

Evaluation report

Evaluated point	Grade	Comments
Scientific impact of research	Good	<p>The scientific impact of agricultural and veterinary sciences research at TUT is good. Publication is in good journals, both general science and specific subject area journals. Publications are cited at a reasonable level and this means that the scientific community finds the research important.</p> <p>The volume of research in the field is relatively low at TUT. It is, however, of good quality. One problem with the research is that it is split between many groups and therefore not all research teams are large. On the other hand scientists work on basic research in their various fields as well as research in agricultural and veterinary science. This is an important component in keeping the quality of the research at a good level.</p> <p>Research and monitoring of water quality as influenced by agriculture is an important area, but needs partners to process this data. Investigations on the history of crop cultivation in Estonia at the Dept. of Geology are dependent on other ongoing work in the department. Food technology directly related to agriculture is in application of omnic techniques to study food microorganisms and yeasts and fermentation. Biogas production is also a possible application of fermentation.</p> <p>The strongest groups in terms of critical mass are the groups working on plant biology and plant pathology, particularly plant virus and fungal diseases. The proximity of these two groups is good for research into plant breeding. Other important partners are the chemists who can add extra dimensions to plant research.</p> <p>The groups that seem to be most successful are those that have established good international contacts, particularly through EU joint research proposals.</p> <p>TUT is a strategically important University in agriculture research and teaching. The level of research and teaching in veterinary science is low. Veterinary science is not part of its remit. In chemistry, gene technology, and food science there is evidence of a good level of interdisciplinary interaction between cognate groups. The research activities are supported by a good level of seminar, journal club and interdepartmental meetings.</p>
Sustainability and potential of research	Satisfactory	<p>The funding for agricultural and veterinary sciences research at TUT is already rather low, only about 0.5 million Euros per year, and this is spread over several areas ranging from food technology to soil biota and plant biology. This means that there is limited scope for expanding future research directions. Thus the greatest</p>

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		<p>threat to a continuation of good research and the potential for new research directions is the low level of funding. Without a change in this situation agricultural and veterinary research may be marginalized at TUT and it will not be possible to maintain staff and continue research education.</p> <p>One very positive point for potential is the quality and quantity of equipment used in the laboratory for research. This is achieved by having both basic natural science and agricultural research in close proximity. Using this potential will, however, be dependent on adequate funding for agricultural research.</p> <p>Collections of types of fungal and virus diseases as well as databases containing information on water quality and soil biota are essential components of agricultural research at TUT. Efforts should be made to guarantee the continued maintenance of these data sets. It might also be possible to do more research by synthesizing this information.</p> <p>The research is good to excellent especially in gene technology as applied to plants. Structural reforms initiated recently have produced a good result in terms of promoting research. However the level of resources for research is low.</p>
Societal importance of research	Good	<p>Plant science research is very important for plant breeding for disease resistance and improved cultivars. This is essential for improving Estonian agriculture, which is of high societal importance. Collaborations with plant breeders at the Estonian Crop Research Institute are important to the chain of bringing basic knowledge into application for bringing new and better cultivars to Estonia.</p> <p>Quality of water and soil are also essential for continued environmental health. This indicates a good societal impact of these research directions.</p> <p>One weak point is that communication of scientific results to agricultural advisors and into extension education (for example courses at Tartu College) is not well developed. More collaboration with international plant breeding companies and institutes should also be encouraged.</p> <p>The research in gene technology has direct application to growth of crops, cross breeding and novel needling technologies for enhanced characteristics and disease resistance for industry and farming communities. Research in food science and development and application of analytical techniques in food analysis is standard. The issues of food toxicology, antibiotic residues and bacterial contamination are not being addressed in this section. There</p>

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		was good evidence for outreach with industry and engagement of schoolchildren in imaging is commendable.
<p>Scientific basis in the field is sufficient to conduct doctoral studies. (This question should be answered only if: a) institution being evaluated is conducting doctoral studies and; b) The field being evaluated is proposed to grant positive evaluation. If these conditions are met then: a) If the level of scientific basis is sufficient for conducting doctoral studies in every structural unit being evaluated, then the answer should be „yes“; b) If the scientific basis is not sufficient in some structural units, then those units should be listed.)</p>		<p>Yes, the scientific basis in the fields is sufficient to conduct doctoral studies. This is particularly evident at the Department of Chemistry and Biotechnology. It is less clear in the other units. Student get their degrees in subject areas not actually designated as agricultural and veterinary sciences. But the subject areas of the PhD degrees can be of high relevance to agriculture. It would definitely be positive for PhD students at TUT to be able to participate in research schools dealing directly with agricultural and veterinary sciences.</p> <p>The biggest threat is financing of PhD students and the need for full time support so that the degrees can be achieved in the four-year period.</p> <p>The scientific opportunities for PhD research are good and facilities are excellent. The use of structural funds to support has been valuable and commendable.</p>

Summary assessment

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<p>Areas of special note as appropriate (Where necessary indicate sub-fields, assessment criteria, and/or structural units which, in the committee's opinion, were of a notably high level.)</p>		<p>Areas of special note are plant biology and geology. These areas have published well and have good international contacts/collaborations.</p> <p>Research in gene technology both in terms of the problems being addressed is at a high level with some staff producing publications in international journals.</p> <p>The Departments are missing a major opportunity for engaging with sensing technologies, IT and computer based simulations of the environment.</p>
<p>Areas in need of improvement as appropriate (Where necessary indicate sub-fields of the field being evaluated, assessment criteria, and/or structural units which, in the committee's opinion, revealed significant shortcomings.)</p>		<p>Being part of a technical university is not being used to full advantage. For example remote sensing for plant disease could be developed. Another possibility for collaboration is modelling water quality. The strong links with other Baltic countries in the area of water pollution by agricultural practices could be used more in research synthesis.</p> <p>The low efficiency in completing doctoral studies is due to the part time nature of PhD students research funding. If PhD students are taken on in research programmes then to be internationally competitive they need to be funded full time. Opportunities for travel and placement in international centres of excellence should be encouraged and funded. In some of the CVs of staff where this has been the case it shows both on terms of scientific output and international standing.</p> <p>In publications conference proceedings and abstracts should not be counted as research papers. Such publications are an inherent part of all scientific papers. Staff should be encouraged to publish in international science journals and not local journals (e.g. Agronomy Research).</p> <p>There are shortcomings in the degree of engagement with industry. Fields of research are in places very relevant to industry in agriculture biotechnology and engineering. Strategy is needed to be in place to support integration.</p>
<p>Assessment proposal to the Minister of Education and Research</p>	<p>To grant positive evaluation</p>	<p>The strengths of research in the area of agricultural and veterinary sciences at TUT positively outweigh the threats of funding cutbacks. The research performed and published as well as the scientific proficiency of the staff is good. The infrastructure base is also good and these things indicate a positive evaluation.</p>

Feedback

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<p>Feedback for institution (This question should be answered only if the institution asked for feedback from the evaluation committee in the self-report (about up to three specific areas of R&D which it finds to be currently important, e.g., related to its development plan).)</p>	<p>Feedback was asked for as to the target for tenure track staff to % non-tenure track staff in a year perspective. A target of 50:50 would seem a reasonable goal. However, this will be different for different staff positions. A goal for senior scientists that would make working conditions more stable would be that approximately 80% should have tenured positions.</p> <p>Another area where feedback was asked for was how support for realization of researcher potential for creativity can be achieved. There seems to already be some activities in place; seminars and journal clubs meet regularly and appear to be well attended. Other suggestions are creating fora for discussions on new research directions. Brainstorming and scanning of international trends in science can produce new ideas. Also invitations to scientists from other disciplines at TUT to participate in such discussions would open new partnerships.</p>
<p>Suggestions for unit, institution, state etc. (As appropriate, committee can give additional feedback for the structural unit, the institution, or the State (please specify whom feedback is directed to) according to the directive assessment criteria for regular evaluation (article 7).</p>	<p>The staff should be encouraged to publish in international journals and spend less time on national publications as well as conference proceedings and trade journals.</p> <p>The level of resources for research have been frozen for 9 years. Unless unfrozen none of this excellent research will be sustained at a level that maximises the considerable potential in the short and medium term.</p> <p>The State Budget allocation to the R and D at TUT should be increased. Agriculture is a strategic and important scientific development for Estonia.</p>