Lithuania: Research Assessment Exercise

Panel A: Agriculture
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Panel A: Agriculture

MOSTA, March 2015
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Introduction

Background

The overall objective of the research assessment exercise of the Lithuanian Higher Education and Research Institutions was:

To provide the Lithuanian public, policy-makers and decision-makers and the academic community with the most objective picture possible of the excellence and competitiveness of Lithuanian science in comparison with the global practice in the respective area of science.

The assessment produced evidence based analytical material that carefully and in details analyses the research excellence and competitiveness of Lithuanian research, combining its socioeconomic impact and the capacity of its research institutions. This material provides evidence for research policy making at different levels as well as enabling the research institutions involved in the process to gain a significant impetus for improving their activities. The research assessment was directed at institutions that were Higher Education institutions and their constituent faculties/departments/research groups or State research institutes.

Altogether nine panels were appointed to perform the evaluation. This document is the report of Panel A: Agriculture.

Scope of Panel A: Agriculture

The Panel was asked to evaluate research in the Agriculture in 8 Units of Assessment (UoA) using the following criteria: research quality, economic and social impact, infrastructure, research management and development potential and to score each Unit on a five point scale, namely, ranging from outstanding [5] to poor [1]. The overall objective was to benchmark research in Lithuania against international research in the Agriculture.

Material on which the assessment was based

Each Unit participating in the evaluation provided the Panel with a self-assessment report for the years 2009 - 2013. The self-assessment report contained the following categories:

1. General information about the unit of assessment (UoA)
2. Human resources
3. Research output
4. Doctoral training
5. National and international collaboration
6. Other scientific and social activities
7. SWOT analysis
8. Funding

The self-assessment also included a list of best which were sent to the panellists. The panel also had access to a bibliometric analysis including information on citations and international co-authors.

The evaluation by the Panel was based on the self-assessment reports prepared by the Units of Assessment themselves, bibliometrics based on the data from the Scopus database, publicly available information via the websites of the research institutions as well as site visits and meetings with the representatives of the Units of Assessment. The Panel and the organisers of the assessment exercise do not take any responsibility for the quality and accuracy of the information submitted by the individual Units of Assessment.
Assessment procedure

Experts from Panel A visited Lithuania on January 19 – 22, 2015 and during this period they made site-visits to all UoA. The final Panel P assessments were based on both, the self-assessment report and evidence gathered during site visits. At least two Panel members were present at each visit. Each self-assessment report was read in details by at least two Panel members and then discussed by the whole Panel on at least two occasions, namely, before and after the Panel visits to the Units.

Institutions involved

Panel A was asked to evaluate 8 UoA within 3 institutions. The scientific disciplines of these institutions include Ecology and Environmental, Zootechnics, Veterinary, Forestry, Agronomy.

Universities

1. Aleksandras Stulginskis University
2. The Lithuanian University of Health Sciences

Research Institutes

1. Lithuanian Research Centre for Agriculture and Forestry
Assessment of the Unit
Agronomy, Aleksandras Stulginskis University

<table>
<thead>
<tr>
<th>Name of the UoA</th>
<th>Agronomy</th>
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<tbody>
<tr>
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<td>Total no. FTE researchers</td>
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<td>Composition of the Unit of Assessment (UoA)</td>
<td>Faculty of Agronomy; Experimental station; JRC Laboratory of Agrobiotechnologies</td>
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<tr>
<th>Category</th>
<th>Score</th>
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<tr>
<td>Quality of the research performance and impact on the scientific research discipline of the UoA</td>
<td>3</td>
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<tr>
<td>The economic and social impact of the research in Lithuania</td>
<td>3</td>
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<tr>
<td>The physical infrastructure of the UoA</td>
<td>4</td>
</tr>
<tr>
<td>Research management (including career development and human resource management) of the UoA</td>
<td>3</td>
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<tr>
<td>The development potential of UoA</td>
<td>3</td>
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<tr>
<td>OVERALL SCORE</td>
<td>3</td>
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Overall score

Given its nature and size, the Faculty was assessed as generally a strong national player in its research areas, with good industry links and recently improved research infrastructure. Its strategic management is impressive; it is less obviously strong in terms of day-to-day and month-to-month management, e.g. current high-profile projects, and numbers of PhD students and postdoctoral staff. Though it has a number of international links and contacts, it has yet to show itself as a strong international research player in terms of ongoing multi-project links, and its development potential in terms of future research initiatives is not clearly identified.

Quality of the research performance and Impact on the scientific research discipline of the UoA

The Faculty of Agronomy of the Aleksandras Stulginskis University is composed of three Institutes, an experimental station and a shared JRC laboratory of agrobiotechnologies, all on the main campus. The Faculty is the only one of its type in Lithuania, with a long tradition in agricultural research, and is a main
The geographical focus of the Nemunas Valley initiative. Research funding is limited (€34K p.a. per researcher FTE), with a low 6% from international programmes (see also international publications), but 14% from industry, which is relatively high. The rate of publications, at 9 per researcher (Scopus, 2009-2013), is satisfactory, but only a limited number of papers have been published in internationally recognized journals, with no really strong example. Most of the journals used for publications are of medium level, typically in the lower quartiles of the relevant impact factor range. Of the four papers submitted to the Panel, all were in international journals (two carrying non-Lithuanian secondary co-authors, from Canada and Poland respectively), and covered a range of topics, e.g. genomics and organic production.

The number of PhD students, at 14, is rather low in proportion to staff numbers including 30-40 professors, i.e. a PhD student / professor FTE ratio of under 0.5; most graduating students took at least 5 years of full-time study. No postdoctoral researchers or projects were reported, which is worrying.

Much international collaboration was reported but the outcome of these efforts to date, in terms of (enduring research linkages, seemed somewhat limited. A unit of this size should be able to report say ten significant FP7 or equivalent international projects.

The economic and social impact of the research in Lithuania

The senior management of the Faculty (and its home university) clearly recognises the importance of its economic and social links, though this was not as obvious amongst its middle-ranking staff. Large numbers of industry (agriculture) contracts were reported, mostly trials and evaluations for small (under €10K) funding amounts, while larger contracts (e.g. for €214K over 3 years for medicinal plants, and several just under €100K each) were not further explained. Some new plant varieties - often of decorative flowers - have been developed (5 in 2011 and 2012, and 10 in 2013) were reported, and one patent, for liquid fertiliser for vegetables, was registered in 2010, though only in Lithuania. Higher, and more recent, registrations, including some at EU level, would have been hoped for.

The Faculty and University are quite heavily involved in the popularization of science via TV, radio, and domestic journals and exhibitions. Its interactions with non-academics (i.e. business, policy-makers, and the public) are at a level to be expected of recognized academic institutions of this type. It provides a large basis of expertise for the Ministry of Agriculture and has intensive contacts with local industry.

The physical infrastructure of the UoA

The Faculty has a research environment that is comparable with globally recognized academic institutions in its discipline, with a convenient experimental station, and a new set of well-equipped laboratories. This infrastructure is in good shape and quite modern, and appears to be supported by adequate technical staff and services. Access to databases and on-line journals seems to be sufficient. A major task will be to ensure that the infrastructure, which at present appears somewhat underutilized, is intensively and productively used, with good interactions between researchers of different disciplines (the Panel did not see any social areas, except in the impressive new business centre, where one of its meetings was held).

Research management (including career development and human resource management) of the UoA

The research management of the Faculty, as described in Sections 411 et seq. of the self-assessment report, and in the visual presentation made by senior management during the Panel’s visit, appears appropriate and sophisticated. Its strategic plans are well developed, and recognise the changing research environment, e.g. of the Lithuanian Government, and the EU Structural Funds. Contacts with senior University and Faculty staff, and inspection of the ASU website and other documentation, gave the Panel confidence that long-term strategic and financial planning was taking place, although human resource management was somewhat
constrained by the national framework of academic employment, the dominance of teaching over research, etc.

At a lower level, there were some areas of concern, e.g. there have been a number of scientific visits of University workers to institutions abroad, and some in the opposite direction (mostly during 2010-2012), but long-term visits of 6 - 12 months in either direction are completely missing.

**The development potential of UoA**

The “Opportunities” identified for the Faculty in its SWOT analysis were considered by the Panel to be rather vague; and similarly for the "niche" and "characteristic features” responses. The Faculty is of sufficient size to have “critical mass” (although its research interests are rather disparate), and specific efforts to establish international links, e.g. by attracting high-level doctoral students and researchers from abroad, seem yet to be developed.

The Faculty has demonstrated the ability of its researchers to participate in international competitions, but their present scientific capacity as measured by scientific output is somehow limited. They have, however, the capability to initiate new research directions, if these can be identified and pursued more precisely than was obvious from the self-assessment report. In the SWOT analysis, the “opportunities” were stated very vaguely, and positive solutions to “weaknesses” and “threats” were not identified.

The age and career progression of the active scientific staff seems to be well managed. However, there is a lack of long-term secondments abroad and a need for stronger involvement of English in its current scientific life and a stronger emphasis on publication in stronger journals. The Faculty is able to raise funding that is awarded competitively from EU funds, such as FP projects and Eureka, and intensive exploitation and networking for international projects such as Horizon 2020, etc. must be supported. Contact programmes such as COST should be exploited (and not simply engaged in) with significant future research work in mind. For similar reasons, the university should exploit instruments such as Erasmus and Leonardo for exchange of students (in both directions).

**Conclusions and recommendations**

In order to achieve a strong intentional reputation in research, the Faculty should make every effort to ensure that its leading staff, and its new research infrastructure, are exploited by establishing strong and enduring links with key institutions in other countries, e.g. in the Nordic area and Western Europe, and possibly Ukraine, given its geographical and linguistic links with Lithuania.

All doctoral theses are currently written and presented in Lithuanian; it would be helpful that at least a part of PhD theses are in English; this would improve the visibility of PhD results, e.g. when applying for positions abroad. More generally, communication skills in English should be exploited and improved.
**Panel A: Agriculture**

**Forest Sciences and Ecology, Aleksandras Stulginskis University**

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<tr>
<th>Name of the UoA</th>
<th>Forest Sciences and Ecology</th>
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<td>Total no. FTE researchers</td>
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<td>Composition of the Unit of Assessment (UoA)</td>
<td>Faculty of Forest Sciences and Ecology with institutes (Institute of Forest Biology and Silviculture, Institute of Forest management and Wood Sciences, Institute of Environment and Ecology)</td>
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</tbody>
</table>

### Quality of the research performance and Impact on the scientific research discipline of the UoA

- **3**

### The economic and social impact of the research in Lithuania

- **3**

### The physical infrastructure of the UoA

- **4**

### Research management (including career development and human resource management) of the UoA

- **3**

### The development potential of UoA

- **3**

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### OVERALL SCORE

- **3**

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**Overall score**

The Institute is a strong national player with good potential to become an important international player. The overall score is mainly based on the quality and impact of its research and the strategic management of the unit. An even higher profile in publishing (more international, higher-impact papers, and some signs of leadership at the international level), together with a clearer strategy in management and research profiling, would improve the overall score of the Faculty.

**Quality of the research performance and Impact on the scientific research discipline of the UoA**

The Faculty of Forest Sciences and Ecology conducts research in a number of diverse fields of forestry and in some fields of environmental sciences, and is a strong national research player with some international recognition. Research funding is limited (€45K p.a. per researcher FTE), with a relatively high 12.5% from international programmes, but only 3% from industry, which is low. The rate of publications, at 7.3 per
researcher (Scopus, 2009-2013), is above average for all units assessed by the Panel. The research groups have active international contacts, resulting in collaborative projects and papers. Overall, the publication record is rather good: papers are being published in good international journals, the average number of Scopus articles per researcher is relatively high, and papers are well-cited. The Faculty has a relatively sound demography with a satisfactory number of PhD students. Funding of the unit consists of basic state budget funding, competitive state R&D funding from the Research Council of Lithuania, some international funding (e.g. some EU framework projects) and a vast number of small, market-oriented or contract research payments. Some of the projects resemble more surveys than research projects and may not result in publications. The research profile of the Faculty is strong in traditional, biological fields of forest research, but with many important contemporary aspects (e.g., forest economics or technology) completely missing. International collaboration seems to be important in the strategy of the unit, with young researchers actively taking part in activities. According to the PhD students interviewed, they are being encouraged to write their PhD theses in English, and as a collection of papers with a summary instead of a monograph, which Panel warmly welcomed. To become even more prominent in the research area, the unit would benefit from even tighter international collaboration in its main fields, and closer contact (if not incorporation) with other disciplines such as socioeconomics.

The economic and social impact of the research in Lithuania

The Faculty is important in its research area, and has satisfactory contacts with society, both in resulting in some larger joint projects (e.g. in multipurpose farming, although the role of forest research in the project was unclear to the Panel), and numerous small inventories and surveys. Many of the contract research or market-oriented type projects are closer to agriculture than forestry. While research on multiple land use is commendable, the Panel would have liked to see more forest-specific projects. In forestry projects, the end-users are specified as citizens or land owners, but the forest industry (mechanical, chemical) seemed to be missing. Senior staff are relatively active in various national bodies, e.g. memberships of official, NGO, and industry bodies. Forests in Lithuania are important, both for the economy and for the wellbeing for its citizens (multiple use, recreation). Climate change and increased interests in bio-economy will bring new challenges to applied studies on forestry, and increase its societal and economic importance. The Faculty is a national key player, providing information to the forestry sector (especially the state-owned sector) in the country, but interdisciplinary studies including aspects of forest economy, technology and modelling would increase its national importance.

The physical infrastructure of the UoA

The Faculty seems to have sufficient infrastructure and access to common infrastructures in the Nemunas Valley. Recent funding from EU (ESF, regional funds) has considerably improved its facilities in laboratories, and presently the Faculty seemed to have most modern, well-equipped laboratories e.g., for genetic research (isolation of DNA, sequencers, etc.). The laboratories are next to those of the Faculty of Agronomy, which are also very well-equipped and probably can be jointly used. The critical point will be to obtain enough funding to utilise and maintain these facilities. Furthermore, more emphasis should be put on expertise in data handling and storage, since many studies conducted in the Faculty result in valuable data which, if described and stored accurately, could be utilised in future.

Research management (including career development and human resource management) of the UoA

The research management of the Faculty, as described in the self-assessment report, and in the visual presentation made by senior management during the Panel’s visit, appears appropriate and sophisticated. Its strategic plans are well developed, and recognise the changing research environment, e.g. of the Lithuanian Government, and the EU Structural Funds. Contacts with senior University and Faculty staff, and inspection
of the ASU website and other documentation, gave the Panel confidence that long-term strategic and financial planning was taking place, although human resource management was somewhat constrained by the national framework of academic employment, the dominance of teaching over research, etc.

The Faculty has described in its self-assessment report and in its presentation a clear university strategy for research, and its systems of planning, HR management and dissemination. Since 2011-12, the implementation plan is assessed periodically (currently, every 3 years). Society and industry is involved in the development of strategy in the university through contacts, mainly at project or national committee level. The Nemunas Valley open access centre that is supposed to integrate research and industry is part of the strategy – and should be utilised more in the field of forestry. While strategies for research management and human resource management were solid and worthy at the university level, the research management of the Faculty was less clear to the Panel. The recent merger of several departments may have caused some confusion, e.g., with terminology in the self-assessment report (institute – laboratory – department). It may take some more time and effort to create joint united research management for the Faculty.

The development potential of UoA

The “Opportunities” identified in the SWOT analysis in the Faculty’s Self-Assessment Report were appropriate if somewhat vague. They will need specific action, particularly in view of some “Weaknesses” and “Threats” also identified, e.g. “poor management of scientific activity”, and scarce funding.

The Faculty has the potential to become an even more important national and international player if research efforts are focussed on a few main themes (to be identified internally or via international priorities) and if international collaboration becomes more important at all levels (students, research groups, large-scale coalitions). Forestry and the forest-based sector are becoming increasingly international, with forest reproductive material exported over country limits, multinational companies, and international changes in climate. Therefore forest research should be very international, too. The Faculty is an important national player and has the potential to become important player in the future with more emphasis is put on international collaboration. The Faculty already is internationally oriented, but lacks signs of leadership in such projects. Relatively high numbers of young researchers and PhD students make the Faculty dynamic, and especially favourable trends are the proportion of students conducting part of their PhD work abroad and the number of foreign PhD students working in the research projects and laboratories of the Faculty.

Conclusions and recommendations

The Faculty should increase even more the number of international contacts, and seek to take a leading role in some of them, and should promote visits by international experts, not only visits abroad. It should continue to increase the number of publications in international journals and reduce the number of national/too regional publications. Furthermore, the policy to support writing PhD theses in English should be continued, with possibilities for the thesis to consist of several papers instead of a monograph and to undergo international refereeing. The research infrastructure in the Faculty is good, but much effort (and funding won in competition with others in the EU and elsewhere) will be needed for its full utilisation and maintenance. Contemporary forest research in countries where forest and forestry is important include interdisciplinary studies combining forest biology with e.g., economics, technology and modelling e.g. for decision-making tools in forest management. These aspects should be studied also in Lithuania, and the Faculty could assess if they have a role in that kind of approaches in the future.

The Faculty should aim to coordinate workpackages in EU projects and invite foreign researchers for visits to the Faculty. More emphasis should also be put on the research strategy of the Faculty: it has to teach various subjects, but it should identify the key themes where it wants to be excellent.
Institute of Forestry, LRCAF, Lithuanian Research Centre for Agriculture and Forestry

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<th>Name of the UoA</th>
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**Quality of the research performance and Impact on the scientific research discipline of the UoA**

- 2

**The economic and social impact of the research in Lithuania**

- 3

**The physical infrastructure of the UoA**

- 2

**Research management (including career development and human resource management) of the UoA**

- 2

**The development potential of UoA**

- 2

**OVERALL SCORE**

- 2

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**Overall score**

The Institute is a satisfactory national player with possibilities to become a strong national and an important international player. The overall score is mainly based on the quality and impact of the research and the strategic management of the Institute. Stronger viable international collaboration, and a higher profile in publishing (more international, higher-impact papers), together with a clearer strategy in management and research profiling, would improve the overall score of the Institute.

**Quality of the research performance and Impact on the scientific research discipline of the UoA**

In research, the Institute as a whole was assessed as a strong national player with some international recognition, with differences between disciplines in terms of international importance. Research at the Institute concentrates on applied themes of environmental and forest sciences. The rate of publications, at 3.7 per researcher (Scopus 2009-2013), is low amongst the units assessed by the Panel. The funding structure...
(many small and survey-type projects) evidently reduces the quantity and quality of publications. Some of the listed papers are placed in journals with international impact, e.g., *Eur. J. For. Res.*, and others in journals with local and regional impact. Research funding is relatively high at €64K p.a. per researcher FTE, but only 2.2% comes from international programmes (see also international publications), and 9% from industry. Basic state funding covers only 22% of the total budget, and competitive R&D funding comes from many projects, most of them being national and small (funding under €20K). The Institute possesses only limited international funding (e.g., no ongoing EU FP7 projects, one FP6 project, SNS, INTERREG), and some ‘easy’ instruments such as COST are underexploited. However, the Institute has a long tradition of international collaboration (over 50% publications with international co-authors), and is presently active in new Horizon2020 calls. The Institute has a relatively good and steadily improving demographic profile, with a growing number of junior researchers.

**The economic and social impact of the research in Lithuania**

Lithuania is 35% covered with forests, and this proportion is growing. Threats of climate change are mostly reflected in the forests, agriculture, and countryside. Therefore, forest research has a pivotal role in the bio-economy of the country and has strong societal impact. The research Institute is a national key player providing information to the forestry sector in the country, especially to the state-owned forest sector. Close contacts with the society are shown by many market-oriented research projects and contract research projects. It takes part in many surveys in silviculture and forest biology. However, perhaps due to the research emphasis of the Institute (i.e. towards state forestry), contacts with the forest industry (mechanical, chemical) are not viable, research and interaction with enterprises and society are not well represented, and no spin-off companies have been established. In the Institute, issues such as business activity based on forests or development of forest economy-based knowledge pool are poorly studied (very few people involved). Furthermore, the Institute could have stronger involvement in the relevant decision-making bodies.

**The physical infrastructure of the UoA**

The Institute seems to have sufficient infrastructure at the Institute and in Nemunas Valley (one laboratory room that was not yet functional). Some of the researchers had also a position (or were PhD students) in the Aleksandras Stulginskis University (Faculty of Forest Sciences and Ecology), and thus also could use those facilities. In addition to the main station, the Institute has some field stations around the country. The Institute practises studies that need long-term experiments e.g. a large number of field tests. However, the maintenance of field experiments is poor due to limited funding. Field experiments should be evaluated (suitability of experimental design for modern studies, present state of experiment, etc.), with the most valuable experiments being identified and maintained, and the poor-value experiments being discarded. Furthermore, more emphasis should be put on databases (experiments, data collected from them) that enable use of these experiments in long-term studies in the future (sufficient hardware and software to store and utilise large databases for various uses, and expertise in creating and utilising those). The Institute’s research milieu is still evolving to achieve a level that is expected in the international scientific community of a respected institution in the given discipline. This is reflected by the fact that visitors from developed countries are almost absent. However, the level of the infrastructure is mostly given and dictated by outer factors, e.g. the poor level of state financing.

**Research management (including career development and human resource management) of the UoA**

Due to very strong dependency of the Institute on outside funding, the management of research and steering of the Institute along strategic lines are challenging. It was not clear to the Panel if the Institute had a strategy for how to improve the state of art of its research and to create a competitive research profile in the future.
The Institute seemed to lack proactive responses to research challenges. The Panel got the impression that the Institute was missing an external board with end-users giving advice when planning long-term strategy. However, the demography of the staff was positive, with a large number of young and early-stage scientists and a good gender balance. Attention was being paid to the personal development of staff including the cultivation of international contacts. However, senior researchers were mostly working only part-time in the Institute, and thus may lack full involvement.

**The development potential of UoA**

The field of forestry is already highly international and will become even more so in the future. Therefore forest research should be very international, too. The Institute has potential to become an important player in the future if more emphasis is put on international collaboration (from national player to international player). The high coverage of forests of the territory (Lithuania and Baltic region), together with increasing interest in bio-economy in Europe, suggest the importance of forest research also in the future. A good proportion of early-stage researchers and PhD students make the Institute dynamic and enable new expertise to enter the Institute. However, young researchers should be more active in long-term visits abroad – and writing their research in English, including PhD theses. More emphasis on the profile of research (research fields where the Institute wants to be at the international level, and those where the national level is sufficient) would help to identify resources needed (research infrastructure, e.g., database construction or equipment or staff with specific skills) to achieve the goals set in the strategy.

**Conclusions and recommendations**

The Institute has a solid niche in national research sector and society via its strong links with the state forest sector. Its role could be more important, however. More distinct profiling of the Institute and the University would be useful, with possible emphasis of the research institute being in utilisation of long-term experiments (tree breeding, growth and yield, etc.), and with a stronger analytical approach (e.g. tools for forest management decision-making). Forestry is global, and forest research should be so, too. There have been several recent attempts to increase international collaboration and the share of international funding, which Panel sees as a very desirable trend. Shifting towards international research should be established as a strategic priority of the Institute, not only as the efforts of single researchers. It should include stronger involvement of young researchers, e.g., encouragement of students and recent PhDs for longer working visits to international groups (could be done e.g., via COST funding and using existing EU networks to provide transnational access to various infrastructures in the field of forestry). The Panel realises the importance and uniqueness of small languages as Lithuanian, but research publications should be written in English, including PhD theses – the results would be of interest in the scientific community outside the borders of the country. The dissemination of results is a serious duty for research institutes in applied areas, and should be taken seriously – and comprehensive reporting of scientific results should be done in the native language in forums reaching end-users. The Institute is conducting studies in various fields in forest research. However, fields outside traditional forest biology, e.g., economics or modelling approaches, are much underrepresented despite their obvious benefits and applications to the forestry sector. These issues should be included in research projects, finding expertise either via new recruiting or via collaboration.
Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry

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<td>Institute of Horticulture</td>
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Quality of the research performance and impact on the scientific research discipline of the UoA: 3

The economic and social impact of the research in Lithuania: 4

The physical infrastructure of the UoA: 4

Research management (including career development and human resource management) of the UoA: 3

The development potential of UoA: 4

OVERALL SCORE: 3

Overall score
The Institute has good fundamentals and a good demographic status. Early-stage researchers and PhD students are prolific and communicative, and they have ambitions to develop their careers and their institution. Now, with strong investment in infrastructure, it will depend how this will be further exploited. The existing limiting factor to a better position in the international status is still medium-quality publications, although a very promising trend is visible.

Quality of the research performance and Impact on the scientific research discipline of the UoA
Research funding per researcher FTE is the highest amongst the units assessed by the Panel, at €71.8K p.a., but less than 2% comes from international programmes, and only 3.2% from industry. The rate of publications, at 3.6 per researcher (SCOPUS 2009-2013), is low. Most of the papers presented by the Institute of Horticulture were of very good quality. Over the half the selected papers in the self-assessment
document are in the top quartile (i.e. are of very good quality), and the *Proc. Nat. Acad. Sci.* publication, written in collaboration with co-authors from Purdue USA and Osaka Japan (which is an advantage), is in a top-ranking journal. Some publications have a good number of recent citations that document their quality; the Institute also filed 2 EU patents awarded that are being exploited in a spin-off company, with a large series of new cultivars being produced. Intensive contacts with local and foreign research institutions including those from developed countries (including 3 high-level centres in the USA, and about 20 from about 12 European countries) bring tangible results in terms of common publications and multi-centre projects and networks. The full exploitation of the Institute’s current international networks, such as COST and RIBESCO is very important. For example, COST activities should also be used more intensively for inviting experts and students/scientists from abroad and also for involving early-stage researchers in management committee activities so that they can establish their own international contacts. Involvement in the N-B- network on soya beans is notable. There is a good number of long-term study stays abroad (though still with no postdoctoral stays abroad for one or two years). However, incoming visits to the Institute from advanced countries such as those in Western Europe and the USA, in the form of longer-time missions of foreign experts, and also incoming students, are almost completely absent.

**The economic and social impact of the research in Lithuania**

The Institute keeps intensive contacts with non-academic public organizations and with industrial and production bodies. They also have viable contacts with the local community, such as lectures, collaboration and coordination with local politicians. Also, as the owner of 400-hectare farm, the Institute is a strong player in the local economy, countryside, etc. More generally, the Institute’s research is important for society. The interactions with non-academics (i.e. business, policy-makers, and the public – such as TV, radio and press reports) are at a level expected of recognized academic institutions. The Institute has generated 3 spin-off companies ("Ltd "Rūtos moksliniai technologiniai tyrimai", Hortiled, Melynė) – which are all active, using e.g. EU-patented technology of LED irradiation or natural colorant extraction. Collaboration with foreign industrial companies is of utmost importance. The Institute has a good pilot plant production facility that they use for the development of specific food products, and can also be utilised by local producers/farmers. They supply special food products to the market and sell also garden supplies. It also produces a large number of practical results, besides basic science results such as papers; two EU patents and a large number of cultivars and results pending to the plant protection are very important.

**The physical infrastructure of the UoA**

The instrumental infrastructure seems to be fully appropriate to the research performed. Some hi-tech and modern instruments, such as LC-MS, are available and are being introduced into operation. There is also infrastructure for technological experiments; phytotrons form a core of the infrastructure. With a large number of technical personnel (25.6 FTE in 2014), the Institute is able to provide a research environment that is comparable with globally recognized academic institutions in its discipline, although limited base and uncertain funding is a concern, as reflected in the SWOT analysis.

There is still limited access to informational sources – this should be a subject of investment. Instrumentation for advanced molecular genetics (sequenation, PCR, etc.) is available. Access to advanced heavy instrumentation such as hi-res MS (e.g. FT-MS) and NMR is not available at the Institute. It is obvious that the infrastructure is a limitation on further development, but the existing and new equipment is fully compliant with current research plans, and the Institute has great potential for further development and mainly for the more intensive exploitation of its work.
Research management (including career development and human resource management) of the UoA

There exists a well-developed and well-specified strategic plan; senior and chief researchers have mostly full-time employment (20.8 FTEs from 23 persons), which is very important. The number of junior and postdoctoral researchers, at 3.4 FTEs, is low, and limits the future research contribution of the Institute, but for current Institute activities may be compensated by the number of other researchers (7.4 with degree, 9.4 without). There is a stable number (about 8) of PhD students enrolled. PhD dissertations should be written in English. Presentation skills and writing skills of the PhDs should be strongly developed - intramural PhD student conferences (in English) should be organized. PhD education in the Institute should also be supervised by the administration. Only a few presentations/visits (invited lectures/experts) from abroad (2 in each of 2010 and 2011 only) are reported. Funding is not fully dependent on state sources: a large proportion is received from abroad (e.g. ERA NET, Eureka and other programmes), but EU Framework projects are missing. Involvement in Horizon 2020 would be an advantage. Funding from national and mostly foreign industry exists, and is very important. A large proportion of the contract research strongly contributes to the finances of the Institute and on the other hand demonstrates its economic impact.

The development potential of UoA

The Institute has very good potential to strengthen its position in the international scientific community as a highly recognized and convincing partner within international collaboration networks. A very positive point is the good proportion of younger and full-time scientists. It is very important to promote longer (ca 1 year or more) postdoctoral stays abroad in renowned laboratories and subsequently give those returning home a good chance to create their own research groups. This trend is visible in the self-assessment response to the question about utilizing a +25% increased budget. Sending people to international conferences could bring more contacts for funding from foreign agencies. Inviting foreign experts and visitors for a longer research stays is very important, and the Institute should work on its image to attract such people. Exploitation of Erasmus and other student-exchange schemes is advisable. The Institute should have steady and growing ambitions to publish in top journals - maybe to publish more in biochemical, phyto-chemical and phyto-genetic journals to improve its visibility. In general, the Panel felt that the Institute is on the right track.

Conclusions and recommendations

The Panel was impressed by the funding and publication record of this Institute, by its economic and social impact, and by the planning and management systems reported, although it considered the first and third of these were constrained – in part - by national funding and policy (which may not favour agronomic research). The current situation of personnel and infrastructure are felt adequate to the Institute’s current situation but may be hard to maintain in more stringent conditions without more external competitive funding, and future scientific leadership needs consideration.

New infrastructure should be intensively exploited, and their performance supported. In order to improve the quality of future scientific output, access to advanced instrumentation such as hi-res MS (e.g. FT-MS) and NMR is recommended, probably in shared facilities elsewhere. Presentations and working visits from abroad should be strongly promoted, by means of invitations to experts from abroad, e.g. from the "competing institutions"; these would bring about better comparison with the ‘state of the art’ in the relevant science.

Support for publications should be focussed on international journals, and the position of the local journal in the Lithuanian language should be reconsidered. PhD theses in English should be encouraged, e.g. via the organization of official PhD student conferences with oral presentations (in English), and feedback from senior researchers. Incentives (e.g. prizes) to papers published by PhD students should be provided, along with the promotion of international refereeing of theses. In general, the atmosphere in the Institute should be made more competitive in a scientific sense.
**Institute of Agriculture and regional branches of the Centre, Lithuanian Research Centre for Agriculture and Forestry**

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<th>Name of the UoA</th>
<th>Institute of Agriculture and regional branches of the Centre</th>
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</table>

**Quality of the research performance and impact on the scientific research discipline of the UoA**

- 3

**The economic and social impact of the research in Lithuania**

- 3

**The physical infrastructure of the UoA**

- 3

**Research management (including career development and human resource management) of the UoA**

- 3

**The development potential of UoA**

- 3

**OVERALL SCORE**

- 3

**Overall score**

The Institute recognises that it faces new societal, economic and ecological challenges linked with changing lifestyles (healthy, organic food), climate changes, and new dangers for crops. It seems to need stronger, more centralised (but Institute-based) management for the encouragement of individual researcher initiatives. The employment of the Institute’s PhD students for research and teaching is commendable.

**Quality of the research performance and impact on the scientific research discipline of the UoA**

The Institute of Agriculture of the Lithuanian Research Centre for Agriculture and Forestry occupies an important and stable position in the international scientific community. Annual funding was relatively high €71K/FTE over 2011-13, but less than 1% was from international sources although many significant
international projects were reported elsewhere. 17% of total funding was from industry, which is considered commendable.

There are some good-quality publications in top-quartile journals (among these, the *Plant Science* paper is of very high quality), but their number and level in relation to the size of the Institute and number of scientists (nearly 90 FTEs) is not so impressive. There are a good number of PhD dissertations, but all in Lithuanian; it would help if some of these were in English. National working contacts are very good: there exists intensive collaboration with major Lithuanian research centres and universities in the field, and also with industrial companies. International collaboration is quite intensive; some contacts, e.g. with ETH and Aarhus University are of great importance and have led to collaboration (joint publications of high quality). Two longer working visits (ca 6 and 9 months) of Institute workers to abroad are commendable, but only 2 short incoming visits (both from Belarus, for training) were reported. There are also intensive working contacts within the Baltic region.

Compared to nearly 40 Chief or Senior Researchers, about 25 PhD students were enrolled in each of the years 2011-2013, mostly coming from other institutions (presumably often the Aleksandras Stulginskis University), but the numbers of PhD graduations declined over that period. Pleasingly, two postdoctoral researchers and their projects were reported.

**The economic and social impact of the research in Lithuania**

The number of articles, TV programmes, exhibitions, etc. declined from 189 in 2009 to 146 in 2013, but annual conferences, field days etc. are organised, and there is use of social media (Facebook etc.)

A “key activity” is reported to be the publication of results and release of plant varieties. However, there is little mention of direct input from industry (farmers, processors, traders, etc.)

36 new plant varieties were registered in 2009-2013, but numbers declined in the more recent years

Large number of new cultivars introduced into agriculture. The Institute faces new societal, economic and ecological challenges linked with changing life style (healthy, organic food), climate changes, and new dangers for the crops. The interactions of the Institute with non-academics (i.e. business, policy-makers, and the public) are at a level that is expected in the recognized academic institutions.

**The physical infrastructure of the UoA**

There is significant collection of genetic resources of cereals and grasses, with modern laboratories equipped with state-of-the-art facilities. The equipment seems well suited for modern research, although much seems to be used for consultancy (e.g. advisory) services, with a very large number (181 FTEs in 2014) of technical personnel. The Institute is able to provide an internationally comparable excellent research environment to high-level international researchers in its discipline. Some problems of access to information sources were reported.

**Research management (including career development and human resource management) of the UoA**

The Institute shares the common strategic plan of the Research Centre, with 5-year (or more) programmes said to be revised and monitored annually by the Research Council of Lithuania. The “joint methodical commission” of the Centre monitors and promotes research. Despite (or perhaps because of) this higher-level framework, the direction(s) of research within the Institute are not always very clear, e.g. with three elements in its “research focus” but four “long-term programmes” of research.

With about 40 Chief or Senior Researchers, and about 22 each Researchers and Junior Researchers, the Institute has sufficient “critical mass” in terms of staff, although its national responsibilities have to cover a wide variety of crops and plants, and may make it difficult to focus high-level research. Much
administrative and technical resource must be going to the very large numbers of “research contracts” reported for each year in the Self-Assessment Report: most of these are for relatively small sums (under €1 each, or per trial.

A large number (about 25) of doctoral students were enrolled in each of the years 2011-13, but more might be expected for the number of supervisory staff available.

The development potential of UoA

The Institute recognises the limitations imposed by funding, national priorities, etc., and its SWOT analysis presents some “opportunities” for how to overcome these, though not always very specific ones.

Over the next 5-7 years, the Institute will be able to maintain or strengthen its position in the international scientific community as a convincing actor and a trustworthy partner within international collaboration networks. Intensive exchanges of young scientists and experts can be promoted, intramural English communication can be strengthened (English seminars, dissertations in English etc.), project-writing skills can be developed mainly in young scientists, and intensive exploitation of networking international projects (COST), Horizon 2020 can be supported. Stronger contacts within Nordic region can be further promoted.

Conclusions and recommendations

The Panel was concerned that much of the work at this Institute is contained in a large number (274 during 2009-2013) of relatively small advisory and consultancy contracts which involve little high-level research content. This is perhaps reflected in the Faculty’s SWOT analysis which is rather vague as to “Strengths” and Opportunities”. No large-scale FP7 or similar advanced research projects were reported. While links with industry appeared extensive, these seemed to be largely of a ‘customer-client’ nature with the Institute taking a subsidiary role, and wider societal responsibilities were not reflected in the self-assessment report.

Employing professors or docents, even part-time, would help to attract young researchers from universities, since more active and widespread recruitment is desirable. Visits of high-level experts from abroad, and long-term working visits by students and early-stage investigators, would be helpful as bases for establishing longer-term and higher-level international research activities. For the same purpose (i.e. establishing enduring and significant joint research), the use of exchange tools, such as Erasmus, Leonardo, COST, etc. is strongly advised as an initial stage. Presentations in English - namely oral and plenary lectures at international conferences - should be strongly supported and valued.
Institute of Animal Science, Lithuanian University of Health Sciences

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<tr>
<th>Name of the UoA</th>
<th>Institute of Animal Science</th>
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<tr>
<td>Name of institution being assessed</td>
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<td>Total no. FTE researchers</td>
<td>16.5</td>
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**Quality of the research performance and Impact on the scientific research discipline of the UoA**

- The economic and social impact of the research in Lithuania: 3
- The physical infrastructure of the UoA: 2
- Research management (including career development and human resource management) of the UoA: 1
- The development potential of UoA: 2

**OVERALL SCORE**: 2

**Reasons for an overall score of 2 are:**
1. Lack of international research visibility and impact,
2. Lack of adequate environment for high-quality research,
3. Lack of a clear strategy how to enhance the level of research grant acquisition,
4. Lack of a clear focus in advanced research,
5. Lack of a clear strategy how to renew and enhance the qualification level of young researchers or to attract them to join the Institute with still-limited capabilities.

The Institute recognizes the need to develop new research tools (genomics or proteomics), but the Panel questions whether these are possible at the Institute (they can be done in cooperation with other national partners), without detailing how this can be achieved. There is no clear strategy for the research facilities and most importantly how the staff will be trained to be acquainted with these techniques. Most importantly, there is no clear strategy as to which research fields will be implemented by using such new and modern research tools.
Quality of the research performance and Impact on the scientific research discipline of the UoA

Research funding is limited (€47K p.a. per researcher FTE) for animal science research, with a low 1% from international programmes, but 14% from industry, which is relatively high. The rate of publications, at 3.3 per researcher (SCOPUS, 2009-2013) is low. According to the bibliographic information provided to the Panel as well as the information collected by Panel members during its visit, it became clear that in terms of impact the Institute of Animal Science occupies a stable position within the national scientific community in Lithuania. The major dedication of the Institute is applied research, mostly related to the Lithuanian livestock industry, with no work load dedicated to teaching activities, although the unit is part of the Lithuanian University of Health Sciences. Basic research is virtually non-existent, although this is a key component of the stated mission of the Institute. The unit has built a national profile in silage production and quality (ruminant feeding), in swine breeding and product quality (most importantly, milk quality, and also eggs and meat of local pig and geese breeds) and also in reproduction of horses and cattle, most importantly in artificial insemination and embryo transfer. However, the international position and visibility of research of this unit is extremely low with a minimal number of international articles (5 papers with international participation in 5 years), which are dominated by publications in journals with low impact in the discipline of Animal Sciences. The list of 20 most important publications indicates papers in journals with low impact (impact factors under 1 for most), and only in few of them the main authors (first or corresponding author) originate from the Institute. The low number of citations and also the fact that over half the articles are not cited indicates a low international profile of the Institute’s research in its research discipline. Efficient international research cooperation is comparatively low (only 5 articles with international partners). Although Institute researchers participate in internationally competitive projects (EU-FP7 or Horizon 2020), the impact in and of these interactions seems to be insignificant in terms of both publication output and responsibility as a partner in those projects.

The economic and social impact of the research in Lithuania

The Institute is a key player in terms of propagation and transfer of modern knowledge/know-how and best practices of animal feeding, keeping, welfare, reproduction, and production of food of animal origin, as well as environmental issues of interest to major national stakeholders such as agricultural specialists, advisors of extensive service, and society. The Institute has organized 7 national projects and a number of seminars, workshops, media reports, exhibitions, and training sessions for interested specialists and also for the society in 5 years. These have helped to introduce modern production techniques into practice, and also to increase social awareness in livestock, ecology and the production of food of animal origin. There is intensive exchange with other organizations, institutes, schools and professional breeder and agriculture organizations which emphasizes the role of the Institute in propagating livestock research and interactions in Lithuania. Important, though still limited, cooperation with local livestock industry has been established, in particular in the areas of silage production and animal reproduction. Spin-off companies (Genimpeksas and Augmena) have also been established. All these are very important for rural economic development in Lithuania. Another important point is the involvement of the Institute in the maintenance of the culture and heritage in Lithuania. Members of the Institute serve as experts on various important national boards: this emphasises the important role of the Institute as a policy adviser and think-tank in the area of livestock production in Lithuania.

The physical infrastructure of the UoA

The physical infrastructure is more than sufficient for performing high-quality research, with importance in both national and international contexts. The current infrastructure allows thorough feed chemical analyses, semen analyses, reproduction traits, and certain food analyses, as well as to perform research in basic aspects.
of feeding and reproduction as well as animal welfare and environmental issues. The Institute has obtained important new equipment, and is in the process of establishing a new research facility to perform more intensive research trials. The Institute also possesses important databases of a national character both for local feed evaluation and also for autochthonous genetic databases. However, the operative ability of the staff with such new and modern infrastructure as well as the Institute's ability to maintain and support such requirements taking into account the low level of funding and the large numbers of technical staff (36 FTEs in 2014, up from below 30 in 2011 and 2012), which was reduced by half from 2011 to 2013, is questionable. Because of this and of the fact that funding through competitive grants or national/international industries are insufficient to support both a continuous training of the staff and the maintenance of the research facilities, the Institute cannot provide an acceptable international level of research environment.

Research management (including career development and human resource management) of the UoA

The Institute has 4 departments, 1 laboratory, and 1 centre of animal genetic resources. It also has a relatively high number of research staff (both senior and supporting) but an extremely low number of junior research staff (only 0.8 FTE of young researchers allocated to research, no post-docs and only 2 PhD students enrolled and 2 PhD awarded in 5 years) compared to more senior (and probably older) staff. This is a critical issue in terms of career development and avoiding future bottlenecks. The ratio between scientific and supportive staff (1:2) seems inappropriate, at least when taking into account the low percentage of young researchers involved in research. The Institute recognizes the necessity to raise more research funds, and the need to recruit new and highly motivated staff as well as to obtain more modern research facilities. However, there is no clear strategy for development to achieve these goals. Cooperation with industry (national and international) is not specified. Also, there is no clear strategy how to improve the level of excellence of the scientific staff. The amount of competitive funding (e.g. from the Research Council of Lithuania or local industry) decreased from approximately 658k Euro in 2011 to roughly 60k Euro in 2013 (or about 12% of total research funding), which does not allow the recruitment of young and highly motivated researchers. The necessity to recruit young researchers and postdocs with degrees obtained from reputable schools nationally or abroad is mentioned, but no clear strategy how to achieve this goal was visible from the leadership of the Institute.

The development potential of UoA

The Institute has the potential to become a national leader in applied research in the areas of animal feeding, breeding, welfare, and reproduction. It contributes from time to time to the activities of the international scientific community, but still has to work hard to establish itself as an internationally notable institution with clear profiles in the discipline of Animal Sciences within 5-10 years. The Institute has rightly recognized its strengths, weaknesses, potentials, and threats, but there is no clear strategy how to address weaknesses and threats in one side and how to increase their strengths and improve fully exploit its potential as the only institute of its kind in Lithuania and the Baltic countries. The Institute has still much to do to enhance its scientific visibility in order to be able to contribute to the activities of the international scientific community, and to be able to attract highly qualified PhD students and researchers.

Conclusions and recommendations

The still-low international visibility and low level of research management (in particular of human resources) is the weakest point for this unit, and must be addressed immediately. Young researchers with tenure-track options and the potential to open new research opportunities should be recruited and encouraged. More postdocs and PhD students could take on research responsibilities at the expense of the laboratory work currently being conducted by technical staff, if no additional resources are available to recruit new research staff. Moreover, international cooperation requires a solid core of competences and research facilities, the
generation of which is not part of the development strategy. At the moment, no or little core competences are visible to attract the international research community or industry to cooperate with the Institute. Indeed, core competences have to be identified and become internationally visible through international publications. The very limited level of English knowledge is recognized as a major weakness which hampers international networking and the visibility of the unit, but there is no clear strategy how to deal with this problem and how to improve the publication record. The unit may consider attracting prominent and international scientists in the framework of EU mobility (COST, Marie Curie) funds to come and give seminars and exchange at the Institute. The same funding could be used for research and supporting technical staff to give them the opportunity of spending medium- to long-term visits in relevant international research centres abroad to help them to improve both professionally and their command in English communication. An increase in the interactions with other similar and neighbouring units is encouraged not only to better make use of the current resources but also to establish wider research profiles of national character, and to improve the level of training in particular of the PhD students through closer interactions.

In order that the Institute enhances its collaboration with non-academics while improving public perception across the country, it should involve various key stakeholders (producers, farmer organizations, society, relevant livestock businesses, extension services) more heavily in its decision-making processes, in particular for issues related to the orientation and extension of applied research. Because the low visibility and impact of the research was decisive for the Panel’s overall score of 2 for this unit, the Institute should consider publishing its research results in international journals with higher impact factors than now. For instance, it is suggested that during this 5-year period, members of the unit should target journals such as the *Journal of Animal Physiology and Animal Nutrition*, *Archives of Animal Nutrition*, *Animal, Animal Breeding*, *Animal Reproduction Science*, and *Theriogenology*. This will pave the way for the Institute not only to raise the visibility of its research and attain a score 3 in the shorter term (i.e. within 5 years), but also to help a better international profile for the future.
Faculty of Animal Husbandry Technology, Lithuanian University of Health Sciences

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<th>Name of the UoA</th>
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**Overall Score**

Crucial for overall scoring is the quality and impact of research as well as the strategic management of the unit. Quality and the international impact of the research of this unit are still evolving. On the other hand, the complex structure of the faculty with 2 very distinct research areas makes it difficult to establish common research strategies for the faculty and is a real challenge for the strategic management of the faculty.

**Quality of the research performance and Impact on the scientific research discipline of the UoA**

Research funding is low (€30.5K p.a. per researcher FTE) for animal husbandry research, with a very low 1% from international programmes, and only 6% from industry. The rate of publications, at 5.6 per researcher (SCOPUS 2009-2013), is about average for the Units assessed by the Panel.
The Panel came to the conclusion that, when viewed globally, the Faculty is a strong national player but with limited level of international recognition of its research. The Panel, however, recognized that within the Faculty there are areas of research which outstands compared to others regarding their international visibility. Bibliometric analysis revealed a higher quality level for animal models and biomedicine area with various papers published in important journals, although researchers of the Faculty not always cover key author responsibilities in these publications. Within the discipline of animal sciences there are interesting papers and projects (i.e., Eureka project regarding feed and food quality) dealing with highly important aspects of animal nutrition and food quality, but other areas such as animal breeding, genetics, and molecular genetics are less active in terms of publication visibility and project acquisition. Animal breeding is one of the main themes of the Faculty; however, no papers on quantitative or molecular breeding have been listed among most important 20 publications.

The size of the Faculty is relatively small (57.75 FTE in total) but the structure is highly complex (focusing on zootechnics and biomedicine research). Only 33% of key researchers and academics are devoted to R&D activities, which is understandable due to obviously high teaching load. However, this low percentage dedicated to research weakens the impact of the Faculty in research output and visibility. The Faculty has produced a large number (16) of PhD theses during the last 5 years in the area of zootechnics. Most of the PhD students were employed full time, which is very positive for their full integration into research activities. This number is a comparatively high number of PhD graduates in this area of discipline. The topic of these dissertations covers areas of internationally common research interest such as animal nutrition, quality of food products, genetics and molecular biology, and animal health. A major weakness is that all PhD theses were written in Lithuanian, which hampers their accessibility to international scientific community and also publishing of these data in international journals. There are only a few international regional research cooperation (Eureka or Baltic countries initiatives) but limited other EU competitive initiatives (FP7 or Horizon 2020) cooperation during this 5-year evaluation period. Research programmes in the area of biomedical research are missing in the self-evaluation, and unfortunately, the Panel did not have access to these facilities nor to scientific staff during the visits. In the zootechnical area, the large volume of research projects, expressed in relatively high number of PhD dissertations, are not translated into an acceptable level and quality of research papers, which is an indicator of a low efficiency and lack of motivation to disseminate research results internationally and at a high level. The number of published articles in international journals is also low (30 in 5 years) averaging almost 1.2 international publications per FTE and year. Although there are some good publications, the number of citations (143) and h-index (5) in 5 years, and about 50% of uncited papers, as a measure of the impact on science, is rather low too. Thus, in terms of the impact of research, the Faculty needs to make more efforts to occupy a stable position of a recognized centre of competence in the international scientific community.

**The economic and social impact of the research in Lithuania**

The research activities of the Faculty are well interrelated with the needs of the industry and society, e.g. national livestock businesses and organizations, policy-makers, and the public. There are many and close contacts with both national and international industry, especially in the field of animal nutrition and quality of food of animal origin, where several applications and market-oriented research activities are being conducted. The Faculty is an active player in terms of implementing scientific results in national livestock production and dissemination of science to the society (e.g. science festivals, “Spacecraft Earth”). In terms of implementing scientific results in national livestock production, the knowledge generated in research projects around the programme Eureka or the national research programme “Healthy and Safe Food” was successfully used to develop feeds with added value for poultry, which is used by the local community/company (JSC “Kauno grūdai”) to produce meat and eggs with improved biological value. There are a number of cooperation activities with local industries, and the Faculty is a major player in the national initiative “Nemunas Valley”. The contacts with the local and international livestock industries will help in
establishing long-term cooperation in terms of applied research. Several academic staff of the Faculty are members of committees and serve on the scientific advisory boards of governmental bodies and business companies.

The physical infrastructure of the UoA

The Faculty has research facilities for conducting internationally recognizable research, particularly in applied research, but only partly in basic research. For example, the necessary equipment is available in the areas of molecular genetics and breeding, animal nutrition, feed sciences, analytical food chemistry, products (meat and egg) quality. In molecular genetics, high-throughput genotyping for genetic analyses and molecular breeding studies would need to be conducted elsewhere. In the area of systems biology and biomedical research it was hard to get any information; however, because of the good number of publications, it is assumed that the Faculty also possesses at least basic equipment. On the other hand, although there seem to be some animal facilities (dairy or milking centre), the Faculty lacks essential standard facilities (metabolic units, working with manipulated animals, stables with individual feeding systems, etc.) that would enable high-quality basic research in livestock science and health. Faculty scientists are encouraged to increase interaction with the Institute of Animal Science, which is in the process of establishing a well-equipped dairy and pig facility. During the Panel’s visits, Faculty scientists expressed the need for establishment of new research facilities in other livestock species such as rabbits or poultry, which is understandable taking into account the emerging importance of rabbit and poultry production research during the last decade. However, an important issue is the low level of funding, both state resources and, most importantly, third-party resources, which are not sufficient to support high-quality research (maintenance of existing equipment, new facilities and equipment, recruiting of motivated new staff to work in these research facilities). It seems also that most of the research is being conducted in commercial farms, which makes it difficult to perform well standardized research. Without standardized and high-quality research facilities and a well trained personnel, it would be difficult to attract highly qualified researchers and also conduct outstanding and internationally comparable research. The Faculty seems to have adequate numbers of technical staff, and a positive aspect is that many PhD students are involved in lab work. Only limited information was provided to the Panel regarding the qualification profile of technical staff; however, the Panel came to the conclusion that at least the labs that were visited had adequate qualifications (some members of the technical staff had University degrees). However, the level of English is still low, and this hampers interactions with the international peer community and learning from international literature and lab methods. The quality of the support services in the Faculty (and in all other units assessed by the Agriculture Panel) is low, and not comparable with international standards. It is likely that the application of public procurement procedures for research support services (including low-value lab supplies) hampers the effective support of the resources needed for research.

Research management (including career development and human resource management) of the UoA

The strategic plans of the Faculty are based on the guidelines of the University’s mission and strategic plans, which basically intend to amalgamate research, teaching and servicing, but are unfortunately not sufficiently detailed. From the information provided to the Panel, the intention is to increase the degree of knowledge transfer to the community, which may be appropriate in the short term, but does not help to enhance the Faculty’s international profile in research. The strategic plans in research are reduced simply to participation in international (Horizon 2020, Eureka) and national (Research Council) programmes, without providing any detail about which research programmes will be targeted and how these plans will be implemented. Without this information, it is hard for the Panel to judge if these plans are achievable. In terms of strategic resource development, the Faculty plans to optimize research infrastructure by bundling its research capacities and creating open-access laboratories and modernizing the existing ones. Indeed, the Faculty’s physical research
resources seem better managed and organized than its human research resources, and, from a research efficiency point of view, are still underutilized. A limiting factor for human resource management is unpredictable funding shortages, which compromise the dynamic career development of research staff. The ratio of senior scientists (Professors and Associate Professors) to supporting personnel, at about 2:1, seems to be adequate. However, the lack of post-doctoral positions and the low number (7-8 FTE) of junior research associates (young researchers up to 5-6 years after their PhD) dedicated mostly to research is a factor likely to lead to bottlenecks in research development. The high number of lecturers (10-14 FTE) primarily involved in teaching and tutoring, and the low number of research associates, indicate a weak allocation of human resources with high risk of weakening the research profile in the longer term. Insufficient knowledge of English among Faculty members (including senior scientific staff and technical staff) together with inadequate staff training options seem also to be a major weakness that impacts on strong research management. The low level of English among research and supporting staff impairs communication and exchange, with important negative consequences for staff training and further development.

The development potential of UoA

In the Panel’s view, the Faculty has not fully recognized its weakness in terms of its low scientific publication output and quality for certain areas, low funding acquisition level, limited international networking, and limited knowledge of English in all levels including its use in PhD theses: all these hamper the quality of the research and international visibility. The Faculty has a complex structure, with 2 main research fields as zootechnics and biomedical research. The high diversity of disciplines in the same Faculty and the combination of highly competitive basic research (human biomedicine) and highly applied studies (animal production) makes it very difficult to create a joint research strategy for the Faculty. Furthermore, since research is strongly dependent on external funding, management and strategies are even more difficult to put into practice. Also, the lack of young postdoctoral researchers involved in research may hinder the preparation of high-quality researchers for the future.

Nevertheless, the research plans for the future of several disciplines (applied animal nutrition, genetics, and food (meat and egg) quality) are well structured and in most cases realistic. However, the capacity of the Faculty to attract research funds from international sources is low (17.5k Euro) and still unutilized. There is only a single Eureka project, on feeding and the production of added-value meat and eggs. This example should be followed by other areas within the Faculty. In terms of development potential, the Faculty, in the short term, offers opportunities to participate in international competitions (i.e., Horizon 2020, Eureka, ERANET or other similar programmes), which is also well recognized in the self-evaluation report. In the long term, there are opportunities to initiate new research directions, in particular nutrigenomics (working together animal nutrition and molecular biology or systems biology) or production of food with added-value. The latter field of research has particular potential to grow because both society and industry are driven towards the generation of healthier foods. In particular, the initiative to develop research in fish production, a field which is underexplored in Lithuania and other Baltic countries, seems promising.

Conclusions and recommendations

The unit has still a limited international research visibility and impact. This unit has well equipped laboratories and relatively good infrastructure as well as various possibilities for cooperation and networking particularly in the area of Livestock Production and Health, which need to be used better for exploiting synergies and optimizing resources.

Faculty leadership may consider development or sharpening of certain research profiles or foci, in which certain but well detailed research topics will be established according to the expertise already present at the faculty or at the University campus. Also, incentives should be created to encourage the quality of research. Senior researchers should dedicate more time to research (acquiring new grants, setting up new research fields, publishing, and recruiting and supervising younger researchers). Moreover, to increase the profile of
research in Animal Sciences, particularly among young researchers, external and competitive recruitments should be targeted in the future. Interaction among graduate students in Animal Sciences and also in neighbouring disciplines (Veterinary Medicine) probably under the umbrella of a well-managed graduate school is encouraged to increase training level but also the quality of PhD theses in Animal Sciences. Also, it is recommended to expand the PhD committees with external, at best international, members. Not only will the quality of PhD theses increase but also the publish ability of the scientific data of these PhD theses and the international visibility of the discipline Animal Sciences will improve.

Furthermore, to increase the international visibility and profiling in the area of Animal Husbandry and Technology, the Panel suggest that in a short-term (within 5 years) members of this unit should consider publishing their research results in international journals with higher impact factors than now. For instance, it is suggested that during this 5 year-period members of the unit should target journals such as Journal of Animal Science, Journal of the Science of Food and Agriculture, Journal of Animal Physiology and Animal Nutrition, Achieves of Animal Nutrition, Animal, Animal Breeding, Animal Reproduction Science, Theriogenology to publish their research results. This will pave the way for the unit not only to raise the visibility of its research and attaining a score 3 within 5 years, but also will help a better international profiling of the unit for the future.

University should support international networking and grant raising efforts of the researchers, particularly regarding participation in international competitions (i.e., Horizon 2020, Eureka, ERANET or other similar programmes), but also grant proposal preparation and industry research. Establishment of an office with experts in science networking, writing and legal issues will certainly bust the fund-raising capacity.

Because biomedical research (neurophysiology, animal models, human genetics) hardly fit in the profile of the Faculty it is advisable to separate this area from the faculty and attach it to any unit with more relevance.
Faculty of Veterinary Medicine, Lithuanian University of Health Sciences

<table>
<thead>
<tr>
<th>Name of the UoA</th>
<th>Faculty of Veterinary Medicine</th>
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<tbody>
<tr>
<td>Name of institution being assessed</td>
<td>Lithuanian University of Health Sciences</td>
</tr>
<tr>
<td>Total no. FTE researchers</td>
<td>42.61</td>
</tr>
<tr>
<td>Composition of the Unit of Assessment (UoA)</td>
<td>1. Institute of Microbiology and Virology; 2. Department of Anatomy and Physiology; 3. Department of Infectious Diseases; 4. Department of Non-Infectious Diseases; 5. Department of Food Safety and Quality; 6. Large Animal Clinic; 7. Dr. L. Kriauceliunas Small Animal Clinic</td>
</tr>
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</table>

Overall score

This Faculty has very strong potential to develop as a national leader in the field. Visibility at the international level is still to be developed. Publications in international journals and English communication is to be further supported, although all personnel (administrators, senior researchers, PhD students) were found to be communicative, open-minded and clearly able to accept the challenges. The opportunities arising from the new instrumentation and facilities should be exploited. Overall, scientific output should be strongly increased to reach a higher level of quality.
Quality of the research performance and Impact on the scientific research discipline of the UoA

The Faculty of Veterinary Medicine of the Lithuanian University of Health Sciences is a strong national player with some international recognition, at least in certain fields of veterinary science (e.g. veterinary parasitology, microbiology, food-borne pathogens and food safety). Research funding is limited (€31K p.a. per researcher FTE) for veterinary research, with a low 5% from international programmes, and under 3% from industry. The rate of publications, at 5.3 per researcher (SCOPUS 2009-2013), is about average for the Units assessed by the Panel. The list of 20 most important publications shows papers published in important scientific journals in the discipline of veterinary microbiology, parasitology, mycotoxicology, and veterinary public health. Most importantly, Faculty researchers are key researchers in these publications. The Faculty has produced a fairly good number of PhD theses in the last 5 years, covering research topics of common interests in Veterinary Sciences. A positive aspect here is also the compilation of 2 PhD theses in English, which needs to be further supported. However, the impact of the research lacks clear visibility in the international context. Scientific activity (publications and projects) of various important fields of veterinary science at the Faculty (veterinary anatomy, histology, pathology, immunology, clinical research of large or small animal medicine, etc.) are missing. A total number of 208 original articles with 43 papers with international participation in 5 years is a fairly low number for a unit having 42.6 FTE, suggesting almost 1 paper with international participation per FTE in 5 years. The total number of citations with an h-index of 7 is comparatively low for this unit and the discipline, and more than 50% of papers are uncited. The Faculty participates widely in international research programmes, including several EU Framework projects and bilateral cooperation (in particular with Poland), which indicates the solid interconnection of the Faculty in the context of international scientific activity. However, based on the amounts of funds from these programmes and also the low number of common publications, the contribution of Faculty in these international projects as a partner seems rather insignificant.

The number of publications (and also number of citations – reflecting its quality) shows stable trend with some fluctuations. A stable rate of around 30 papers per year should be maintained, and their quality should be fostered to improve their visibility and thus their citations. Successful areas (such as animal parasitology or food safety) are to be supported.

The economic and social impact of the research in Lithuania

The Faculty is an important national player in terms of spreading scientific knowledge in the areas of veterinary, animal health, public health and food safety to practising veterinarians and those working for state agencies. The University is the only one in the country teaching veterinary sciences, and thus it has also clear importance to the society. It produces a fairly high number of popular publications and has strong and dynamic interactions with local industry and other state and private organizations in Lithuania. Faculty scientists are strongly involved in various national boards, and they occupy an indispensable role in advising issues related to veterinary medicine, animal health and food safety in Lithuania. It can be expected that the Faculty interacts much more closely with the public because of animal health issues in its clinics. The Faculty has good contacts with national industry and with some international contacts. Relationships between the Faculty of Veterinary Medicine, Faculty of Animal Husbandry Technology and the Lithuanian State Food and Veterinary Service should be improved to achieve even higher societal impact.

The physical infrastructure of the UoA

The Faculty has been able to create a high-level research infrastructure during the last years. Several new labs (7 covering different aspects of veterinary science) have been built, and new technology has been invested in these labs. Sufficient animal facilities are available, and with the level of supportive infrastructure, the Faculty offers an excellent level of research environment. New instrumentation is quickly introduced into an operation and seems to be intensively used both for education, research and clinical work.
The fiscal numbers indicate a reduction of state funding from 2011 to 2013, but this is not accompanied by increasing levels of third-party funds. The Faculty seems to possess recently improved excellent facilities with well-equipped laboratories. A limiting factor seems to be human capacities and excellence, not the physical infrastructure.

**Research management (including career development and human resource management) of the UoA**

In terms of research management and organization, the Faculty is a strong national player, and now is (or will be soon) able to provide a research environment that is comparable with globally recognized academic institutions in its discipline. The academic staff (Professors, Associate Professors, Lecturers, Assistants) dedicate only 33% of their time to research. There are a fairly high number of lecturers (16) and assistants (10) but only a limited number (5) of junior researchers and no position for a postdoctoral researcher. In general terms, the strategic planning is adequate, but the funding necessary to support this research is currently inadequate. A negative aspect is also the low level of funds raised through clinical work. The veterinary clinics of the Faculty have considerable opportunities to raise funds, which can be used to fund clinical research. Obviously, this aspect is not yet well developed and needs improvement. During the visit, the Panel acquired the impression that the management is fully aware of most of the pending problems and is committed to work on them. An additional positive point is that people from the administration are communicative, open-minded and obviously highly qualified.

**The development potential of UoA**

The Faculty has excellent infrastructure for research. With wise strategy, more international collaboration in teaching (e.g. mutual research visits by PhDs) and research, and good new recruited staff, it can become an internationally important player in its field, with higher-quality research. More important roles (bringing higher funding) in larger international projects could facilitate hiring full-time researchers (e.g. post docs).

The Faculty has a fairly good and new research infrastructure, and has the capability to become an international player within 5 years in the field of food-borne diseases/food safety, veterinary microbiology and parasitology. However, it shows limited capacity to initiate new research directions because of the small number of young and motivated research staff, and also the low funding possibilities to support such (somewhat risky) types of research. However, several PhD students met by Panel members were highly motivated and interested to develop new research areas, most importantly those relating clinical research to basic research. This is a very positive aspect, and such students should be given an opportunity to establish – after a satisfactory PhD thesis defence and post-doctoral experience – their own research group.

The Faculty has realistically assessed its strengths and opportunities but has not recognized major weaknesses, such as its low efficiency in publishing and most importantly its low international visibility both in publication and in the acquisition of research funds. However, in future plans, the publication record, quality and acquisition of funds are supported, although clear incentives are missing. The age and career progression of the active scientific staff seem to be adequate but attention should be paid to increase number of postdoctoral fellows in research. Inviting foreign experts to visit the Faculty should be strongly supported. Its size and composition allows a better interaction especially between non-clinical and clinical subjects in order to attract high-level doctoral students and research grants from competitive sources. Very good points are strongly motivated PhD students who mostly plan to write their PhD theses in English. This will be a strong impetus for a younger generation and for further Faculty development.

**Conclusions and recommendations**

Stronger science in terms of number, quality and visibility (international) outputs will be a decisive factor in further improving evaluation status of the Faculty. PhD students should be strongly supported as this seems
to be one of the strongest developmental elements of the Faculty. Scientific communication in English should be strongly supported, and joint activities for PhD students (e.g. an annual intramural PhD conference, seminars in English, more use of COST, Erasmus and other schemes, also for incoming visitors) should be promoted. Foreign experts should be invited to give lectures (seminars with students), and linking strong theoretical fields – e.g. veterinary parasitology – with clinical research should be promoted. Care should be taken to support the new infrastructure and to secure at least part of their maintenance from central University resources.
Summary of the Institutional Assessments

1. Quality and Impact of Research

The research area assessed by the Panel has high national economic and societal relevance in Lithuania, as is recognised by elements in national strategy, and by the cultural interests of its population. However, there were complaints from some assessed Units that national funding was currently biased away from e.g. agronomic research. As far as the Panel could assess (without discussions with e.g. producers, state agents, policy makers and other research “users”), the units were adequately addressing questions put to them from national stakeholders. This led to a relatively good average score (of 3.1) across the eight units for the criterion “Economic and Social Impact” of their research. How far future - and so far largely unexpressed - economic, environmental and social needs were being addressed by the units was unclear: with few exceptions, the Self-Assessment Reports, and Panel visit discussions, did not highlight such issues except in very general terms.

From an international or global standpoint, the scientific research is still weak. Many units cited only a few low-level and one-off activities in international research projects, and, with a few exceptions, international contacts with developed countries are generally unimpressive. This led to rather low scores (averaging 2.6) as regards the criterion “Quality of the Research Performance and Impact on the Scientific Research Discipline”.

Opportunities in contacts with neighbouring partners (Baltic states, Nordic states, Poland, Belorussia, Ukraine) should be fostered where these are clearly seen to enable practical and enduring research cooperation, e.g. in joint bids for high-level positions in EU research grants. Stronger investment in informational resources, databases and publisher consortia should be encouraged, perhaps from central resources.

Contact between the Panel’s units of assessment and the Lithuanian economy and society seem somewhat patchy, with good – if sometimes over-frequent and low-level – research contracts in some areas (e.g. agronomy) but rare contacts in some other cases (e.g. with forest companies). In Kaunas, the Panel observed rather strong contacts of the Horticulture and Veterinary Faculties with local society, though not so much with others.

2. Universities and research institutes

Five of the Panel’s eight units of assessment were University faculties (two in the Aleksandras Stulginskis University, and three in the Lithuanian University of Health Sciences), and three in the Lithuanian Research Centre for Agriculture and Forestry (LAMMC). In some areas, e.g. forestry and agronomic research, the existence of institutes separate from the Lithuanian university system seems to have resulted in much activity being devoted closely to the requirements of Lithuanian industry or state agencies rather than to wider scientific (or societal) demands, for which research activities with ambitious goals, for either scientific or societal/industry innovations, would be needed. While the need to support nationally important sectors is understood, the assessment criteria supplied to the Panel stress international or global academic standards, and in many cases this has resulted in average or sub-average scores.

The LAMMC units were approximately twice as large as the University ones (averages 50.3 and 23.4 FTE researchers respectively) on 31 March 2014, and were almost twice as well funded (averages €69K and €38K per researcher) during 2011-2013. In terms of Scopus 2009-2013 output, the University units reported twice as many per researcher as the LAMMC units (6.5 and 3.3 for all publications, and 5.8 and 2.9 for articles) but citations (excluding self-citations) were almost equal at 7.2 and 7.3 per researcher. Perhaps
surprisingly, while the LAMMC units reported more PhD students than the University units (15.3 and 9.0 annual averages respectively for 2011-13), they reported only slightly fewer PhD graduations (8.7 and 9.4 respectively) over that period.

There was no clear pattern of overall Panel scores between these two types of unit, except that the University units tended to score higher for infrastructure. The average scores for “Development Potential” - perhaps the most difficult criterion to assess - were equal (at 3.0) for the two groups.

No strong conclusions can be drawn, but the Panel was generally under the impression that the University units were – as should perhaps be expected - more intellectually open than the LAMMC units, and were playing – or at least attempting to play - a greater role in international terms. Indeed, the rationale for two types of research unit in the same sub-area, such as forestry or animal science, must be at least partly (teaching responsibilities must also be considered) in terms of a different focus, i.e. national for the LAMMC units and international for the University ones. To that extent, given the explicitly “global/international” performance criteria of the assessment exercise, the University units perhaps performed worse and the LAMMC units better than might have been expected.

The risks of physical isolation in a research unit far from others of a similar nature – or even across a campus - were in the Panel’s mind, and in general it was felt that concentration of resources in order to achieve a better-than-critical size was desirable. In addition, opportunities to interact professionally and socially with fellow-professionals, in social rooms, colloquia, at seminars, etc., should be encouraged by appropriate space and facility planning and by research management. This would also help to foster inter-disciplinary research, and to pursue multi-disciplinary research projects.

3. Infrastructure

Considerable variation in the scale and quality of physical infrastructure (laboratories, experimental fields, etc.) was reported and observed across the eight assessed units, with half receiving a score of 4 (“Very good: strong international player”) but two receiving a score of 2 (“Adequate: satisfactory national player”). The average score for this criterion was 3.3, the highest of the five individual score averages. It was clear that efforts had been made to concentrate EU funding obtained for new physical infrastructure (buildings and equipment) in a few facilities such as those in the “Nemunas Valley”, and in some cases (e.g. at ASU) the available facilities were impressive.

Some concern was raised within the Panel about the necessary ongoing support for operating new equipment, in terms of both staffing by technicians and finance for training, materials, machine spares, etc. If - as is to be hoped - the new equipment is to be fully utilised in future, adequate arrangements – perhaps via cross-subsidy from commercial uses - will have to be made in these respects. The ongoing installation of live animal testing facilities in renovated stables at one unit was queried inside the Panel as to its future utility for international research.

In terms of strategic cooperation, the Panel observed only minimal cooperation among the 3 Animal and Veterinary Sciences units, although they operate within the same cluster (Nemunas Valley) and in the same University. More intensive exchange will increase the profile and impact of certain research fields both nationally and internationally. At the same time, better cooperation will avoid repetition and the wastage of resources (labs, human). The LSMU Institute of Animal Science has potential that can be very well used by other units. On the other hand, other units offer great potential for cooperation, in particular in terms of molecular techniques and know-how in research for this Institute, in particular in the area of molecular breeding and biology. The same is true for the LSMU Faculties of Veterinary Medicine and of Animal Husbandry Technology, in terms of research in farm animals, biomedicine and animal models.
4. Publications

The Panel recognises the importance of disseminating research results (whether self-produced or not) in the Lithuanian language to end-users such as students, producers (e.g. farmers), officials and the general public. However, the improvement of the international research profile of institutions can best be achieved by the publication of scientific results in high-quality scientific journals in English. National scientific series of publications utilise financial, human and authorship resources that would be better focused and upgraded to international-quality publications. The continued publication of scientific articles in Lithuanian-only journals (or those likely to be read only by fellow-scientists in closely neighbouring countries) should be re-examined; such journals might be altered to lower-cost and faster vehicles of publication in Lithuania, merged with sister journals (a good example is Baltic Forestry), or dropped altogether.

At PhD level, the Panel felt that theses in its area should normally be written in English (perhaps with chapter summaries in Lithuanian: this would promote good practice amongst young researchers. It was also felt that visits to (and from) other countries, whether by individuals or to conferences, should have international publication with a foreign co-authorships as a potential goal.

5. Research Management and Context

Enhanced international collaboration together with interdisciplinary approaches would increase the scientific and societal and economic importance of agricultural, forest and food research in Lithuania. The importance of the bio-economy in Europe, together with changing climate with Baltic countries having environmental conditions interesting for more northern countries in the future, will give interesting opportunities and challenges for forest research.

Management of research was assessed as patchy (heterogeneous) with senior management sometimes very good, but the Panel’s discussions with middle-ranking staff did not always seem to reflect institutional objectives. However, some visits provided excellent discussion. In some cases, the unit’s objectives themselves were not clear, with rather vague statements as key research areas or directions in self-assessment reports. Each institution should identify a small set of “key selling points” (KSPs) or similar items which highlight its specific leading areas (actual or perhaps potential).

Some institutions appear to have a problem of aging staff, perhaps because the best younger staff were attracted into industry (to be benefit of the national economy, and with opportunities to follow up these leavers for promising research projects).

The great majority of reported scientific visits were by Lithuanian staff going abroad for short visits: the Panel recommends longer visits for specified working purposes, and a greater proportion of incoming visitors.

Assessed units in the area of this Panel generally exhibit a generally good national research position. However, virtually all self-assessments complained of unstable scientific and award-granting policies, and staff may be somewhat underestimated by national regulatory bodies and granting bodies. Their administrative burdens – and teaching ones in the case of research-oriented professors, docents, etc. – are widely considered to be too heavy. In several cases, an advisory board – perhaps on an informal basis at the start – should be set up to provide senior management (and middle-ranking staff via selective one-to-one meetings) with important information and views as regards research areas and directions.

6. Specific Science Areas

Areas of Animal Science and Veterinary Science play a key role in improving animal health, animal protection standards, animal production and food production systems, and livestock farm economy, as well as the quality of food of animal origin, food safety, feed and animal resources and environment protection in
Lithuania. The reforms made in science and education system in the country seem to have positively affected development of both disciplines. Thus, the Institute of Animal Sciences is part of the same University as the Faculty of Husbandry and Technology and the Faculty of Veterinary Medicine. They operate with the same goal and are part of similar national strategies (e.g. the Nemunas Valley). They also have improved their research infrastructure with a couple of highly modern research facilities, take part in national research programmes (most importantly those geared by Lithuanian Research Council), and also international programmes (both regional with other Baltic countries or Poland) and European (FP, Eureka, Horizon 2020). Without doubt, these units are key national actors that play an important role to meet the expectations of Lithuanian society mentioned above.

As can be seen from the ample international collaboration and high frequency of internationally co-authored papers, *Forest Research* in Lithuania is strong in traditional fields, e.g., in forest pathology, genetics, ecology. However, some other important fields, e.g., economics, technology, or decision-making tools in forest management (e.g. effects of alternative stand management regimes on wood production and profitability on stand or country level), seem to be almost entirely missing. Although some of these issues may be studied by other players in the country, lack of such elements suggests at least limited interdisciplinary research in these fields – and maybe also small importance of these themes that are topical in contemporary forest research.

From the international perspective of research status, despite the progress made in any particular area of research within the disciplines, there is still much to do in particular in terms of increasing the profile and visibility of the research. In particular, international publication output, which is an important indicator of visibility, is comparatively low. Both quantity and quality of publications are still low. Research environment still does not offer an environment comparable with the best international research environment, which would be able to attract research resources (both humans and projects) to Lithuania. All units of Animal and Veterinary Sciences evaluated have limited international visibility of their research without clear profiles, which would make them required partners for international programmes. Although the Panel sees development potential for all units, a critical issue felt by all units was the reducing level of funding from 2011 to 2013. In some units, the reduction was by half, and this jeopardizes seriously the quality of research in particular in terms of recruiting young and motivated research personnel and also enlarging their research capacities. Reduction of state funding for R&D activities was not associated with an increase of third-party funding. Reduction of the budget and external funding also jeopardizes the maintenance and development of the modern labs and equipment established during the last years.

The acquisition of third-party funding seems to be a major weakness of the many of the research institutions in Lithuania. In some institutes, very small and fragmented research grants (up to 0.2k Euro/project) were observed. This makes it difficult to manage these funds and also to build a clear research strategy for the institutes. The amount of money raised by competitive sources and industry as well as EU competitive grants is comparably low. Both Universities and Research Institutes should establish fund-raising offices or agencies in order to increase the awareness and opportunity for research fund raising in the country. The management of the units as well as researchers must work better to develop such strategies for increasing the third-party funding.

7. Particular Issues

The Panel observed several issues which deserve particular attention in the future:

1. The necessity of enhancing the knowledge and more intensive use of English language is indispensable. The Faculty of Veterinary Medicine has started and the other units are highly encouraged to introduce the system of compilation of PhD dissertations in English and in a cumulative basis, at best with international participation in the reviewing process. This system will increase the publishability of the research results in international peer-reviewed journals. Also, this
system will encourage young graduate students deepening their knowledge in their disciplines and the exchange with their counterparts in other countries.

2. Strategic planning within the Units and probably within “Nemunas Valley” needs a better coordination and profile development. Research plans of the units indicate general aims, mostly without defining a clear focus or profile. It is advisable that Units or the University identifies foci of research based on the best experience given at the units currently. The best lines of research at the Unit or University should be further strengthened (“Strengthen the strengths”) and this will give the unit a certain profile, which is attractive both for the (international) industry and also international research community.

3. In many units, the dedication to research among senior scientists is low (33%), and positions for young postdocs (young, highly motivated and promising people with a PhD up to 5-7 years after degree award, and dedicated totally to research) are missing. This jeopardizes future development, and is also a problem for initiating new research fields. In some units, the number of technical staff is comparatively high, and might be reduced in number in order to enhance the recruitment by competition of young and motivated scientists.

4. Reducing funds for R&D activities from the University budget is a problem. Rather than reducing global funds for research, basic funding could be granted based on productivity among and within each unit. The amount of third-party funds in all units is comparatively low. This is true for funds gained by competitive grants such as Research Council and also by local industry. When considering the funds from international sources (international industry, EU competitive calls), the situation is no better. The units may attract the local and international industry if they can offer to them solutions and if they are competitive (in knowledge, expertise, speed, costs). For this, a clear profile and visibility of the research is highly important. Regarding a better involvement of the units in international collaborative calls (i.e., Horizon 2020) it is advisable that the University creates opportunities for researchers for networking and also assistance during the application process.