	15.3	18.8	19.8	9.1
Total research staff	33.4	27.3	27.3	31.1	35.0	37.3	26.8

The personnel of the WIAS Graduate School comprise a combination of tenured academic staff, postdoctoral researchers and other non-tenured academic staff, PhD students employed by the University during four years, PhD students with fellowships, external PhD students and support staff. On an fte basis (i.e. taking account of the staff time spent on research) there was a considerable increase in non-tenured staff (+60%; Table 2a) and PhD students (+38% ; Table 2b) over the review period, whereas the number of tenured staff was stable over this period.

Type of PhD student	2003	2004	2005	2006	2007	2008	average 1999-2003
Employed PhD students	10	14	9	11	16	21	10.1
Sandwich PhD students	2	4	8	7	18	7	7.9
Guest PhD students	6	2	3	3	0	4	1.3
External PhD students	1	3	9	2	4	6	1.2
Research staff as PhD student	1	0	1	2	0	2	0.7
Total influx	20	23	30	25	38	40	21.2

2.5 Supervision and training of PhD students

In principle a PhD study at Wageningen UR lasts four years; at least 75% of this time is devoted to the research project leading to the PhD thesis, the remaining 15-25% is directed to an education and training programme, tailor-made to meet the needs of the individual student. To ensure the quality of the PhD programme WIAS has instituted a number of specific operational and management provisions:

Quality control of PhD research

- Each new PhD project proposal is submitted to two or three external reviewers (usually from abroad) who assess the *scientific quality* and *feasibility* of the PhD project. Such a review is omitted only if the project has already been reviewed (e.g. by NWO).
- Employed PhD candidates are selected via a normal job application procedure. Students from abroad with a foreign Masters degree have to pass an entrance exam and English language test.
- Within eighteen months, a go/no go decision is taken, based on a formal evaluation of the PhD student's performance.
- Students are strongly encouraged to publish their work in refereed journals and to present at international symposia, which further enhances quality awareness and provides feed-back.
- The University Commission on Animal Experiments assesses the ethical and animal welfare aspects of all animal experiments and has the authority to forbid or alter certain experiments.
- The draft PhD thesis must be approved by an independent examination committee appointed by the University before the student is allowed to publicly defend his/her thesis.

Education and training of PhD students

- Within six months after beginning his/her project, the PhD student submits a personalised training and supervision plan to WIAS following consultation with the daily supervisor and the WIAS education coordinator. This plan needs the approval of the WIAS Education Committee.
- Education and training must comprise a minimum of 30 ECTS credits and a maximum of 60 credits (1 ECTS credit equals 28 hours of study load).
- The two mandatory elements are a) the WIAS Introduction Course (1.5 credits) and b) a course on Philosophy of Science and Ethics (1.5 credits). The latter is mandatory because working with animals is a special responsibility. WIAS offers such a course; taking a similar course outside WIAS is acceptable.
- Certain elements, e.g. international exposure and professional skills, are mandatory. A PhD student must present his/her work at least four times at a congress or seminar.
- If a PhD student already possesses the competences that mandatory courses or mandatory elements of the training programme bring about, a waiver for such activities can be granted. In particular PhD candidates with considerable working experience can thus engage in the WIAS training programme without unnecessary loss of time.
- A PhD student usually takes one third of his/her credits within WIAS. The majority of credits are taken outside WIAS, often abroad, and this is encouraged. For such external courses and symposia, every PhD student has an individual education budget of € 2500.
- After two years, the PhD student submits a midterm training and supervision plan. Its main function is to make the student and supervisor aware of whether or not the student is on schedule regarding his/her curriculum.
- A few months before graduation, the student submits his/her completed curriculum, which must be approved by the Education Committee before a WIAS education certificate can be issued at the official graduation.

3. Performance of the Graduate School

3.1 The identity of the Institute and the mission statement

The Review Committee assessed a considerable body of written information during the review and spoke to a wide range of staff, PhD students and other stakeholders. We had a good opportunity to assess the level of staff engagement in WIAS and ‘buy-in’ to its mission. It is abundantly clear that WIAS has a strong identity, and staff and students understand and pay a strong allegiance to its mission and vision. The WIAS mission statement:

“The Graduate School WIAS aims to improve our understanding of animals and their various roles for mankind through fundamental and strategic research and training of early stage researchers”

is appropriate and suitably encompassing, and fits comfortably under the mission of its parent, Wageningen UR:

“To explore the potential of nature to improve the quality of life”.

Underlying the WIAS mission are three underlying interdisciplinary research themes:

- Animal Health and Welfare
- Healthy and Safe Products
- Sustainable Systems.

These contemporary themes provide for focus around the mission statement, demonstrate to the outside world WIAS’s scientific intent and serve to stimulate cooperation among Chair groups within themes.

The Committee finds that all Chair groups have made an effort to align their research programmes to these various themes, leading to a certain degree of cohesiveness and overall focus in WIAS research and postgraduate education. Alignment is not universal and that adherence to the themes is not absolutely prescriptive, is considered by the Committee as being positive. It is pleasing to note that a recently re-caste mission statement for the contract research ASG is consistent with the WIAS research themes (M. Scholten’s reaction assessment report (ASG), to the 2008 ASG assessment). Partly because of the overall focus achieved through the thematic approach, but also due to the quality of the research, productivity and strong collaboration, the identity of WIAS reaches well beyond Wageningen UR and indeed the Netherlands. There is no doubt that WIAS is highly regarded internationally as a leading centre of research and higher education. The Academic reputation of WIAS is upheld by the generally strong publication records of staff and their wide-ranging involvement in national and international scientific forums. By way of example, nearly all WIAS tenured staff sit on the editorial board of one or more international scientific journal. The current professoriate of WIAS includes a number of younger individuals, bringing a sense of dynamism and vitality to its operations. This bodes well for the future. Overall we have found the work of WIAS to be relevant both scientifically and to society in general, and in some cases it can be said that the work is truly cutting-edge and world-best.

The mission and research themes of WIAS have been carefully chosen to ensure a relevance to Dutch agriculture and society, and of course this is highly appropriate. WIAS builds off a long-standing reputation for quality and performance. It continues to maintain high standards with a distinctive national role in the provision of expertise and resources for advanced research and graduate education and training. With the formation of Wageningen UR and the alignment of a considerable CRO staff complement, WIAS faces new challenges and opportunities. These challenges are being met to a large extent and the considerable opportunities realised at least in part. WIAS must continue to build off its strong sense of identity and fellowship to further strengthen these new alignments and to pursue its mission, and in so doing, continue to enlighten minds, generate new scientific knowledge and serve industry and society at large.

3.2 Management and Leadership

The Review Committee was very impressed overall by the leadership of the Animal Sciences Group of WIAS and of the individual Chair groups. Both the current and the previous scientific directors of WIAS had made an excellent job of improving and developing the graduate school. They appeared to be well regarded by staff within WIAS as well as by senior contacts in other organisations who saw them as accessible and “user friendly”.

The current WIAS Science Director has clearly worked hard with the limited financial resource at his disposal, to improve collaborations and quality within WIAS and its partners. The Committee in particular was impressed with the development of the “Talents and Topics” programme which already seems to be having an impact in this regard.

The review in 2004 commented on the complexities of the matrix of management within which WIAS lies. This has been addressed with overall control lying with Martin Scholten and regular discussions taking place with the Director of WIAS. This appears to be working well but its success relies in large part on there being a successful working relationship between the individuals involved. *The interface between WIAS and the Animal Sciences Group retains the potential for future misalignment should the personalities involved change, and the University should keep this under scrutiny.*

The small size of a number of the Chair groups within WIAS produces a number of major challenges for management including overall management and strategic planning, succession planning, career development of individual staff, collaboration between areas and critical mass, vulnerability and vitality of the groups. *The Committee felt that these challenges would be best met by combining the Chair groups into larger managerial entities whilst retaining the Chairs and some clustering into subject areas. If this clustering proved not to be possible then the Committee would recommend the clustering of some of the smaller Chair groups into larger entities on the basis of similarity of subject areas. In forming larger sized groups it will be critically important to preserve the independent leadership of the individual Chairs and to ensure adequate funding for each Chair and transparency in that funding.*

The Review Committee felt that there were opportunities for improved profiling of WIAS. *The Committee recommends that the University provides a budget to WIAS to improve their profiling. This should be allied with the development of a capability statement for WIAS to clearly identify its position and capabilities in research and teaching.*

Chair groups are dependent for a considerable part of their funds on the University, with further income from a range of contracts and relatively little income from NWO funding (although approximately the same as WU-average). WIAS acknowledges this situation and is working to increase NWO funding. *The Committee recommends that WIAS develops a cross-chair group strategy and plan to increase NWO and EU funds in an integrated and comprehensive fashion.*

Chair groups appeared to have relatively little involvement in commercial exploitation of research through avenues such as their own patents and joint commercial ventures. Although the Committee recognises that the financial benefits can be over emphasised it felt that there could be greater emphasis on intellectual property and its exploitation and that the University should put mechanisms into place to aid researchers in the protection and exploitation of their research. *The Committee recommends that WIAS reviews best practice in knowledge exchange at other Dutch Universities and adopts the approach that suits them best.*

It was clear that there had been significant progress in collaboration and integration with the CRO based groups including collaborative research and initiation of research centres. *The Committee felt that there was additional benefit to be gained by even greater collaboration, exchange of staff and expertise with the CRO. The greatest benefit would be realised by the amalgamation of the groups onto a single site if that could be achieved.*

3.3 Strategy and policy

Research themes and performance targets – There are 10 Chair groups within WIAS and two more Chair groups (from outside ASG) participate for a small part in WIAS. Each of these has its own research strategy, and most are actively seeking to improve their performance targets (quality and quantity of publications, increased numbers of PhD students). Although WIAS oversees the Chair groups, in practice the groups have considerable autonomy, including budgets directly allocated from the ASG. The Chairs reported that there is very little top-down involvement in how the groups are managed and they are evidently content with that.

Reflecting this, there was relatively little indication of a ‘top down’ research strategy. The main management goal is that the Chairs are successful and meeting their own targets. As a result, some of the research within WIAS falls outside the remit of traditional agricultural science, and individual research groups had plans to continue in this vein, for example by pursuing basic research or general life sciences research. In several cases it was clear that their scientific aspirations extended beyond the traditional remit and strengths of WIAS. Overall, this approach has many more advantages than disadvantages, and should be encouraged. The main issue of concern is to maintain international competitiveness: many groups rate very highly in comparison with those in other agricultural research institutes, but would be far less competitive judged against broader biomedical research. Nonetheless, there is a clear desire of several group Chairs to branch out, often working with external collaborators to achieve this.

The Committee felt, and as already identified by WIAS management, that there is also scope to extend research activities beyond classical livestock species: two possible areas include companion animals and also the development of animal models for humans.

The Committee also considered that there was scope for greater emphasis on the development of strategies to explore increased knowledge transfer, patentable products and industrial outcomes. However, based on the amount of industry funding received, and discussions with an industry representative it appears that some (though not all) Chair groups are meeting industry expectations.

Fields of work and collaboration – The range of topics covered within WIAS is broad but generally appropriate to the mission of WUR. We noted that some of the Chair groups are involved in several different areas, so that the 10 Chair groups cover more than 10 different disciplines. There was also clear evidence of enthusiasm for multidisciplinary approaches to research, and for multidisciplinary thinking in setting research agendas. The Committee strongly supports this.

Many of the groups work closely with, and to a significant extent rely on, external collaborators. Several key collaborations are with the CRO institutes, especially ASG Livestock Research, CVI and Wageningen IMARES. Other groups have active collaborations with units in other universities, nationally and internationally, covering areas such as basic biology, medicine and genomics. This greatly strengthens the institute’s research potential but it remains important to identify and nurture core scientific strengths within WIAS. Further collaboration, particularly with the CRO institutes, will be actively promoted through the creation of six ASG Centres. These Centres indicate future research priorities for WIAS and other members of the WUR Department of Animals Sciences and cover the following areas: Animal Breeding and Genetics and Animal Nutrition (in place), Adaptation Biology/Animal Welfare and Aquaculture (in development) and Livestock Systems/Animal Husbandry and Infection Biology/Animal Health (planned). The Review Committee noted the recommendation of the 2008 Assessment Report for the Animal Sciences Group (Contract Research) that there should be a research strategy for ASG as a whole (Recommendation 2, page 6). *We support this in principle but recommend that any joint strategy should reflect differences in the goals and aspirations of university and CRO staff.*

Strategic development of research groups – The major achievement of WIAS is the assembly of an excellent set of Chair groups including recent appointments. It was noted that the number of staff in some Chair groups is dangerously low, which compromises viability and means that there is no critical mass in some disciplines. We recommend that this is carefully monitored and that consideration is given to the merging of complementary groups in order to address these problems. The creation of new Chair groups may in the future need to be balanced by withdrawing from other areas. Several of the smaller groups would benefit from the investment of additional faculty, and supporting successful groups in this way might be a higher priority than creating new ones.

Resources – The Chair groups vary considerably in size and funding level. The allocation of WUR faculty posts is set and the Committee was not told of any plans to increase staffing levels as a whole. The allocation of WUR-funded PhD posts largely reflects research activity and was not given as a cause for complaint by the group Chairs. By international standards, institutional investment in PhDs is high and this makes a very significant contribution to research output.

The Director has recently initiated a Talents and Topics programme which encourages cross-group collaboration. This has been very well received and fits well with the strategic development of the institute. This programme is funded through a one-off initiative from WUR, *but the Committee felt that continued support for activities such as “Talents and Topics” would be very beneficial to WIAS.*

‘Start up’ funds for new Chairs are, by international standards, very modest. The new Chair in Host-Microbe Interactomics for example appeared to receive only K€ 90 which, in the Committee’s view, falls well short of needs. *The Committee recommends that the level of resource provision for new Chairs should be revised.*

Infrastructure for WIAS is undergoing a major change as the institute relocates to the new campus in 2-3 years time, so there is no need for comment on existing facilities. However, the Committee was very supportive of the approach of core facilities being used by different research groups as required, although some flexibility is required in the allocation of core support as demand for specialist facilities rises and falls.

Technical support was not raised as an issue; Chair groups appeared to be able to obtain funding for technical support as required.

Importantly, the Committee considered that there should be a proactive WIAS-wide strategy to increase NWO and EU funding. Income from these funding sources, as a proportion of total income, is not high and below what would be expected in comparator institutions.

3.4 Research staff

The Review Committee was favourably impressed overall by the quality of the staff. There were clearly many examples of individual members of staff competing at the highest international levels in their respective areas of research. We were pleased to see that ongoing quality assessment of research staff takes place. Conditions for admission of tenured staff to WIAS are not very stringent but for admission at senior level are more challenging and include objective measures of output and esteem. Admission at the latter level has increased in the last two assessments such that 75% of staff now achieve the higher level.

The Committee felt it important that research staff had a clear international perspective and outlook in their research and was pleased to see progress in development of the international orientation of research staff.

The Committee felt that procedures for the assessment, training, and development of non-tenured and tenured staff at all levels should have received more emphasis in the written documents provided. Staff development policies and practices need to be more explicit. The policies for staff development should be implemented at the level of WIAS and not left only

as the responsibilities of individual Chair groups. Policies should include the capability development of tenured staff.

Alongside staff development policies *the Committee recommends that there should be more comprehensive succession planning*. The smaller groups in particular are very vulnerable to the loss of key individual scientists and there was little evidence that strategic planning took into account the risks of losing key individuals. Succession planning taking into account the development of staff would greatly ameliorate risk in this area.

3.5 Resources, funding and facilities

WIAS includes an impressive range of facilities ranging from experimental facilities for cattle, pigs, poultry, fish, shrimps and rodents. The available advanced analytical facilities are state of the art and include equipment for genome wide sequence analyses and NWO co-funded facilities for metabolic research and mass spectrometry.

The concentration of all WIAS groups in a new building in 2010 with new experimental facilities provides an excellent opportunity to further improve and optimize the research facilities. In particular, it allows for the shared use of expensive equipment.

In discussion with some of the Chair groups it became apparent that policies for replacement of capital equipment and use of shared central facilities were not well understood and should be clarified.

The total research capacity remained more or less constant over the evaluation period, but the sources of funding have changed over time. The number of WUR funded staff in 2009 is almost the same as the average level of the previous evaluation period. Contract funded staff has increased considerably. The Committee was pleased to see that the performance of WIAS in the highly competitive NWO funds has almost regained the level of the previous evaluation period but there is still room for improvement. The overall picture is that about 40% of the research capacity relies on University funds.

The average teaching load of permanent staff is not meant to exceed 40% of available time. However, some groups complained about an overly heavy teaching load. The change in output financing implemented two years ago is likely to solve this problem.

We were pleased to see that WIAS has some strategic money available to support new research initiatives and visiting scientists.

3.6 Academic reputation

The Graduate School WIAS is a well recognised science cluster with an impressive structural and organisational arrangement having a considerable impact on the scientific agenda in the relevant international science communities. There is clear evidence of some variance in reputation within WIAS which seems to be somewhat linked to the size of a Chair group and partly also to its stage of development.

Academic Reputation, as a criterion of excellence, is part of the general assessment procedure of tenured scientific staff and is of relevance in resource allocation. The record concerning external activities on editorial boards, invited papers, and invitations to organize or speak at international conferences provides proof of the individual engagement of WIAS tenured staff.

Building and enhancing academic reputation in WIAS is also linked to the rigour in pursuing science quality through (i) a systematic process of internal and external reviews of PhD projects, (ii) the systematic training and supervision of PhD students, (iii) the required minimum of 4 publications in peer reviewed journals, (iv) the systematic programme formation process followed by most Chair groups, (v) the systematic assessment of scientific merit of WIAS scientific staff, and (vi) the periodic bibliometric analysis of WIAS's publication output applying the common criteria of CI, RI and the respective comparators.

The Committee felt that the kind of in-depth evaluation requested by WIAS was worthwhile. We were impressed by the standard of bibliometric analysis carried out by WUR but felt that a purely bibliometric analysis of the current output of small and sometimes multidisciplinary groups could mislead. *The Committee also noted that the report placed much greater emphasis on outputs than outcomes and recommends that future reports consider ways to incorporate measures of the wider impact of WIAS research.*

3.7 Scientific and social relevance

WIAS has instruments in place to (i) periodically review the relevance of its research programmes by means of external peers and stakeholders, (ii) by exposing PhD projects to a process of internal and external evaluation, and (iii) by a recurrent bibliometric analysis of published output. This evaluation rigour is part of the WIAS culture and impacts on the behaviour of its scientific staff.

The research activities of WIAS are guided by WUR and its view on strategic development, by competitive national and international funding programmes, and by recurrent consultations with stakeholders from the general public, industry and the science community. The Review committee was impressed with the rigour and mechanism of relevance securing measures applied in WIAS. While strategic developments of the research agenda through consultative processes with stakeholder communities are highly applauded, *the Review Committee recommends careful discussion of the pros and cons of performance indicators resulting out of various bibliometric assessments practised in the science system as measures of relevance.*

3.8 The primary processes

3.8.1 Research

Performance overview of individual groups – A major challenge for the review Committee was to set benchmarks for the evaluation of performance. It was decided that the appropriate benchmark was other research institutes working primarily in the field of animal and agricultural sciences. Against this benchmark the majority of Chair groups performed well or very well. On the other hand, several of the groups were producing outputs in broader areas of biomedical sciences where the competition is much more intense. In such cases, the outputs were often good (highly cited papers, high impact journals) but did not reach the standard of the most successful groups internationally specializing in those areas. It is incumbent on each group to recognize clearly its own true strengths and not to lose focus.

Scientific performance – The WIAS report put great emphasis on bibliometric analysis. On those criteria, the overall performance of WIAS was good but not excellent: importantly, publications outputs were under-represented in the very best papers in the relevant field, only 6 out of over 1000 publications were ranked in the top 1%. Nonetheless, several groups have produced publications in very highly ranked journals such as *Nature* or *Science*. The Committee's overall impression was that WIAS was performing very well in its core areas (animal and agricultural sciences) where both the quality and quantity of its outputs were well above the world average. However, WIAS groups are much less competitive when moving outside these areas.

There are very good arguments for enriching animal and agricultural sciences with expertise in other areas of more fundamental science, such as human medicine and the life sciences, so the Committee was generally supportive of efforts to engage with other disciplines. However, it is important to get the balance right and for WIAS not to lose sight of its core competencies.

Internal collaboration – The level of collaboration within WIAS was variable, but almost all groups claimed some links with the others.

Internal collaboration is also actively encouraged by the Talents & Topics programme. Those who had participated in this were very positive, but there was some disappointment from groups that had not yet been included, all of which suggests that the programme could and should be continued and expanded.

External collaboration – As described, the key external collaborations are with the CRO institutes. An important vehicle for further developing this key link is the creation of six ASG Centres (see Section 3.3). These Centres will include WIAS and other members of the WUR Department of Animal Sciences, CRO institutes and other institutes as appropriate (e.g. Utrecht Veterinary School). The Centres are essentially networking structures and are intended to promote co-working; the Committee strongly supported this approach.

3.8.2 Training and education

The training programme- The PhD training programme at Wageningen University presents a unique environment, offering a very high level of support both financial and intellectual, as well as a broad or generic skills training programme preparing graduates for a research career or a change in career direction.

The enrolment and selection of PhD applicants maintains a high standard of student; all students need a Masters degree and good English language skills. All supervisors must be research active and it is expected that every member of staff in WIAS will be a PhD supervisor.

Each new PhD project is externally reviewed and comments fed back into the project. The PhD applicants often write the initial proposal themselves which is an excellent way of judging the research potential of the applicants.

The Department should record the number of applications to places and the numbers interviewed as such information will provide a valuable record of demand for doctoral placements and selection intensity and is a measure of the perceived quality of the PhD program. Selection is by “a normal job application procedure” if the PhD student is employed and the PhD programme is carefully structured with work over the first few years planned in advance.

The education programme- A very notable feature of the PhD programme is the training component. The Training and Supervision Plan (TSP) is agreed at the outset of the PhD programme and will occupy at least 6 months of the 4 years. There are compulsory elements including the introduction and an ethics course. The student/supervisor can choose from a selection of seminars, sometimes in different institutions. Although when talking with a small number of students, it was not always clear to them what was compulsory or what was optional, the Head of WIAS was very clear on the requirements.

The quality of the courses in the education programme needs to be continually reviewed and evaluated as is current practice. There was an internal review in 2007 and the recommendations on flexibility in the mandatory elements have been implemented. Courses are evaluated and adjustments made when evaluations are poor.

There is a financial advantage to the Chair Group if a successful graduation is accompanied by an education certificate, neatly adding an incentive to an educational aspiration.

PhD completion and quality- Before 18 months into the 4 year programme there is a formal assessment of progress and permission to advance granted (or not). Projects can be stopped before 18 months. Written feedback to the students is given by the Chair Group. At two years the Chair group reports on progress (a mid-term review).

WIAS has made determined efforts to reduce the time taken to complete the thesis; the median figure is now around 4.5 years and this is the total time from starting to the award of the thesis. A more reasonable time period might be from start to submission in which case the thesis time must be closer to 4 years.

The drop out rate is around 10% which is probably satisfactory in a total population size of around 150 PhD students.

The quality of the thesis needs to be continually monitored; this is not under the control of WIAS but of the independent examination committee that ensures the quality of the thesis. There are examples of theses that have won awards and students who have gained prizes during the course of their studies, all of which point to high quality research training. The independent examination committee ensures the quality of the thesis.

The strong encouragement to publish thesis work is excellent although it was not clear what exactly the rules are. Would 4 unpublished manuscripts be sufficient with perhaps one or two in review? This should be clarified by the development of suitable guidelines.

As PhD students are very frequently working in teams and individual chapters may be the result of a joint effort, it is important that the contribution from the student to each chapter is described. *It is recommended that the Introduction and the Discussion to the Wageningen University PhD thesis should be substantial independent pieces of work that can be assessed as the student's own. In addition it is recommended that WIAS considers that the student includes their own comprehensive literature review in the thesis.*

Student experience- The Committee met four PhD students (apart from PhD Council members) and two postdoctoral workers, one of whom was a WIAS PhD graduate. They all spoke enthusiastically about their training, facilities and support. The education and training programme is much appreciated and is clearly successful. The people we met undertook more training than the minimum requirement indicating their appreciation of the programme. There were some comments about the variability in quality between the courses which reinforces the issues of quality control mentioned above.

It is to the great credit of WIAS that they give every PhD student the opportunity to study abroad. This opportunity is taken by many, but not by all it seems. It is clearly important that the research quality of the collaborating institution is carefully judged and that the students only go to reputable laboratories. An alternative model would be for overseas experts to visit WIAS to give master classes to a PhD cohort. However, the experience gained by working abroad and/or presenting at international conferences is inestimable.

The students and staff spoke with appreciation about the confidant system. Although there are only a very small number of students who use the system, it is very valuable and seems effective.

There was some discussion about the overload that some popular supervisors might experience. Clearly the daily supervisor must have time free to respond immediately to questions. The other supervisors may also be called upon. If the daily supervisor is away for a long period of time and the other supervisors are occupied with for example teaching, there may be difficulties.

The supervisory load where around 60 staff are supervising around 150 students needs to be monitored. Before any further expansion in PhD numbers the availability of staff to act as daily supervisors and members of supervisory teams should be determined. Bench mark numbers for a world leading institute may be a ratio of around 2 or 2.5 students per staff member and WIAS is in this territory.

The PhD students interviewed also spoke flatteringly about the "Science meets Society" events which the students organise themselves. *WIAS should consider broadening this to include all animal science research within the University.*

The final issue concerns careers. The employment statistics that we received indicated that up to 80% of PhD graduates continued in a research career. The recording of student employment over time is very good practice.

3.9 Prospects and expectations for the Graduate School

The review committee was pleased to note that recommendations from the earlier peer review and from the mid term review have all been carefully considered and mostly actioned. WIAS is in a strong position having shown considerable growth in recent years. To date the institute has weathered the recent recession well, with funding and PhD enrolments generally increasing.

The institute has some very strong Chair groups that are assured a positive future. At the same time, however, there are Chair groups that are very small by international standards, and amalgamation of either all or some Chair groups to increase critical mass needs to be considered. In the future, only relatively large highly focused science groups are likely to succeed. Alternatively, further resourcing can be applied to increase the size of some of the existing Chair groups. In either case, the achievement of a critical mass is important.

The future offers great prospects for WIAS and Wageningen UR. The pressing need to feed an ever-burgeoning human population in a sustainable manner, presents great challenges, and WIAS is in a position to provide solutions. The recent merging of the CRO's with Wageningen University offers much potential for enhanced scientific and educational collaboration and offers a conduit for science from the laboratory to the company and farm. WIAS benefits already from a new enlarged Wageningen UR, but in our view the full potential has not yet been exploited.

It will be important for WIAS to retain its special character and to focus on its core business of animal science, while at the same time judiciously developing skills in aspects of the more fundamental sciences and building bridges to areas such as plant science, environmental science, food science and human nutrition, and marine science. The Institute should not be complacent. World-wide, competition in science intensifies, particularly from some of the developing countries (especially India and China), and there is a pressing need to have a sharp focus, a critical mass and a strong public profile. Having said all this, we are absolutely clear that the future prospects for WIAS are very strong. The Institute is in good heart and can build on its currently strong position to continue to serve international animal- and agricultural-science with distinction. The impending move to a new campus with new facilities is a further significant opportunity for the Institute.

4. Performance of the Chair groups

Introduction

Each evaluating subcommittee consisted of a chair, a rapporteur, and mostly one extra member. Each of these experts formed a preliminary opinion of the group to be evaluated, based on the materials supplied by the Chair groups. The meetings with these groups were opened with a brief summary of activities during the evaluation period, followed by a discussion about core activities of the group, scientific highlights, publications and impact, staffing, financing, relations to and with WIAS and other research groups, problems experienced during the evaluation period and future perspectives of the group. Available positions for tenured staff, changes expected in the next 5 to 10 years of significance for the viability of the group were also discussed.

Following the interview, the subcommittee discussed the information provided, in the absence of the group, to establish a provisional set of scores for the four criteria; Quality; Productivity; Relevance; and Vitality and Feasibility, as well as the reasoning behind each of the scores. The rapporteur formulated the text which was discussed by the subcommittee and modified as deemed necessary resulting in the final subcommittee report on the group.

It was possible to draw clear conclusions and assign scores for each of the four criteria, based on the documents and interview with each of the groups. These preliminary results were discussed in several plenary meetings of the entire committee to finalize the text and scores and to ensure that the general evaluation procedures were comparable across all of WIAS.

The scores on the group performances are indicated as below (Table 3). The explanation for these scores is given in the following paragraphs of this chapter.

The standard for scoring, that was adopted by the Committee, is in full compliance with the protocol. The groups were benchmarked against comparable groups, active in the international research arena of animal sciences.

Table 3. Scores for Quality, Productivity, Relevance, and Vitality and Feasibility for each Chair Group.

	Q	P	R	V
1. Animal Breeding and Genetics ABG	5	5	5	4.5
2. Adaptation Physiology ADP	4	4	4.5	5
3. Aquaculture and Fisheries AFI	4	3.5	3.5	4
4. Animal Nutrition ANU	4.5	5	4.5	5
5. Animal Production Systems APS	4	3	4	3
6. Cell Biology and Immunology CBI	4.5	4.5	3.5	4
7. Experimental Zoology EZO	5	3	4	4
8. Human and Animal Physiology HAP	(2.5)	(2)	3	3
9. Host Microbe Interactomics HMI	-	-	4	3
10. Quantitative Veterinary Epidemiology QVE	4.5	4	5	3.5

Note that especially the scores between brackets have to be read in context.

4.1 Animal Breeding and Genetics (ABG)

Current Chair holder:	Prof. J. van Arendonk
Average tenured research input:	2.9 fte
Tenured research input in 2008	2.7 fte

Assessment:	Scientific Quality	5
	Productivity	5
	Relevance	5
	Vitality and Feasibility	4.5

ABG has a well-established and well-deserved reputation for research in the area of animal breeding and genetics, putting them clearly in the top 10% of groups internationally. They have contributed to the development of new ideas and approaches (e.g. analysis genetics of social interactions) and have been rapid in adopting and applying new technologies (SNP typing, next-generation sequencing and new traits). The group has a strong and improving publication record with excellent citations and impact for the field. Several of the group are at the forefront of their respective fields and also provide leadership internationally in their areas of research.

The mission of ABG seems very appropriate to WIAS as a whole, but the review group was slightly concerned that they might be limited to some extent by this mission as well, which does not explicitly include “understanding and knowledge generation”. This would be a concern if some of the wider impacts of their research are not pursued, but it is clear that some efforts are being made in these directions, with collaborations on genomics of song birds and on the genetics of social interactions in natural populations, for example.

Human resources and research facilities of the group are good. There has been a rapid increase in numbers of PhD students and the group is aware that it will be challenging to maintain this level in a rigorous funding environment. Some staff seem to have a heavy load of PhD supervision consequential on the requirement for PhD students to be promoted by a full professor. There has been a clear societal and scientific impact of their PhD programme in the form of trained individuals in research and in industry around the world.

ABG clearly have strong and relevant links with industry. The development of the Animal Breeding and Genomics Centre (ABGC) has strengthened links with the group at Lelystad. This Centre also provides new links to the industry as well as a single interface for contract work which is placed by the ABGC rather than by the contractor. Overall ABG has a good critical mass with a number of excellent scientists at various stages of their career. The presence of two professors in the group increases the viability and vitality of the group, and is a model that could with benefit be adopted for other growing groups within WIAS. The links to Lelystad increase the critical mass still further. The group’s past record demonstrates their ability to respond to the changing technological and societal environment with uptake of new technologies and refocus of projects in new directions. However, many new opportunities arise in the rapidly developing field of genomics and ABG will need to make a careful choice of new directions to pursue. In this light the Review Committee felt that ABG should consider carefully the relevance of epigenetic mechanisms to their programme.

ABG provides a model of a successful WIAS Chair group. Some of the group’s research has the potential for substantial impact outside of the field and ABG should consider how to capitalise on this. In order to ensure continued success it is recommended that ABG make a careful assessment of future research directions as well as working hard to maintain their current level of external funding.

4.2 Adaptation Physiology (ADP)

Current Chair holder: Prof. B. Kemp
Average tenured research input: 1.8 fte
Tenured research input in 2008 1.9 fte

Assessment:	Scientific Quality	4
	Productivity	4
	Relevance	4.5
	Vitality and Feasibility	5

The group started in 2000 with the new mission to understand and unravel the mechanisms underlying adaptive capacity in animals. Adaptive capacity is a timely and important main research area. It is a considerable change of focus initiated with the formation of the new Chair group. The group has been very successful in attracting contract research. Moreover, the evaluation period is characterized by a strong increase in scientific output. This can be considered as a clear positive result of successful leadership and a change in focus.

Within the field of Agricultural Sciences, the quality of the research is significantly above world average. Outside this field, i.e. the general area of stress and adaptation, the quality is still below average. The group should continue their policy to publish in higher impact journals that do not specialize in production animals, for example by emphasizing the general biological significance of their results. Production animals should be considered as suitable animal models for specific scientific questions. The group is encouraged to be more active in the NWO competition.

There are plenty of opportunities for collaboration within and outside the setting of WIAS. Closer collaboration with the Human and Animal Physiology group should be considered as mutually beneficial. In the consolidation of the current position of the group, more focus and critical selection of collaborative projects may be required. The multidisciplinary nature of most of the projects is extremely important, but includes the risk that the group has no specific own core activities and expertise. The group should nurture their integrative approach emphasizing the specific advantages of their animal models.

The group has a good size and has clearly demonstrated its vitality. The absence of specific behavioural and neurobiological expertise within the group is a matter of concern.

4.3 Aquaculture and Fisheries (AFI)

Current Chair holder: Prof. J. Verreth
Average tenured research input: 2.1 fte
Tenured research input in 2008 2.0 fte

Assessment:	Scientific Quality	4
	Productivity	3.5
	Relevance	3.5
	Vitality and Feasibility	4

AFI is one of the larger research groups in WIAS and has a long track record in aquaculture and fishery research. The group's staffing has decreased compared to the previous review period. In 2008 it reached a staffing level comparable to 2004. Published output in refereed journals over the last 5 years averaged 14/FTE and increased to 19.7 per FTE in 2008. The group reached an average CI and RI of 1.03 and 1.17. Some 11% of the papers are in the 10% most cited publications (T10). The CI is considered to be on par with the world average. The AFI has formal programme relations with IMARES and since the last review has delineated its mission ("Sustainable use of aquatic and marine living resources") and concentrated its research into three themes: organism, production systems, and ecosystems. The research strategy has been focused on biological mechanisms, rather than problem solving, and is concentrated on (i) natural ecosystems (pulsed systems and constant systems) to understand resilience of fish populations and communities to anthropogenic drivers of change (fisheries, eutrophication, coastal land use, water management and climate change), and (ii) on aquaculture with a focus on the ecological sustainability and environmental impact with a focus on feed and its negative impact on wastes directed to different aquaculture systems. Fish genetics research has been phased out.

This research programme requires inputs of nutritional physiology, behavioural ecology, nutrient and food web dynamics and follows a combination of three approaches: observational analysis, experiments to test mechanism, and modelling to integrate the generated knowledge. Given the comparable small staff base, extended liaisons and co-operations within WUR platforms and with International partners are practised. The future strategic directions foresee an expansion of activities towards Marine Resource Management (Coastal zone resource use systems)

The Review Committee (a) considered the overall leadership and research management to be very active and responsive to recommendations of the last review, (b) understands the external pressures to expand into Marine Science (MSc education, funding opportunities, government demands).

The Committee cautions the Group to carefully define its comparative advantage and to narrow the scope of research in this domain towards coastal aquaculture, and encourages the Group to use all possibilities to increase staffing and funding through expanding contacts especially with the feed and food industry.

4.4 Animal Nutrition (ANU)

Current Chair holder:	Prof. W. Hendriks
Average tenured research input:	2.0 fte
Tenured research input in 2008	2.1 fte

Assessment:	Scientific Quality	4.5
	Productivity	5
	Relevance	4.5
	Vitality and Feasibility	5

The WIAS Animal Nutrition Group has a long held reputation of excellence in Europe and further afield. In 2005 a new chair was appointed with a well-managed seamless transition from the previous leaders to the new leadership team. The new head appears to have been particularly effective in developing and implementing new strategic directions for the group. Some traditional research areas have been disbanded, having reached maturity. There is a palpable air of enthusiasm and vitality within the group with a real “can do” attitude. This is commended.

During the review period, quality, productivity and relevance of work has been very good to excellent. In particular, productivity as measured by PhD theses and refereed journal papers per FTE staff is very high compared with other groups in WIAS and with international norms. The group should aim to secure some prestigious NWO and EU grants in the future, and thus enhance their already high quality rating.

In the last external review, the review committee remained unconvinced of the group’s initiative to expand into the area of companion animal nutrition. Such fears appear to have been unfounded. The companion animal nutrition programme is looking particularly promising. The group’s strategy aligns with that of WIAS. The collaborative initiative in establishing the Centre for Animal Nutrition (CAN) and making best use of the recent CRO and Utrecht University alignments is particularly pleasing.

A substantial decrease in funding for the group (2006-2008, 7.1-7.7; average 1999-2003, 9.3) is of some concern, but it is accepted that this is largely due to a significant change in direction for the group, and the situation appears to be well in hand.

The group is encouraged to further their linkages with Human Nutrition and Wageningen’s Top Institute, to take advantage of considerable opportunities afforded for animal model work in the development of functional foods for humans. We also recommend that the group forges a closer alliance with the Human and Animal Physiology Chair group.

The strategy for ANU is well-conceived with ambitious aims to develop into new areas of science. Whereas this is supported, new specialised areas require specifically trained staff and specialised equipment. Noting that the group has undergone significant recent change, it is recommended that current initiatives be well established before embarking too vigorously on completely new fronts.

4.5 Animal Production Systems (APS)

Current Chair holder: Prof. A. van der Zijpp
Average tenured research input: 1.5 fte
Tenured research input in 2008 1.5 fte

Assessment:	Scientific Quality	4
	Productivity	3
	Relevance	4
	Vitality and Feasibility	3

This small Group of 1.4 FTE research tenured staff input (currently 5 people) produces research of high quality compared with other comparable groups in Europe. The approach is to develop a set of methodologies that can be used to assess sustainability. Almost all of the expertise needed resides in the group except for the need for systems economics and social sciences and their relationships with these disciplines have been long-standing and continue to develop. The research is not only published in plant and animal sciences and agricultural sciences journals but also has an impact on Dutch government agricultural policy and the advice given to international R&D institutions (FAO, ILRI). The approach to sustainability is well structured and coherent.

There is evidence of leadership from the Chair holder.

The group produced 42 publications. In their SWOT analysis they comment that a weakness is the difficulty in publishing interdisciplinary work. The group suggests that the previous review group warned them of overload and that productivity was extremely high. The comment now is that “output is now back to an average level in quantity and quality”. The number of publications has fallen from 42 in 2003 to 23 in 2008. The group intends to increase the number and impact of the publications over the next little while and also to increase the number of PhD students.

We judged that the societal and cultural impact of the work was excellent but the citations and relative impact were relatively low. Therefore the score represents these two conflicting factors.

The focus is on high quality work which analyses elements of sustainability. The methodologies are clearly worked out for animal systems, or present the challenge for the future. Any work on sustainability has to be holistic. The major challenge is in the appointment of the new chair leader. The field of research for this person is still not decided. It could be in carbon emission reduction, welfare, or systems science.

It is recommended that the group continues to concentrate on world leading multidisciplinary research, including economic and social analysis, with an increase in volume of publications and a deliberate strategy of increasing impact and hence citations.

The strategy for the future takes into consideration Dutch government, EU and international preoccupations with greenhouse gas reduction, living with environmental change and balancing these with economic costs and animal welfare.

The Peer-Review Committee viewed a report of the “Structure Committee” on APS. It was felt that the Structure Committee needs to give more definitive advice concerning the future development of APS. There is a need for clarity concerning future strategies.

4.6 Cell Biology and Immunology (CBI)

Current Chair holder: Prof. H. Savelkoul
Average tenured research input: 1.7 fte
Tenured research input in 2008 1.7 fte

Assessment:	Scientific Quality	4.5
	Productivity	4.5
	Relevance	3.5
	Vitality and Feasibility	4

This is a relatively large group (within WIAS) with a very significant complement of non-tenured staff. In 2008 the group produced 5 PhD theses and now has 20 PhD students.

The research interests of the group are extremely broad, spanning fish, livestock and human immunology and cell biology. It is a challenge to maintain international levels of excellence over this range of topics, although the publications output suggests that the challenge is being met. Nevertheless, in areas such as resistance to malaria or human innate immunity the group is in competition with much more substantial research effort elsewhere.

However, the main focus of the group's research – comprising 50% of their research effort – is in fish immunology. This is an area of strength and the group is doing novel work which is benefiting (in terms of techniques, reagents and understanding) from close association with livestock and human research.

The bibliometric analysis confirms that the group is productive and the outputs are of good quality, though not outstanding.

The group is well led with an enthusiastic and energetic Chair. The group is managed in a way which is clearly supportive of the research staff and there was a generally positive outlook within the team.

Some of (but not all) the fish immunology research does have considerable downstream potential, but it was not clear that this is being fully exploited. This aspect of the group's work could be strengthened. The same is true for the livestock related research. The human research does not have a good 'fit' within WIAS. However, this is the main area of interest for the Chair, the work is externally funded and so the costs to WIAS are relatively modest, and there are tangible benefits for the remaining programmes, helping these to stay at the forefront of the field.

4.7 Experimental Zoology (EZO)

Current Chair holder: Prof. J. van Leeuwen
Average tenured research input: 1.2 fte
Tenured research input in 2008 1.3 fte

Assessment:	Scientific Quality	5
	Productivity	3
	Relevance	4
	Vitality and Feasibility	4

This small Group of 1.3 FTE research input by tenured staff (currently 5 people) produces research of the highest quality as judged by the journals that accept their work for publication. They have produced two Nature and three Science articles in the current period which is an increase on the previous assessment period. Publications that were highlighted included work on flight in swifts, super fast muscles in bird song and control of backbone development in fish. The strategy is clearly to tackle interesting problems in biomechanics wherever they are found

Members of the group hold internationally-leading positions including guest editing of prestigious journals and editorial board membership, and have been awarded national and international prizes.

The group produced 58 papers in refereed journals in the past six years. In their SWOT analysis they comment that a weakness is the moderate number of publications in specialized journals. The productivity seems to be average for WIAS. PhD thesis numbers are relatively low although there is an intention to bring in 2 PhD students per year. Funding is predominantly from WUR with a small proportion from NWO. Contract funding was relatively low in the middle of the assessment period.

Because of the interest in the research of the group there has been wide publicity for some of their discoveries.

The citation scores present something of a problem for this group. Despite the high quality of journals that contained some of the group's work, the CI was below world average for most of the period, as was the RI. Citations per paper should increase with time over the period but this is not happening. The group members consider that the CI values are a result of publications in a small field and do not do justice to the high quality work.

The societal impact of the work could be high, most notably in the area of flight and micro-air vehicles that are being developed with Delft and in the area of animal health and welfare.

The focus is clearly on high quality work in biomechanics in its broadest sense and also work on fish populations. The future direction of the group will be in the area of biomechanics where with a large enough group it would be possible to challenge world leaders. The research facilities seem to be world-leading and some very high quality PhD graduates have come out of the group, and of course contributed to their publications.

It is recommended that the group continues to concentrate on world leading research wherever a suitable question arises. Research aimed at fundamental understanding seems to be their metier.

They should continue their good start in patenting their original discoveries.

The move to molecular studies linking biomechanics and cell responses will continue with likely high quality results.

The balance with teaching of undergraduates and MSc students should be carefully monitored so as not to damage research.

4.8 Human and Animal Physiology (HAP)

Current Chair holder:	Prof. J. Keijer
Average tenured research input:	1.0 fte
Tenured research input in 2008	1.2 fte

Assessment:	Scientific Quality	2.5 *
	Productivity	2 *
	Relevance	3
	Vitality and Feasibility	3

The Group focuses on the physiology of energy homeostasis and contributes to the two WIAS themes: health and welfare, and sustainability. The group has potentially suffered from not having a permanent head for more than three years and currently has a low number of staff and a low overall funding. An historically high teaching load may partly explain a low past productivity.

The performance of the group over the review period has not been strong and staff and PhD numbers have fallen to a critically low level. Can this group be turned around?

The recent appointment of Prof. J. Keijer is expected to give the group some stability and impetus. We commend Professor Keijer and his team for the development of a clear vision and strategy for the group, and note some early successes in the appointment of PhD scholars and the securing of EU-funding. The new Chair is also to be commended for having made decisive changes and for focusing on one central research theme that does relate well to activities in general across WIAS. We detect a new found level of enthusiasm in the group.

*** It should be noted that the assessment of this group is biased by past performance, and it must be said that plans for the future appear to be sound.**

We recommend that Human and Animal Physiology formulates a plan to increase its contacts with industry with a view to substantially increase funding particularly in the area of functional foods and the influence of bioactives on animal performance. Wageningen University needs to be particularly concerned about the vitality of this important group which has become small in size, and take all steps to support the new professor in his endeavours to establish new footing. Currently the group is vulnerable.

4.9 Host-Microbe Interactomics (HMI)

Current Chair holder: Prof. J. Wells
Average tenured research input: 0.4 fte (since the onset of the group in 2007)
Tenured research input in 2008 0.5 fte

Assessment:	Quality	-
	Productivity	-
	Relevance	4
	Vitality and Feasibility	3

This group started in June 2007 and aims at understanding the interaction between both pathological and beneficial micro-organisms with their host. This is an important niche and can develop into a strong binding research theme within the context of WIAS.

Understandably, the group has spent most of the time of its two year existence to set up the laboratories and get the research going. Despite the limited support of WUR, the group has succeeded in establishing a state of the art laboratory. Scientific output is partly based on research of staff members prior to the creation of this Chair group. Therefore, the committee has decided to refrain from an assessment of quality and productivity. The committee is nevertheless impressed by the spirit and achievements of the group leader to set up a considerable research group within this short period of time.

There is a multitude of possible scientific interactions both within WIAS, WUR and beyond. This creates not only opportunities, but also includes the risk of lack of focus. The Committee trusts that this focus will emerge in due course when the programme further develops.

The prospects of this group are very good, but in view of the lack of tenured staff not free of risks. This has influenced the score for vitality and feasibility. The Committee wishes to encourage the Board of the University to be more generous in their support of newly formed groups that is more in line with the ambition to attract highly qualified scientists and to obtain a solid position in some new areas of research.

4.10 Quantitative Veterinary Epidemiology (QVE)

Current Chair holder: Prof. M. de Jong
Average tenured research input: 0.9 fte
Tenured research input in 2008 1.1 fte

Assessment:	Scientific Quality	4.5
	Productivity	4
	Relevance	5
	Vitality and Feasibility	3.5

This group takes a multidisciplinary approach to veterinary epidemiology, combining field work, experimental studies and state-of-the-art quantitative analyses. The group scores well on the bibliometric analyses, both in terms of productivity and quality. This is supported by the highlighted publications which report high quality quantitative epidemiology studies of H7N7 avian influenza, E. coli O157 and foot-and-mouth disease. This is good science addressing some key issues of relevance to Dutch agriculture, and also having a wider international relevance.

The group is supported mainly through WUR funding. In the future there should be scope for bringing in more external funding, but it is noted that some of the collaborative studies that the group undertakes involve funding spent at other institutes.

This group has expanded since the last review but remains small: the chair holder, Prof. M de Jong, has only had a full-time appointment in WIAS since 2007. Budget-wise the Chair still counts as a half-time position, which means that the group has half of the basic WU funding compared to other Chairs. The group is highly dependent on the Chair and remains relatively isolated within WIAS (showing less evidence of WIAS collaborations than other groups). Its long term viability could be strengthened by recruiting more early or mid career researchers and by strengthening internal links.

The group has productive external collaborations, most importantly with the Central Veterinary Laboratory at Lelystad. This link is essential for the core research activity of the group, which involves work with animal pathogens in target species under the heading 'experimental epidemiology'. The link is maintained by the long term involvement of the Chair with Lelystad and his close working relationship with collaborators there, and is facilitated by the institutional links between WUR and Lelystad.

The Chair group has an excellent national and international reputation and is at the forefront of his field. The group's approach to experimental epidemiology is being replicated elsewhere.

The forward strategy of the group has a large component of the evolutionary biology of pathogens. This is an important area and bringing evolutionary concepts into agricultural research is desirable. However, it will be a challenge to undertake such research at a level of excellence equal to that in leading biology departments (e.g. in areas such as antibiotic resistance). Active links with such departments and the introduction of more biologists into the group would make it easier to meet that challenge.

Annexes

Annex 1.

Main characteristics of the SEP and interpretation of criteria

Main characteristics of the SEP

The Standard Evaluation Protocol entails two main characteristics:

- **Two levels of assessment:** The assessment takes place at two levels of research organisation, i.e. the level of the Graduate School (A-level) and the level of Chair groups (B-level);
- **Four main criteria:** The assessment entails four main criteria, i.e. quality, productivity, relevance, and vitality & feasibility.

The Graduate School and the Chair groups are supposed to give sufficient information in their self assessment reports for a thorough preliminary judgement of their performance. The evaluation committee is requested to report its findings along the four main criteria. Regarding the institute level the findings should be reported in qualitative terms with a focus on policy and management questions. For the assessment of the Chair groups, the verdict should be cast in both qualitative and quantitative terms. In the text, the most important considerations of the committee should be clarified, while the conclusion should be summarized in a single term according to a five point scale, "excellent" meaning world class research, and "unsatisfactory" below standards. The committee is requested to consider the full range of the five point scale and apply the criteria according to the descriptions given.

Range

5. Excellent

Research that is world leading. Researchers are working at the forefront of their field internationally, and their research has an important and substantial impact in the field.

4. Very good

Research that is internationally competitive and makes a significant contribution to the field. Research is considered nationally leading.

3. Good

Work that is competitive at the national level and makes a valuable contribution in the international field. Research is considered internationally visible.

2. Satisfactory

Work that is solid but not exciting, but adds to our understanding. Research is nationally visible.

1. Unsatisfactory

Work that is neither solid nor exciting, flawed in the scientific and or technical approach, repetitious of other work, etc.

Interpretation of criteria and elements that are to be considered

The four criteria should always be reviewed in relation to the mission of the Graduate School or Chair group, especially if this mission restricts the institute or group to operate only for/in a national scientific community. The criteria are to be understood in the following way:

Criterion 1: Quality

Quality refers to the level of the research conducted by the researchers of an institute and its groups or programmes compared to accepted (international) standards in that field. As a rule, quality is measured by judging the international academic reputation, the position and the output of the unit to be evaluated. However, in the case of a national orientation of a research field, the point of reference consists of other groups in the country. When judging research quality, the following elements are to be considered:

Quality of the research:

Leadership of the Graduate School and the individual leadership of the principal investigators, including research policy and research management.

The academic reputation of the group or programme:

Organizational aspects of the institute and of the research programmes such as the human and financial resources.

PhD training: For the A-level (Graduate school level) an assessment of PhD training is included.

The Graduate School intends to be accredited once every six years through the so called ECOS-accreditation under the auspices of the Royal Netherlands Academy of Arts and Sciences (KNAW). This accreditation focuses primarily on PhD training, but also on a number of other research activities of the research school. An ECOS-accreditation is usually sought shortly after an external peer review (SEP-evaluation), because this evaluation may be used as input for the ECOS-accreditation. In order to diminish the administrative burden and to optimize the link between the SEP-evaluation and the ECOS-accreditation, the evaluation committee is requested to focus on:

- objectives and outcomes of the course programme
- the quality (-assurance) of the PhD course-programme
- the success rates
- training and supervision, incl. selection and progress monitoring;
- the institutional embedding of the programme in the research organization
- collaboration in research

Furthermore, the committee is requested to reflect on the educational resources, such as the availability of courses and the endeavours to improve these.

Criterion 2: Productivity

Productivity encompasses all the various activities and outputs of the research. Productivity should always be assessed relative to the mission and resources of the Graduate School and Chair group. Elements to be considered are:

- The output to the scientific community and the output for wider audiences are to be judged. Quantitative and qualitative measurements may be used.
- The policy measures to render the output to the best and most relevant level possible. Of course the output needs to be reviewed in relation to the input in terms of human resources (tenured staff).

Criterion 3: Relevance

This criterion covers both

- the scientific and the technical, and
- the socio-economic and societal impact of the work.

To address the first element the bibliometric analysis is a very helpful tool (but it needs to be read with thorough understanding of the context).

To address the second element the results of the research can be considered from different angles:

- *Societal quality*. This concept refers to the value put upon research and its (expected) results by specific stakeholders or society at large. It may also refer to the contribution of research to important issues and debates in society.
- *Societal impact*. This concept refers to how research affects specific stakeholders. This can be measured, for example, via behavioural change of actors or institutions.
- *Valorization*. This concept refers to economic, technological and socio-cultural benefits of research.

Criterion 4: Vitality & feasibility

This dual criterion addresses the graduate school's / Chair group's ability to adequately react to important changes in the environment. It refers to both internal (personnel, research practice) and external (developments in the field and in society) dynamics of the group and can best be assessed via the SWOT-analysis.

- At the graduate school level, the ability and flexibility may be shown by performances / achievements in its assignments and adjustments in a changing environment.
- At the level of the group it may be shown by, for example, the way in which professional projects and the human resources are managed. This regards an assessment of policy decisions as well as assessment of project management, including cost-benefit analysis, subject choices, concentration of research lines, etc.

Annex 2.

Checklists

Checklist for Graduate School as a whole for internal use by the evaluation committee

CRITERION	SUB-CRITERION	Elements to be considered
A. Quality	A1. Quality and scientific relevance of the research	Overall quality and significance of the output; Scientific and technological relevance of the research themes / programmes.
	A2. Leadership	Management processes; Mission and goals; Strategy and policy to promote coherence and quality
	A3. Academic reputation	(Inter)national position and reputation of the institute
	A4. Resources	Human resources; Funding policies and earning capacity; Research facilities
	A5 Training and education	<ul style="list-style-type: none"> ○ objectives and outcomes of the course programme ○ the quality (-assurance) of the PhD course-programme ○ the success rates ○ training and supervision, incl. selection and progress monitoring; the institutional embedding of the programme in the research organization ○ Collaboration in research
B. Productivity	B1. Productivity strategy	Productivity goals; Publication strategy; Rewards and sanctions
	B2. Productivity	Scientific publications and PhD-theses; Professional publications; Output for wider audiences
C. Relevance	C1. Scientific relevance	Relative impact / citation scores (bibliometric analyses)
	C2. Societal relevance	Availability of research output for users; Socio-economic and cultural impact and significance of research results for stakeholders and society at large
D. Vitality and feasibility	D1. Strategy	Strategic planning; Contribution to promotion of research quality and coherence; quality assurance; admittance policy for Graduate School members.
	D2. SWOT-analysis	Analysis of the position of institute; Analysis of strengths and weaknesses
	D3. Robustness and stability	Research facilities; Financial resources; Staff competition; Mobility and attractiveness; Expertise within the institute

Checklist Chair group for internal use by the evaluation committee

The numbers refer to the five point scale explained in chapter 2: 5 = *excellent*, 4 = *very good*, 3 = *good*, 2 = *satisfactory*, 1 = *unsatisfactory*.

The “subcriteria” and “elements to be considered” are just an aide memoire and in no way should provoke a discussion about how to rate or how to weight these individual items. The elements are identified to help the peer in grounding his conclusions.

CRITERION	SUB-CRITERION	Elements to be considered	Score range 1 – 5 (.5 score allowed)
A. Quality	A1. Quality and scientific relevance of the research	Originality of the research approach and ideas; Significance of the contribution to the field; Coherence of the research; Quality of the scientific publications; Quality of other output; Scientific and technological relevance	
	A2. Leadership	Recognized leadership of individual researchers; Mission and goals; Strategy and policy	
	A3. Academic reputation	(Inter)national position and reputation; Prominence of the Chair leader and other research staff; Impact and significance of research results in the field; Relevance of research facilities	
	A4. Resources	Human resources; Funding policies and earning capacity; Research facilities,	
B. Productivity	B1. Productivity strategy	Productivity goals; Publication strategy; Rewards and sanctions	
	B2. Productivity	Scientific publications and PhD-theses; Professional publications; Output for wider audiences	
C. Relevance	C1. Scientific relevance	Relative impact / citation scores (bibliometric analyses)	
	C2. Societal relevance	Availability of research output for users; Socio-economic and cultural impact and significance of research results for stakeholders and society at large	
D. Vitality and feasibility	D1. Strategy	Strategic planning; Investments and collaboration; Research topics planned for the near future and their perspectives; Flexibility and anticipation on expected changes.	
	D2. SWOT-analysis	Analysis of the position of the Chair group; Analysis of strengths and weaknesses and adjusted strategy	
	D3. Robustness and stability	Research facilities; Financial resources; Staff competition; Mobility and attractiveness; Expertise within the group	

Annex 3:

Brief Curriculum Vitae of the Peer Review Committee Members

Prof. Paul J. Moughan (Chair)
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Paul holds the position of Distinguished Professor at Massey University in New Zealand and is Director of the Riddet Institute.

Paul was appointed to the foundation chair in monogastric biology at Massey University in 1993 and his research has encompassed the fields of human and animal nutrition, food chemistry, functional foods, mammalian growth biology and digestive physiology. While holding this Chair he was also foundation Head of the Institute of Food, Nutrition and Human Health at Massey University and director of the University's Monogastric Research Centre and Foundation Scientific Director of the Fonterra funded Milk and Health Research Centre. He was awarded Doctor of Science in 1995 and in 1997 he was awarded a Personal Chair at Massey University and elected a Fellow of the Royal Society of New Zealand. He has published in excess of 300 scientific works and received several prestigious international awards for his work, sits on a number of editorial and company boards and is an adviser to the international food and feedstuffs industries. He is a non-executive Director of the Gardiner Foundation, Melbourne, Australia.

The Riddet Institute, a New Zealand government funded Centre of Research Excellence (CoRE) is a partnership between the University of Otago, Auckland University and Massey University, and two New Zealand Crown Research Institutes, Plant and Food Research and AgResearch. It is dedicated to research and post graduate education in the area of food science and human nutrition.

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Chris (FRSE) holds a joint appointment between the MRC Human Genetics Unit and the Roslin Institute at the University of Edinburgh.

Chris joined the Roslin Institute in 1984, subsequently becoming head of the Department of Genetics and Genomics in 1996. In 2008 he moved to the MRC Human Genetics Unit within the division of Biomedical Systems Analysis but retains a part time appointment and research programmes at Roslin Institute.

His interests lie in developing an understanding of the control of complex traits, where inter-individual variation within and between populations is controlled by variation at a number of genes (often referred to as quantitative trait loci or QTL), by environmental factors and by the complex interactions of these components. Most variation between individuals within and between populations is in the form of complex traits. He has led and collaborated in a large number of projects focussing on the dissection of complex traits in a range of species. These have included the first genome-wide scan of QTLs in livestock and many subsequent studies as well as studies in humans, fish, model vertebrates and plant species.

The Medical Research Council (MRC) Human Genetics Unit is at the forefront of research into human genetics. Its role is to advance the understanding of genetic factors implicated in human disease and normal and abnormal development. The Unit's programmes of work cover the themes of developmental genetics, chromosome biology and models for human genetic diseases. The Unit is part of the Institute of Genetics and Molecular Medicine (IGMM) in association with The Centre for Molecular Medicine and Edinburgh Cancer Research Centre.

The Roslin Institute is a Biotechnology and Biological Sciences Research Council (BBSRC) Institute associated with the Royal (Dick) School of Veterinary Studies, the number one-ranked Veterinary School in the UK in the 2008 Research Assessment Exercise. The Institute undertakes research within the framework of the BBSRC Institute Strategic Programmes focussed on the health and welfare of animals, and applications of basic animal sciences in human and veterinary medicine, the livestock industry and food security.

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Dominic is Vice-Principal for Research and Commercialisation at the University of Aberdeen. He is a Professor in Zoology and his research interests have been fish growth and metabolism.

Dominic's career has gradually shifted towards management; firstly as Head of Zoology, then Head of the Faculty of Science and latterly as Vice-Principal for Research. His main responsibilities cover the generation of income to the University from government and non-government funding and in the conversion of research ideas into a form that will attract external funders. Dominic works with colleagues in the University's Research and Innovation group to assist academics to form companies or license intellectual property in order to promote research findings. The University has developed a pipeline of commercial ideas that has led to several new company formations. Dominic has been a member of several Funding Council committees and is a director of several of the spin-outs he has formed. He has spent the last 5 years developing the University's international strategy and is responsible for successful links, particularly in China. Dominic was responsible for the last research assessment submission which resulted in a significant increase in research funding.

The University of Aberdeen is Scotland's third oldest and the fifth oldest in the UK. With over 13,000 full-time matriculated students, the University is a world-class research-led centre of learning and teaching excellence. Nearly 90% of research undertaken at the University of Aberdeen was been recognised to be of international quality following the 2008 Research Assessment Exercise (RAE). The University aims to be within the top 20 in the UK and top 100 in the world in the next few years.

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Jaap Koolhaas has been full professor in Behavioral Physiology at the University of Groningen since 1990.

Jaap trained as a biologist specializing in animal behaviour and animal physiology at the University of Groningen. He did his PhD on the neurobiology of aggression. In 1976 he was a Post Doc at the department of Experimental Psychology at the University of Oxford and in 1984 he was a visiting professor at the department of Pharmacology of the University of Rome. His research includes the physiology and neurobiology of social behaviour, social stress and adaptation in rats and mice. He has a strong interest in the contribution of personality factors in social stress and adaptation and their relevance for animal welfare. In addition to his research activities he is Editor of the journal *Physiology & Behaviour*.

The University of Groningen is the second oldest university in the Netherlands. It has a large international network and an excellent reputation for academic teaching with a modern, student-oriented approach. It offers degree programmes at Bachelor's, Master's and PhD levels in virtually every field. It encompasses 9 faculties and hosts almost 25,000 students. The research of the Behavioral Physiology group is to unravel the mechanisms by which animals (rats and mice) adapt both behaviourally and physiologically to challenges in their social environment. Specifically, the program studies both the causes and the consequences of intermale aggressive behaviour. The research tries to understand the interaction between social environmental demands and the individual capacity to cope with these demands in terms of behaviour and physiology (coping style). The results of these studies are relevant for understanding the involvement of personality and environmental factors in the development of violence and stress related disease.

Prof. Kurt J. Peters
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Last April Kurt retired as Professor of Animal Production at the Humboldt Universität Berlin. In 1981 Kurt was appointed as Professor of Animal Breeding and Husbandry in the Tropics and Subtropics at the Georg August Universität in Göttingen with a leave of absence from 1985 to 1990. In this period he was Director of Research and Deputy Director General at ILCA, a CGIAR Center with Headquarters in Addis Abeba. From 1990 to date he held the Chair of Animal Production at the Faculty for Agriculture and Horticulture of the Humboldt Universität Berlin. During parts of this period he was also Director of the Institute of Animal Sciences and Head of the department of Animal Breeding in Tropics and Subtropics. In between he was involved as a member and chairman of several Boards of Trustees at the CGIAR and was President of ATSAF e.V., Council for International Agricultural Research for Developing Countries. He also participated in a number of CGIAR and EU evaluation teams. For the major fields of research in developing countries he was engaged in efficiency of breeding organizations and programmes for dairy cattle goats and sheep, efficiency of

performance recording systems, effectiveness of smallholder oriented dairy value chains and evaluation of feed resources and their integration into feeding systems.

The Institute of Animal Sciences comprises three Chairs: Molecular Genetics, Animal Husbandry, and Animal Breeding (in the tropics). In the past working focus was directed towards international Animal Systems development. From 2009 onwards the focus will be directed towards environmental sustainability and climate change. A strong engagement related to climate change and livestock and the environment is already established in problem related teaching courses and study projects. Major third party funded projects are implemented with partner universities in countries of eastern Europe, Asia and Africa.

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Mark (FRSE) holds the Chair of Infectious Disease Epidemiology at the University of Edinburgh, Scotland.

Mark graduated with a BA Zoology in 1980 at the University of Oxford and with a MSc Biological Computation at the University of York a year later. He obtained his PhD Biology in 1985 at Queen's University, Kingston, Ontario, Canada. From 1985 to 1997 he held research fellow positions at several Universities (Zimbabwe, Oxford, London). From 1997 to 2005 he held a Chair of Veterinary Public Health and Quantitative Epidemiology in the Department of Tropical Animal Health at the University of Edinburgh. From 2005 onwards he held a Chair of Infectious Disease Epidemiology in the Centre for Infectious Diseases at the University of Edinburgh.

Mark has been honoured with several awards and prizes. He has supervised several PhD students and has written well over 150 peer reviewed articles. He has been a PhD examiner on several occasions.

The University of Edinburgh's School of Biological Sciences includes about 125 academic staff and independently-funded senior research fellows, and approximately 200 postgraduate research students. The School comprises six research-focused Institutes with a strong interdisciplinary remit: Structural and Molecular Biology, Cell Biology, including the Wellcome Trust Centre for Cell Biology, Stem Cell Research, Immunology and Infection Research, Evolutionary Biology, and Molecular Plant Science. Research of the highest international standard is conducted over a wide range of pure and applied biological sciences. The School's teaching programme includes both undergraduate and taught Masters degrees, with some 1600 students enrolled in the degree programmes.

Annex 4:

Programme for the WIAS Peer Review 2009 site visit

Monday 8 June

Time	Scheduled event
18:00	Full committee with Martin Kropff, Rector Magnificus, and WIAS representatives
	Welcome presentation by Rector Magnificus
18.30	Full committee with Martin Kropff, Rector Magnificus, and WIAS representatives
	Dinner

Tuesday 9 June

Time	Scheduled event		
8:30	Full committee		
	Preliminary discussion on performance assessment Dividing tasks		
9:30	Full committee with Wouter Gerritsma, WU library representative		
	Discussion on bibliometric analysis		
10:00	Break		
10:30	Full committee with Bas Kemp, WIAS Director, and Gab van Winkel, WIAS Secretary		
	Introduction to WIAS		
11:00	Committee sub-group: Dominic Houlihan, Paul Moughan, Kurt Peters	Committee sub-group: Chris Haley, Jaap Koolhaas, Mark Woolhouse	
	Aquaculture and Fisheries	Animal Breeding and Genetics	
12:00	Break		Break
12:30	Lunch		
13:30	Committee sub-group: Paul Moughan, Jaap Koolhaas	Committee sub-group: Chris Haley, Mark Woolhouse	Committee sub-group: Dominic Houlihan, Kurt Peters
	Education committee	Interview two PhD students: Haisheng Nie and Gonçalo Santos	Interview two postdocs: Liesbeth Bolhuis and Mark Zwart
14:00	PhD Confidants	PhD students Council	Interview two PhD students: Ansa Wasim and Simone de Bruin
14:30	Break	Break	Break
15:00	Committee sub-group: Dominic Houlihan, Jaap Koolhaas, Paul Moughan	Committee sub-group: Chris Haley, Kurt Peters, Mark Woolhouse	
	Experimental Zoology	Quantitative Veterinary Epidemiology	
16:00	Break		Break
16:30	Committee sub-group: Dominic Houlihan, Jaap Koolhaas, Mark Woolhouse	Committee sub-group: Chris Haley, Paul Moughan, Kurt Peters	
	Cell Biology and Immunology	Human and Animal Physiology	
17:30	Break		Break
18:30	Full Committee		
	Dinner		
20:00	Full committee with Bas Kemp, WIAS Director Visit to Wageningen University Campus		
21:30	Group discussion of findings		

Wednesday 10 June

<i>Time</i>	<i>Scheduled event</i>	
8:30	<i>Committee sub-group: Jaap Koolhaas, Paul Moughan, Mark Woolhouse</i>	<i>Committee sub-group: Chris Haley, Dominic Houlihan, Kurt Peters</i>
	Adaptation Physiology	Animal Production Systems 9:00: Discussion with Pim Brascamp, advisory committee on the future direction of the Animal Production Systems Chair
9:30	Break	Break
10:00	<i>Committee sub-group: Dominic Houlihan, Paul Moughan, Kurt Peters</i>	<i>Committee sub-group: Chris Haley, Jaap Koolhaas, Mark Woolhouse</i>
	Animal Nutrition	Host-Microbe Interactomics
11:00	Break	Break
11:30	<i>Committee sub-group: Dominic Houlihan, Paul Moughan, Mark Woolhouse</i>	<i>Committee sub-group: Chris Haley, Jaap Koolhaas, Kurt Peters</i>
	Meeting with Martin Scholten, General Director Animal Sciences Group, also Director of Wageningen IMARES	Meeting with Paul Vriesekoop, Director Wageningen Livestock Research
12:00	<i>Full Committee with Sjoerd Wendelaar, Chairman WIAS International Advisory Board</i>	
	Lunch	
13:00	Walk to Zodiac building followed by excursion to Zodiac labs and facilities	
	<i>Committee sub-group: Chris Haley, Paul Moughan, Mark Woolhouse</i>	<i>Committee sub-group: Dominic Houlihan, Jaap Koolhaas, Kurt Peters</i>
13:15	Climate/respiration units: Walter Gerrits	Fish experimental facility: Johan Verreth
14:00	Transfer	Transfer
14:15	Feed analysis laboratory: Leon de Jonge	Host-microbe interactomics laboratory and Physiology laboratory: Jerry Wells and Jaap Keijer
14:45	Transfer	Transfer
15:00	Animal genome analysis laboratory: Martien Groenen	Biomechanics laboratory: Johan van Leeuwen
15:30	Walk back to Hotel De Nieuwe Wereld	
15:45	Group discussion of findings	
17:30	Questions to WIAS Director	
18:30	<i>Full committee with Leo den Hartog, director Nutreco Agriculture R&D</i>	
	Dinner	
20:00	Preparation of draft Report	

Thursday 11 June

<i>Time</i>	<i>Scheduled event</i>
8:30	<i>Full Committee</i> Finalizing draft report
11:00	<i>Full committee with WIAS Director and WIAS Secretary</i> In confidence presentation of agreed draft report
12:00	<i>Full Committee</i> Fine-tuning draft report
12:30	Lunch
13:30	Preparation of presentation at public debriefing meeting
15:00	Break and walk to Zodiac building
15:30	Public debriefing meeting
16:30	Closure of site visit and drinks