

NOKUTs tilsynsrapporter

# PhD in Applied Ecology and Biotechnology

Inland Norway University of Applied Sciences

Desember 2018



NOKUT 

NOKUT (Norwegian Agency for Quality Assurance in Education) is the controlling authority for educational activity at all Norwegian higher educational institutions. This is achieved, among other, through accreditation of new study programs. Institutions that provide higher education have different authorizations to create new study programs. If an institution wants to create a provision outside of its field of authorization, it must apply to NOKUT for accreditation.

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| <b>Institution:</b>        | Inland Norway University of Applied Sciences   |
| <b>Programme:</b>          | PhD in Applied Ecology and Biotechnology   |
| <b>Degree/ECTS:</b>        | PhD/180 ECTS   |
| <b>Teaching:</b>           | Campus based   |
| <b>Expert committee:</b>   | Professor Lena Gustafsson, Swedish University of Agricultural Sciences<br>Professor Jon Moen, Umeå University<br>Professor Tom Kristensen, University of Oslo<br>Frøydis Meen Wærsted, Norwegian University of Life Sciences |
| <b>Decision date:</b>      | 13 December 2018   |
| <b>NOKUTs case number:</b> | 17/09100   |

## Introduction

The external quality assurance performed by NOKUT consists of evaluating the institution's quality assurance systems, accreditation of new programmes and revision of accredited programmes. Universities and university colleges have different self-accrediting powers. For an institution without self-accrediting powers to establish a programme in a certain cycle an application must be made to NOKUT.

Hereby NOKUT presents the accreditation report of PhD in Applied Ecology and Biotechnology at Inland Norway University of Applied Sciences. The expert evaluation in this report is part of the accreditation process following the institution's application for accreditation submitted before the application deadline on November 1<sup>st</sup> 2018. This report clearly indicates the extensive evaluation performed to ensure the educational quality of the planned programme.

The PhD programme in Applied Ecology and Biotechnology at Inland Norway University of Applied Sciences fulfils NOKUT's conditions for accreditation and is accredited by resolution of December 13<sup>th</sup> 2018.

Terje Mørland  
Director general

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## 1 Information regarding the applicant institution

From January 1<sup>st</sup> 2017, Hedmark University of Applied Sciences and Lillehammer University College merged into the new institution Inland Norway University of Applied Sciences (INN). As a university college, INN does not have power of self-accreditation for educational provisions in the third cycle. INN has approximately 13 500 students and almost 1000 full time equivalent employees divided on 6 different campuses in eastern Norway: Blæstad, Elverum, Evenstad, Hamar, Lillehammer and Rena.

The institution consists of six different faculties:

- Faculty of Applied Ecology, Agricultural Sciences and Biotechnology
- Faculty of Audiovisual Media and Creative Technologies
- Faculty of Social and Health Sciences
- Faculty of Education
- Inland School of Business and Social Sciences
- The Norwegian Film School

INN provides bachelor's and master's level programmes within a vast number of subject areas: ecology and agricultural sciences, psychology, sports, law, music, pedagogy, health sciences, social sciences, teacher education, language and literature, biotechnology, film, television and culture, tourism, animation and game sciences, economics, leadership and innovation.

In addition, INN offers five PhD programmes:

- Applied Ecology
- Child and Youth Competence Development
- Innovation in Services
- Teaching and Teacher Education
- Audiovisual Media (offered in collaboration with NTNU)

### **The University College's description of the programme and the applicant's grounds for the application**

The application for the PhD in Life Sciences is an extension of the academic profile of the PhD in Applied Ecology. The PhD in Life Sciences will include the entire Faculty of Applied Ecology, Agricultural Sciences and Biotechnology. The Faculty consists of three departments: Department of Agricultural Sciences (Blæstad), Department of Biotechnology (Hamar) and the Department of Forestry and Wildlife Management (Evenstad).

The PhD programme has four programme options:

- Applied Ecology
- Forestry
- Agriculture
- Biotechnology

The PhD in Life Sciences is an interdisciplinary PhD programme that will foster competence in sustainable management, production and utilization of biological resources such as forests, game, fish, cultivated plants, livestock animals, microorganisms and other bio-based products in, or originating from, agriculture, forestry and wildlife areas. Biotechnology is a broad field of study whose methods are also used in research in applied ecology and agricultural sciences. Together, these different disciplines help solve local and global problems concerning the environment, food production, health and/or sustainability.

## 2 Description of procedures

NOKUT makes an administrative assessment to ensure that all basic conditions for accreditation are fulfilled as expressed in the Regulation concerning NOKUT's supervision and control of the quality in Norwegian higher education<sup>1</sup> (hereafter referred to as the Quality Assurance Regulation on Higher Education) and the Ministerial Regulations concerning quality assurance and quality development in higher education and tertiary vocational education, Chapter 3<sup>2</sup> (hereafter referred to as the Ministerial regulations). For applications that have been approved administratively, NOKUT appoints external experts for the evaluation of the application. The external experts have declared that they are legally competent to perform an independent evaluation, and carry out their assignment in accordance with the mandate for expert assessment passed by NOKUT's board, and in accordance with the requirements for educational quality as determined by the Quality Assurance Regulation on Higher Education.

The expert assessment includes a visit to the institution where the following groups are interviewed: the management of the university college, master students, PhD candidates, academic management, the discipline community, administrative management and possibly employers. In addition, the committee inspects the university college's infrastructure. Based on both the written documentation and information from the interviews, the expert committee shall conclude either with a yes or no as to whether the quality of the educational provision complies with the requirements in the Quality Assurance Regulation on Higher Education. NOKUT also requests that the expert committee advise on further improvements of the programme. All criteria must be satisfactorily met before NOKUT accredits a programme.

If the conclusion reached by the expert committee is negative, the report is sent to the applicant institution, which is then given three weeks to comment. Thereafter NOKUT decides whether the comments should be sent to the committee for additional consideration. The committee is given two weeks to submit the revised assessment. The Board of NOKUT then reaches a final decision about accreditation.

The current report presents the accreditation process chronologically. During the accreditation process, the number of specialisations was reduced to Applied Ecology and Biotechnology, and consequently INN changed the name of the programme from PhD in Life Sciences to PhD in Applied Ecology and Biotechnology. As described above, the committee is free to change its conclusion on accreditation in the course of the process, and has in fact done so in this report. The final conclusion is found in part 7.

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<sup>1</sup> <https://lovdata.no/dokument/SF/forskrift/2017-02-07-137?q=studietilsynsforskriften>

<sup>2</sup> <https://lovdata.no/dokument/SF/forskrift/2010-02-01-96>

### 3 Expert assessment

This chapter is the expert committee's assessment. The term "we" refers to the expert committee as such.

#### 3.1 Summary of the report

The Inland Norway University of Applied Sciences (INN) has applied for a PhD programme in Life Sciences at the Faculty of Applied Ecology, Agricultural Sciences and Biotechnology including specialisations in Applied Ecology, Biotechnology, Forestry and Agriculture. INN was formed in 2017 through a merge by Hedmark University of Applied Sciences and Lillehammer University College.

The proposed programme is an extension of the PhD programme in Applied Ecology accredited to Hedmark University of Applied Sciences in 2011. The Biotechnology specialisation is based at Hamar campus, the Applied Ecology and Forestry specialisations at Evenstad campus, and the Agriculture specialisation at Blæstad campus.

Experiences from the existing PhD programme in Applied Ecology are good. A sufficient number of PhD students have graduated and there are many applicants to the announced PhD positions. Internationalisation has been guaranteed through encouragement of and financial support to PhD students for visits abroad, and through the research school IRSAE. Several PhD courses have been developed.

An evident quality of the participating departments is a strong link to stakeholders, especially the Biotechnology department at Hamar with pronounced cooperation with successful regional enterprises. Commercialisation related to reproductive biology (domestic animals, fish) is especially successful. PhD students graduating in Applied Ecology have been of clear interest to forestry and research organisations in the region.

Nevertheless, the committee sees obstacles to an extended PhD programme. A main objection is the very broad scientific scope suggested, which includes Applied Ecology, Biotechnology, Forestry and Agriculture. The ability to provide a high-quality PhD training in Biotechnology directed towards human health, as is stressed in the application, is also limited. The number of staff and their scientific competence are large and sufficient for Applied Ecology and Biotechnology, but not so for Forestry and Agriculture. This unbalance leads the committee to conclude that a programme focused on Applied Ecology and Biotechnology would be a better option, or alternatively that an increase in the competence in Forestry and Agriculture is needed. We also recommend that the English name of the programme is changed to "Environment and Biosciences" or similar, to correspond to the Norwegian name ("miljø- og biovitenskap") which we consider more appropriate. The term "Life sciences" is much broader than the programme, often including medicine and other human related sciences. If the number of specialisations is reduced, an alternative name could be "Applied Ecology and Biotechnology".

One requirement for PhD accreditation is that at least 50 per cent of the academic staff must have professor or docent qualifications. This is not fulfilled since the full-time equivalents of professors only make up about 30 per cent.

In summary, the proposed PhD programme in Applied Ecology, Biotechnology, Forestry and Agriculture at INN, despite considerable qualities, does not fulfil the requirements for accreditation. Thus, the committee cannot recommend accreditation of the current pro.

### **3.1.1 The doctoral degree programme's field of study**

The field of study is ecology and biotechnology applied to the sustainable management, production and utilisation of biological resources originating from agriculture, forestry and wildlife areas. Specialisations will be offered in Applied Ecology, Biotechnology, Forestry and Agriculture. Applied ecology is a scientific discipline in which scientific knowledge is used to find solutions to challenges associated with land use and the provision of ecosystem services. Biotechnology uses cells and their components to develop biological products and services. Biotechnological methods are also important in ecology. Together these disciplines help solve local and global problems related to bioeconomy, the environment and food production. In the application, a vision is put forward to solve also problems related to human health but the biotechnology direction is too limited to fulfil this.

Accreditation of a PhD programme will give institutions the power to establish new study programmes in the first and second cycle within the field of study of the doctoral degree programme without applying to NOKUT. A clear definition of the field of study is thus important to clarify the self-accrediting powers. Based on our concerns relating to the human health perspective and the limited competences connected to Forestry and Agriculture (see sections 3.3.2, 3.3.4, 3.4.1 and 3.4.5) a clearer definition of the field of study is needed to clarify the power of self-accretion.

## **3.2 Basic prerequisites for accreditation (§ 3-1 (4) in Ministerial Regulations concerning quality assurance and quality development in higher education and tertiary vocational education and § 2-1 in Quality Assurance Regulation in Higher Education)**

### **3.2.1 Requirements assessed by NOKUT**

From the Ministerial Regulations:

§ 3-1 (4) It is a condition for accreditation being granted that the requirements of the Universities and University Colleges Act are met. Regulations adopted under the authority of Section 3-2 of the Universities and University Colleges Act shall form the basis for the accreditation.

From the Quality Assurance Regulation:

§ 2-1 (1) The requirements of the Act relating to Universities and University Colleges and its corresponding regulations must be met.

### **Assessment**

INN was formed in 2017 through a merge by Hedmark University of Applied Sciences and Lillehammer University College. The quality assurance system for INN was approved by the INN board on June 12th 2018, and will be audited by NOKUT in 2019.

“Forskrift for graden philosophiae doctor (ph.d.) ved Høgskolen i Innlandet”, approved by the board in December 2017, describes the rules regarding admission to the INN PhD programmes, progression through



the programmes and finalization of the PhD study. To be admitted, a candidate should have a master degree or equivalent, with an average grade of B or better. In the document "Supplementary regulations for the PhD programme in Applied Ecology" (that presumably will apply to the extended PhD programme as well), give more details regarding admission and states that applicants will be assessed based on the scientific quality of the project description and its academic relevance for the PhD programme. The committee regards these criteria as sufficient to ensure that the admitted students will be of a sufficient academic quality.

The "Forskrift" also states, with regard to the monitoring of the individual students' progress, that the PhD board should receive annual reports from student and supervisor, and that a 3rd or 4th semester evaluation, where the status of the project is presented to a person or group appointed by the PhD board, should be performed.

The system for assuring the quality of the courses, based on evaluation during the course for first semester courses and end evaluation for shorter courses, seems adequate. The follow-up of the individual students' progress is, according to the application and the "step-by-step-guide" available on the INN web pages, based on semi-annual reports from the students and the supervisors. On the web pages of INN, students will find a form for annual progress reporting. During the interviews, it was clarified that reporting is done on an annual basis, as stated in the "Forskrift". In the annual progress report form, it is stated that all PhD students, in addition to submitting a filled-out form, also should give an annual oral progress presentation for the PhD programme committee. However, this oral presentation is not described in the quality assurance system, nor in the "Forskrift".

The diploma (appendix 3) contains, in addition to the actual diploma, general information about the degree, the goals, content and organisation of the study programme, learning outcomes, a description of the general knowledge, skills and competence of the candidate, a transcript of records describing the courses taken and the grade obtained, ending with a description of the Norwegian grading system. The diploma claims to encompass five pages, but the example in appendix 3 contains only four. The information given in the diploma overlaps to some extent with the information in the diploma supplement (appendix 4), with regard to learning outcomes, the description of the general knowledge, skills and competence of the candidate, the transcript of records and the description of the Norwegian grading system.

## **Conclusion**

No, the requirements are not fulfilled.

The institution is required to:

- make the information given to students and supervisors consistent with the "Forskrift", with regard to the progress reporting (annual vs. semi-annual, oral in addition to written, 3rd/4th semester evaluation)
- correct the page number information in the diploma

### 3.2.2 Information about the educational provision

§ 2-1 (2) Information provided about the programme must be correct and show the programme's content, structure and progression, as well as opportunities for student exchanges.

#### Assessment

The educational provision is described in attachment 6 of the application. In addition, supplementary information was given upon request, dated May 8th 2018. The information is well structured and sufficient, but some minor disagreements between different parts are noted. The ECTS for the course "Man and the environment" is in one place noted as 7.5 (p. 8, supplement 6) and in another place as 5 (p. 21, supplement 6). Two courses are listed with 7.5 ECTS in the supplementary information, and with 5 ECTS in the application ("Adaptive ecological monitoring" and "Applied models for fish and wildlife management").

No special requirements regarding the student's pre-existing knowledge are given for any course. Several of the courses appear to be very difficult to pass without basic knowledge on the topic, and the lack of requirements seems misleading.

Students are encouraged to study abroad for 2-6 months, and the faculty will make allowances for such stays. Students may choose optional courses from other national or international universities, for instance the host university during the international stay.

#### Conclusion

No, the requirements are not fulfilled.

The institution is required to:

- give correct and consistent information about the ECTS of the course "Man and the environment"
- clarify whether the following courses are to be offered with 5 or 7.5 ECTS
  - Adaptive ecological monitoring
  - Applied models for fish and wildlife management

The institution is advised to:

- in relevant cases, include recommended or prescribed background knowledge for courses

### 3.3 Demands to the educational provision (§ 2-2 in the Quality Assurance Regulation in Higher Education)

#### 3.3.1 Learning outcome and title of educational provision

§ 2-2 (1) The learning outcomes for the programme must be in accordance with the National Qualifications Framework for Lifelong Learning, and the programme must have an appropriate title.

Learning outcome of the programme:

*Knowledge*

The candidate:

- is in the forefront of knowledge important to solve local and global problems concerning the environment, food production, health and/or sustainability
- masters the philosophy of science related to life sciences
- can evaluate the appropriateness and applicability of different methods and processes in research projects
- can contribute to the development of new knowledge, theories, methods and interpretations concerning life sciences

*Skills*

The candidate:

- can formulate research questions, plan and carry out research and development work within life sciences conforming to high international standards
- can handle complex academic issues and challenge established knowledge and practices in life sciences which are important to solve local and global problems concerning the environment, food production, health and/or sustainability
- is capable of utilizing, or of obtaining the necessary skills to utilize, the most advanced and specialized methods and techniques in life sciences

*General competence*

The candidate:

- can identify new relevant ethical issues and carry out research with scholarly integrity
- can manage complex multi- or interdisciplinary scientific assignments related to the environment, food production, health and/or sustainability
- can communicate research through recognized international peer-reviewed scientific journals
- can participate in relevant professional debates in international fora
- can assess the need for, and initiate, innovation
- can communicate scientific actions to different target audiences, such as scientists within the candidate's field, scientists in other fields, users of the scientific results, and the general public

## Assessment

### Learning outcome:

In general, we find that the learning outcomes are clearly stated and relevant for PhD studies, even though they are very ambitious, and the inclusion of human health does not match the programme content. Further, is it reasonable to aim for mastering the philosophy of science related to life sciences? See also our comments regarding the name. Perhaps the wording could be slightly less bold. We would also like to see formulations about the independence of the candidate, for instance 'to show scientific or intellectual independence' or similar phrases. One of the most important aspects of a PhD programme is to produce independent researchers that can have a critical view of data and interpretations of data.

### Name:

We find the English title of the programme very broad, much broader than the programme itself. Life sciences may also include medicine and other human-related sciences, which is not included in this PhD programme. Although ‘Life sciences’ certainly encompass the subjects within the PhD programme, we find the Norwegian name more appropriate, which may translate to “Environment and Biosciences”, or something similar. Should the name be perfectly covering the strong subjects in the application, an alternative English name could be “Applied Ecology and Biotechnology” (see also our comments in section 3.4.1). If the name should change, so should the formulations of ‘Life sciences’ in the learning outcomes.

### **Conclusion**

No, the descriptions of the programme’s learning outcome and title are not satisfactory.

The institution is required to:

- give a definition of what is meant by health, and describe the aspects of health included in the PhD programme

The institution is advised to:

- rephrase the learning outcomes, or add phrases, to highlight the importance of the independence of the candidate’s knowledge and skills
- change the English name of the programme to PhD in Environment and Biosciences, or something similar, to better reflect both the content and the Norwegian name
- if the name of the programme is changed, the formulations in the learning outcomes should be changed accordingly

### **3.3.2 The educational provision’s academic update and professional relevance**

§ 2-2 (2) The programme must be academically up-to-date and have clear academic relevance for further studies and/or employment.

### **Assessment**

The academic update is reflected in the courses offered as well as in the competence and research direction of professors and associate professors. Regarding courses, there are uncertainties regarding the subject area of human health and the relevance to biotechnology students of the IRSAE research school. The scope of forestry courses seems limited since the Nordnatur network courses are at BSc and MSc level. These aspects are treated in detail under 3.3.4 and 3.3.7. The competence and research direction of professors and associate professors in agriculture and forestry are narrow, mainly since number of staff is low, implying that the necessary breadth of these subject areas is not covered. This aspect is treated in detail in 3.4.1 and 3.4.5.

The PhD programme has a large professional relevance for management of natural resources and the development of biotechnologies associated with this. PhD students will be attractive for future work

with sustainable use of natural resources and bioeconomy, an expanding branch within administration as well as private enterprise. The department at Hamar has a strong applied biotechnology environment, and in the region, there are a number of successful enterprises related to biotechnology. The interviews with stakeholders made it clear to the committee that commercialisation related to reproductive biology (domestic animals, fish) is especially strong, with large companies like Norsvin and SpermVital. A PhD programme embracing biotechnology is highly requested by these branches since they are knowledge-based and also have own research activities. Interviews during the site visit also clarified that PhD students graduating from the existing Applied Ecology programme at Evenstad have been attractive to research organisations like NINA (Norwegian Institute for Nature Research), and to Statskog (Norwegian State Forest and Land Corporation).

A clear strategy for the interaction between end-users and students, another criterion for academic update, seems to be lacking. This could include a model for the localization of industry-supported PhD students (allocation between the department and the host company).

## Conclusion

No, the requirements are not fulfilled.

The institution is required to:

- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture, see also:
  - requirements regarding course clarification in 3.3.4 and 3.3.8
  - requirements for necessary upgrade of the academic breadth in agriculture and forestry in 3.4.1 and 3.4.5

The institution is advised to:

- develop a strategy for interaction between end-users and students

### 3.3.3 The provision's workload

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| § 2-2 (3) The total workload of the programme must be between 1,500 and 1,800 hours per year for full-time students. |
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## Assessment

According to the application, the programme includes 30 ECTS (half a year's work) of organized courses and the rest (150 ECTS) allocated to the research project. In the guidance to applicants, NOKUT specifies that the application at least contain a description of the workload per semester, both in total and distributed between the categories of organized learning activities, self-study and exam preparations. The description must show that the workload is adapted to the profile and learning outcome of the programme. The application does not specify the workload to this extent. We do, however, realize that it is difficult, and maybe not even useful, to make a detailed breakdown of the workload during a PhD study, where the major part of the workload will consist of self-instigated

experimental work and where the workload distribution on semesters may vary widely among the students.

## Conclusion

Yes, the requirements are fulfilled.

### 3.3.4 The educational provision's content, structure and infrastructure

§ 2-2 (4) The programme's content, structure and infrastructure must be adapted to the programme's learning outcomes.

## Assessment

The programme's content and infrastructure seem rather well adapted to the learning outcomes, but there are some uncertainties regarding courses offered and lab facilities at some of the campuses. During the site visit, a potential to link the biotechnological research further to the field of human health was mentioned. However, this research direction is currently not supported by the programme structure and content, and the ability to provide a high-quality PhD training in biotechnology directed towards human health is limited.

### Content:

Two courses are mandatory for all students in the programme ("PhD introduction seminars" - 5 ECTS and "Bioinformatics and biostatistics" – 5 ECTS). Additionally, two courses are made mandatory for students in Applied Ecology ("Applied models for fish and wildlife management" - 5 ECTS, "Adaptive ecological monitoring" - 5 ECTS), one for students in Biotechnology ("Structure and function of biological macromolecules" - 10 ECTS) and one for students in Agriculture and Forestry ("Man and the Environment" 7.5 ECTS). Optional courses include three courses à 5 ECTS relevant for biotechnology students ("Seminars in bioprocess technology", "Seminars in molecular biology" and "Seminars in reproduction biotechnology"), and a course offering a 2.5 or 5 ECTS specialisation in a topic specific for the candidate. Thus, only students in Biotechnology can fill the required 30 ECTS by taking courses offered by INN. The IRSAE research school offers courses that are likely to be relevant for students in Applied Ecology and maybe in Agriculture, while likely not for Forestry or Biotechnology students. The Nordnatur network offer courses in forestry, but at a BSc and MSc level (see also section 3.3.8).

Four courses offered today as a part of the existing PhD programme in applied ecology are mentioned in the supplementary information but not in the application ("Seminars in applied ecology", "Spatiotemporal scaling in ecosystem management", "Large herbivores and ecosystem interactions – top-down or bottom-up" and "Environmental and human dimension of nature tourism, outdoor recreation and related ecosystem services"). The committee is uncertain as to whether these courses would be discontinued in the case of approval of the new PhD programme, and if so, if the courses would be replaced by new courses. Regarding the structure of the programme, the committee is concerned about the frequency of mandatory and optional courses, which are to be given approximately every second and third year, respectively. Taking courses, especially methodological ones, in the second half of a PhD might delay the progress, reduce the quality of the research, and limit

the possibilities for international stays. Scheduling courses late in the PhD training may also create problems for students failing a course.

In the course “PhD introduction seminars”, one learning outcome is that the candidate can contribute to professional debates in their field in international fora. It seems unlikely that a 5 ECTS introductory seminar common for the four specialisations of the PhD programme can provide such competence.

It is not clear whether students having the competence of mandatory courses prior to the PhD education could be exempt from these.

#### Infrastructure:

During the site visit, the laboratories at Evenstad and Hamar were visited. The laboratories in Hamar seemed to have sufficient equipment and space for the students specialising in Biotechnology, but a further clarification of the infrastructure providing a PhD training towards human health is needed. The laboratory in Evenstad seemed somewhat small to service all the employees and students in need of laboratory facilities. Blæstad was not visited during the institute visit. The committee would like to get a description of the students’ need for laboratory facilities at Evenstad and Blæstad, and how these needs are covered on-site or other places. A description of on-site equipment and capacity should be included.

### **Conclusion**

No, the programme’s content, structure and infrastructure does not correspond to and are not adapted to the learning outcome.

The institution is required to:

- clarify how the content, structure and infrastructure in Biotechnology will fulfil the aim of providing a PhD training directed towards solving problems of human health
- describe how students in especially Forestry, Agriculture and Biotechnology will gain necessary scientific insight and depth in their respective subject areas
- provide more information about laboratory facilities and capacity at Evenstad and Blæstad, and describe how the student’s needs are covered if the capacity and equipment at these campuses are insufficient
- clarify whether the following courses will continue to be offered or replaced:
  - Seminars in applied ecology
  - Spatiotemporal scaling in ecosystem management
  - Large herbivores and ecosystem interactions – top-down or bottom-up
  - Environmental and human dimension of nature tourism, outdoor recreation and related ecosystem services

The institution is advised to:

- offer mandatory and optional courses on a more frequent basis
- reconsider the following learning outcome of “PhD introduction seminars”: The candidate can contribute to professional debates in their field in international fora

- clarify if students already having the competence from previous education are offered the opportunity to exchange mandatory courses, except for the PhD introduction seminar

### 3.3.5 Teaching-, learning- and assessment methods

§ 2-2 (5) The teaching, learning and assessment methods must be adapted to the programme's learning outcomes. The programme must facilitate students taking an active role in the learning process.

#### Assessment

A PhD programme is by its nature an individual process where the candidates must take an active role. Appendix 9 also provides clear explanations of how the different PhD courses are run, and what the teaching methods and assessment methods are. We find that it is good to have a combination of oral and written presentations in the courses, as it is important to practice on both methods. Overall, we find that the teaching, learning and assessment methods are adapted to the learning outcomes, although the presentation could be more explicit in the application. A matrix showing when and how the learning outcomes are examined in the different courses and the individual PhD work would have been helpful. For instance, when and how do you evaluate that the candidate “masters the philosophy of science related to life sciences”? The matrix should list all the learning outcomes and the appropriate evaluation for each outcome. It should be possible to see which learning outcomes are evaluated in the course work and which are evaluated in the PhD defence.

An important part of a PhD education is to learn from, and be part of, the scientific discussions that are constantly taking place. This is done formally in, e.g., seminars and conferences, but also more informally in coffee rooms and corridors. This PhD programme is scattered over three different locations, which makes the latter a more difficult process. We would have liked to see a clearer strategy/reflection from INN of how this would affect the student's learning process at the different locations and within the different disciplines.

#### Conclusion

Yes, the teaching-, learning- and assessment methods are suited for the assessment of the students' attainment of learning outcomes.

The institution is advised to:

- employ a matrix of how and when the different learning outcomes are examined
- reflect on how the student's learning process is affected when the students are scattered at different locations and within different disciplines

### 3.3.6 Links to research and academic and/or artistic development work

§ 2-2 (6) The programme must have relevant links to research and academic development work and/or artistic research.



## Assessment

The course programme, the design of PhD studies with supervision by qualified staff, the writing and defence of a thesis, as drafted in the application will guarantee that there is a link to research and academic development work.

## Conclusion

Yes, the programme has satisfactory links to research and academic and/or artistic development work, adapted to the programme's characteristics.

### 3.3.7 The educational provision's internationalisation arrangements

§ 2-2 (7) The programme must have internationalisation arrangements adapted to the programme's level, scope and other characteristics.

## Assessment

All courses in the curriculum are given in English, and all over, the topics covered in the courses are relevant for international, as well as for Norwegian students. The recommended literature is mainly international. International students constitute a high percentage of the students enrolled in the present PhD programme. Participation in one or two international conferences with presentation of the PhD student's own work is also included in the internationalisation arrangements.

An adequate internationalisation arrangement also should ensure that the students regularly are exposed to international guest lecturers. The application accentuates the research school IRSAE (International Research School in Applied Ecology), to which all PhD students are automatically enrolled, as an important part of the internationalisation arrangement. IRSAE is a partnership between several universities in Norway, Italy, Iceland, Sweden, Denmark and UK. The topics addressed in IRSAE appear to be less relevant for the biotechnology students (see also section 3.3.8).

## Conclusion

Yes, the programme has internationalisation arrangements adapted to its level, scope and other characteristics.

The institution is advised to

- invite international guest lecturers to give lectures and seminars relevant for the biotechnology students

### 3.3.8 The educational provision's systems for international student exchange

§ 2-2 (8) Programmes that lead to a degree must have arrangements for international student exchanges. The content of the exchange programme must be academically relevant.

## **Assessment**

### Research abroad:

According to the application, PhD students are encouraged to stay for 2–6 months at another, preferably international, institution with costs to be covered by the faculty. All research groups list international collaborations, seemingly making the opportunity for international exchange possible. The research school IRSAE, in which all PhD students will be enrolled, also offers mobility grants to PhD students. Such stays will normally consist of a collaboration in writing a paper and take place during the last half of the PhD programme. The stay is often placed in time to coincide with a course at the host institution.

The committee learned from the PhD student interviews that most of them had visited labs abroad (in Sweden and the US), for a time span from one week to three months. Their impression was that it was easy to get funding from INN for visits abroad, and that the students were encouraged to make such visits.

### Courses abroad:

IRSAE offers several courses that are mainly relevant for students specialising in Applied Ecology, but stated in the application to be relevant for students in forestry and agriculture as well. The application states that the students automatically will be enrolled in IRSAE and will participate yearly in this research school. For the students specialising in Biotechnology, the relevant courses offered by IRSAE are in scientific writing and proposal writing. For 2018, these courses are given at INN, but it is unknown to the committee if these courses are given every year. It is also unclear whether yearly participation in IRSAE is compulsory, even for the biotechnology students. If so, the content of the research school should be modified to make it more relevant for these students.

According to the example of a partner agreement appended to the application (appendix 7) the commitment of the IRSAE partners was valid until 2015. In a letter sent after the application, the dean informed NOKUT that the manual of IRSAE, which is updated yearly and was included in appendix 7, functions as a prolongation of the partner agreements. As this is the only legally binding agreement for student exchange, INN must present a valid agreement before the committee can recommend accreditation. This may be a prolonged version of the IRSAE-agreement or another relevant agreement.

The network Nordnatur is mentioned in the application but concerns lower grade courses, and not at PhD level.

The opportunities to take courses abroad seem less developed for students specialising in Biotechnology compared to students in the other specialisations. The institution is advised to establish international arrangements that are more relevant for the biotechnology students.

## **Conclusion**

No, the programme does not have arrangements for international student exchanges.

The institution is required to

- ensure that the course portfolio of IRSAE makes the research school relevant for students without an ecological research project
- clarify if yearly participation in a research school is compulsory
- present at least one legally relevant binding agreement for student exchange

The institution is advised to

- establish relevant arrangements for taking courses abroad for the biotechnology students

### 3.3.9 Supervised professional training

§ 2-2 (9) Programmes that include supervised professional training must have formal agreements between the institution and the host for the supervised professional training.

#### Assessment

Not relevant.

## 3.4 Academic environment (§ 3-3 in Ministerial Regulations concerning quality assurance and quality development in higher education and tertiary vocational education and § 2-3 in the Quality Assurance Regulation in Higher Education)

### 3.4.1 Quality and scope of the education and research

§ 3-3 (1) The institution shall offer education and research in the doctoral programme's field of study of a quality and scope that ensure that the programme can be completed at a high academic level. The institution shall offer a wide range of first and second-level degree programmes within the doctoral degree programme's field of study.

#### Assessment

The number of professors and associate professors is considerably higher in the subject areas of applied ecology and biotechnology than in agriculture and forestry. Thus, the ability to supply a broad and high-quality scientific environment in agriculture and forestry is limited. See also section 3.4.9.

The institution offers four bachelor's programmes in agronomy, agricultural techniques, forestry, and nature management ("utmarksforvaltning"). Thus, there is a lack of a bachelor's programme in biotechnology. There are three master's programmes, embracing applied ecology, sustainable agriculture, and applied and commercial biotechnology. Thus, there is a lack of a master's programme in forestry. We note that during the last years, not all master's programmes have been offered. The number of graduated master's students per year for the period 2013 to 2017 has varied between 7 and 18 in applied ecology, and 5 and 23 in applied and commercial biotechnology. No master's students graduated in sustainable agriculture 2013–2015 while 6 students graduated in 2016 and 3 in 2017. The proportion of registered students that have finalised their master's exam is low and varied between 15 per cent and 30 per cent for the period 2013–2017. Still, a total of about 12 graduated master's

students per year in applied ecology as well as in biotechnology will guarantee a good basis for internal recruitment of PhD candidates for these specialisations. On the other hand, the recruitment basis from internal master's students is much less favourable for agriculture, and not existing for forestry.

## Conclusion

No, the requirements are not fulfilled.

The institution is required to:

- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture

The institution is advised to:

- develop a bachelor's programme in biotechnology
- develop a master's programme in forestry if the competence in this specialisation is sufficiently increased

### 3.4.2 The programme's field of study shall constitute a scientific whole

§ 3-3 (2) The doctoral degree programme's field of study shall constitute a scientific whole, and the individual parts that make up the programme shall be internally coherent.

## Assessment

According to the application, the PhD programme in life sciences is multidisciplinary and aims at developing competence for sustainable production, use and administration of biological resources, such as forests, livestock, cultivated plants, game, fish and bio-based products in or from agricultural areas, forests and outlying fields. Within the PhD programme, the students can choose between four specialisations: Applied Ecology, Forestry, Agriculture and Biotechnology. The interviews made it clear to the committee that although there were some efforts to make joint projects between applied ecology and biotechnology, the established strength of the biotechnology milieu in Hamar lies in the strong connections with local industries. We thus expect few joint biotechnology/ecology PhD projects for the first years of the proposed programme. Still, we consider the field of study to constitute a scientific whole, taking into account the close relationships between applied ecology, agriculture and forestry, and the growing importance of biotechnology in exploitation of agricultural and forest resources. We encourage the institution to develop a strategy for networking and collaboration between the different specialisations and campuses. If INN as a result of this evaluation decides to limit the planned PhD programme to ecology and biotechnology, the institution is required to provide a clear and detailed plan for joint courses and projects between these two specialisations.

## Conclusion

No, the requirements are not fulfilled.

The institution is required to:

- provide a plan for joint courses and projects between subject areas

The institution is advised to:

- develop a strategy for networking and collaboration between different specialisations and campuses

### 3.4.3 The academic environment's educational and research expertise

From the Ministerial Regulations:

§ 3-3 (3) The doctoral degree programme shall be affiliated to an academic environment with a high level of expertise in education and research. The academic environment shall be able to document research results, including publication, at a high international level, and results from collaborations with other national and international academic environments.

From the Quality Assurance Regulation:

§ 2-3 (5) The academic environment must be actively engaged in research and academic development work and/or artistic research, and be able to demonstrate documented results with a satisfactory quality and scope in relation to the programme's content and level.

#### Assessment

We note that the staff within the scientific disciplines of Applied Ecology and Biotechnology have good academic competence, while the number of staff specialising in Forestry is very limited (only one associate professor with forestry as a main direction). The situation is similar for Agriculture (one professor with 10 per cent activity in the programme, and three associate professors).

H-index, as an indicator of the quality of the scientific publication and citation, is on average of 18 for professors in Applied Ecology, 9 in Agriculture and 14 in Biotechnology (a professor in forestry is lacking). The low number of staff in agriculture and forestry as well as comparatively low scientific production and citation within these fields raise doubts as to the quality of a PhD programme in these specialisations.

All level 2 publications presented in the proposal include main or co-authors not associated with INN, pointing towards successful national and international collaborations. The authors associated with INN are in either Applied Ecology or Biotechnology.

Of the 15 professors and associate professors specialising in Applied Ecology, 6 have experience as main supervisor for completed PhD students, while another 5 are main supervisors for current PhD students. In Biotechnology, there are 14 professors and associate professors, of which 7 have been main supervisors for completed PhD students and another 2 are main supervisor for current PhD students.

The associate professor specialising in Forestry is main supervisor for one current PhD student, and has no supervisor experience with completed PhD students. The environment in forestry is considered too small and vulnerable to support a PhD programme.

Of the three associate professors in Agriculture, one has been co-supervisor for a graduated PhD student, and one is main supervisor for a current PhD student. The supervision experience at PhD level is thus very limited. The number of scientific publications from this group is also low. The environment in agriculture is considered too small and vulnerable to support a PhD programme.

According to information given to the committee during our visit to INN, PhD students should preferably have a professor as their main supervisor. This reduces the opportunity for associate professors to increase their competence in supervision and promotion to full professors as experience as main supervisor is a requirement for promotion.

## **Conclusion**

No, the requirements are not fulfilled.

The institution is required to:

- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture

The institution is advised to:

- increase the associate professors' experience with supervision of PhD students by promoting their chances of being (main) supervisors

### **3.4.4 The academic environment's depth and breadth**

§ 3-3 (4) The academic environment shall have depth and breadth in all important parts of the doctoral degree programme, so that the doctoral candidates can participate actively in different academic relations and be introduced to different perspectives.

## **Assessment**

The Applied Ecology and Biotechnology specialisations of the PhD programme show a sufficient depth and breadth for a PhD programme as shown by the size and diversity of the staff within the two specialisations, and the level of publications, collaborations, and active research projects. The agricultural side is weak with only four staff members (one professor and three associate professors), only one of which has any prior experiences as main supervisor. The Forestry specialisation is also very weak. The supplementary information that we were sent only shows five staff members that deal with forestry issues, and only one associate professor has forestry as her main focus. Of the remaining, two are specialised in moose browsing and one works with population dynamics of mammals according to the publication lists. While browsing and mammal dynamics are clearly relevant for forestry, the breadth of research on forestry issues is very small. The associate professor specialised in forestry has no experience as main supervisor. Both agriculture and forestry are thus too small to be considered specialisations within the PhD programme.

## Conclusion

No, the requirements are not fulfilled.

The institution is required to

- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture

### 3.4.5 Sufficient and stable academic environment

From the Ministerial Regulations:

§ 3-3 (5) The doctoral degree programme shall be affiliated to a stable academic environment consisting of a sufficient number of staff with professor and associated professor qualifications within the breadth of the field of study. An overall assessment shall be carried out of whether the academic environment has a sufficient number of employees to cover subjects and courses and the supervision provided in the field of study. The academic environment shall consist of employees with the relevant expertise. The institution's assessments shall be documented so that NOKUT can use them in its work.

From the Quality Assurance Regulation:

§ 2-3 (1) The academic environment for each programme must be of a size proportionate to the number of students and the programme's characteristics, be stable over time in terms of competence and have a composition that covers the programme's topics and subjects.

## Assessment

Currently, the number of professors with their main subject area of applied ecology is 4 (average activity in programme 60 per cent) and associate professors 11 (50 per cent), in agriculture 1 professor (10 per cent), and 3 associate professors (48 per cent), in forestry 1 associate professor (45 per cent), and in biotechnology 5 professors (48 per cent) and 9 associate professors (32 per cent). The balance in number of academic staff is thus very uneven between the different subject areas. The expertise in Applied Ecology is broad including competence in subjects like ecosystem services, population ecology, ungulate/predator ecology, plant-herbivore interactions, and sufficient for PhD teaching as well as supervision. The biotechnology competence covers important subjects like functional genomics, reproductive biology, bioinformatics, bioprocesses and enzyme technology, and is also satisfactory. The agricultural research group reports ongoing projects on seedbed preparation, genotype diversity, and cattle welfare, and has a limited and narrow direction. No specific research group in forestry is listed, and forest research is instead integrated in other groups like ecosystems services and ungulate/predator ecology. In summary, the committee considers the competence and number of staff in Applied Ecology and Biotechnology as satisfactory but not for Agriculture and Forestry.

Information on possible fluctuations in staff over years has not been given in the application but we have not detected any signs of large temporal variations.

No regular accounting of scientific staff, their subject areas, activity degrees, scientific achievements (research grants, scientific publications, citations) or teaching activities seem to be made at the institution at present. Still, such data seem relatively easy to compile, as was done for this assessment. Nevertheless, more fixed procedures would more easily facilitate possible NOKUT follow-ups.

## Conclusion

No, the requirements are not fulfilled.

The institution is required to:

- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture

The institution is advised to:

- introduce procedures to record staff employments, subject areas, activity degrees, scientific achievements (research grants, scientific publications, citations etc.) and teaching activities, in a format that can be used for NOKUT follow-ups

### 3.4.6 Capacity and recruitment potential

§ 3-3 (6) The institution shall document that it has the capacity and recruitment potential to admit at least 15 research fellows to the doctoral degree programme during the first five years after its inception. In addition, the institution shall substantiate that it has the capacity to maintain a doctoral degree environment comprising at least 15 research fellows over time. Persons appointed under the Industrial PhD and Public Sector PhD schemes can count towards the number of research fellows pursuant to this paragraph and Section 3-8 (5). At least eight of the research fellows must have their main place of work at the institution. The institution may also accept doctoral candidates with other financing.

## Assessment

### Capacity:

The existing PhD programme in applied ecology has had more than 15 students since 2013, through externally financed projects and 6 recruiting positions at INN (formerly Høgskolen i Hedmark). The suggested PhD programme will have access to twice the number of recruiting positions, a larger number of externally financed projects, and will include a larger academic environment. For the biotechnology branch of the programme, several PhD students are now enrolled at other, collaboration institutions. Thus, it seems well documented that the capacity of the institution is sufficient to admit at least 15 research fellows to the programme during the first five years, and to maintain a doctoral degree comprising the same number of research fellows over time.

### Recruitment potential:

As for internal recruitment from the master programmes of INN, the application specifies that about 25 students yearly take a master's degree from these. About 4–5 of these will start a PhD study



somewhere in the world and might have been interested in continuing their studies in an expanded PhD programme at INN. More relevantly, the application specifies that there regularly are 30–50 applicants for advertised PhD positions in the current programme of applied ecology, most of them qualified. There is good reason to expect the suggested, widened PhD programme to attract the attention of a somewhat wider group of potential applicants, for instance biotechnology students that presently do their research at INN, but are enrolled in other universities.

According to the application, the students in the programme can choose between four specialisations: Applied Ecology, Agriculture, Forestry and Biotechnology. The partitioning of the (at least) 15 PhD students between the four specialisations is not specified. In the application, INN states that they will provide internal funding for 12 PhD students. However, there is uncertainty regarding how the internal funding will be allocated between the specialisations, and the institution should ensure that allocation is transparent. While there are good reasons to expect the Applied Ecology branch to attract a sufficient number of students, based on the number of applicants to the present PhD programme, it is uncertain how many students will enrol in the three remaining specialisations. The lack of a bachelor's programme for the Biotechnology specialisation and a master's programme for the Forestry specialisation adds to the uncertainty. There is an obvious danger that several of the proposed specialisation branches will encompass a relatively small number of PhD students, making it difficult for the students to organise common activities locally, such as journal clubs, project presentations and seminars. Since 10 of the 30 ECTS will be common for all students, the students enrolled in the proposed PhD programme certainly will be acquainted with other programme students located elsewhere, but it would be wise to take measures to further encourage contacts between PhD students at the different locations. INN could, for instance, arrange some kind of transport between the locations, making it possible for the students to participate in common activities, e.g. common seminars, a common journal club with weekly presentations.

For recruitment to the Biotechnology specialisation, a bachelor's programme in biotechnology would seem crucial. The application indicates that INN is working on establishing a biomedical laboratory scientist ("bioingeniør") / biotechnology bachelor's line. During the interviews, the committee was informed that a previous attempt to establish a biotechnology bachelor's programme had stranded, due to a lack of interested students. Hopefully a two-pronged approach with a "bioingeniør" branch and a biotechnology branch, with some common courses, would make a biotechnology bachelor in Hamar more viable. In addition to providing a recruitment arena for the master's and PhD studies in biotechnology, a bachelor's programme when up and running would likely improve the financial situation of Department of Biotechnology in Hamar.

If the specialisation in Forestry is kept as part of the programme, a master's programme in Forestry would be equally crucial, allowing internal recruitment of PhD candidates.

## **Conclusion**

Yes, the requirements are fulfilled.

The institution is advised to:

- take measures to encourage common activities for the PhD students at the different locations, such as organised transport between the locations
- prioritise the efforts to establish a bachelor's programme in biotechnology in Hamar
- if the specialisation in forestry is kept as part of the PhD programme, establish a master's programme in forestry
- make the allocation of the internal PhD financing transparent between and within departments

### 3.4.7 The academic environment's educational competence

§ 2-3 (2) The academic environment must have relevant educational competence.

#### Assessment

INN instructs all newly hired academic staff to take a 15 ECTS course in pedagogical training for University teaching staff. They also encourage existing employees to participate in such a course. Of the 33 relevant CVs in the appendix, 11 have no documented pedagogical training.

INN seems to have good digital competence and a proper plan for further development of such.

The experience with supervision on PhD level is somewhat limited among professors as well as associate professors. Of the 34 people listed, 14 have been main supervisor for a candidate that has completed their PhD and another 9 are main supervisors for current PhD students, 4 have been co-supervisor for finished students and 7 have no supervisor experience.

#### Conclusion

Yes, the academic environment associated with the programme has relevant educational competence.

The institution is advised to:

- increase the scientific staff's experience with supervision of PhD students

### 3.4.8 Academic management

§ 2-3 (3) The programme must have a clear academic leadership with defined responsibilities for quality assurance and the development of the study programme.

#### Assessment

The academic leadership seems sufficient, and the responsibilities are clearly described on page 38 in the application and in Appendix 5. There will be a PhD committee in place, led by the dean and with teacher and student representatives. According to the interviews, the committee will be responsible for overall quality insurance, including recruitment, yearly and mid-term evaluations, conflict management, and quality checks of the theses.

## Conclusion

Yes, the programme has an academic management with a defined responsibility for quality assurance and -development of the programme.

### 3.4.9 Staff with primary employment

§ 2-3 (4) At least 50 per cent of the academic full-time equivalents affiliated to the programme must be staff with their primary employment at the institution. Of these, academic staff with at least associate professor qualifications must be represented among those who teach the core elements of the programme. In addition, the following requirements apply to the academic environment's level of competence:

- a) For first-cycle programmes, at least 20 per cent of the members of the academic environment must have at least associate professor qualifications.
- b) For second-cycle programmes, at least 50 per cent of the members of the academic environment must have at least associate professor qualifications. Within this 50 per cent, at least 10 per cent must have professor or docent qualifications.
- c) For third-cycle programmes, the academic environment must consist of academic staff with at least associate professor qualifications. At least 50 per cent must have professor or docent qualifications.

## Assessment

All 10 professors and 24 associate professors have permanent positions embracing 100 per cent, except for three associate professors at Hamar (biotechnology) with positions embracing 10–20 per cent. Thus, the criterion that at least 50 per cent of the academic full-time equivalents (FTE) affiliated to the programme must be staff with their primary employment at the institution is fulfilled.

The FTE quota for the professors is 33 per cent, and for the associate professors 67 per cent (500 FTE for professors, 1025 FTE for associate professors; "Supplement om fagansatte HINN"). There are no academic staff with docent qualifications. Two full professor positions are currently announced at Evenstad campus. When these two positions are established, the professor quota based on FTE will be 37 per cent (assuming 50 per cent FTE for the two new professors), and for the associate professors 63 per cent. In other words, the change will be minor. Many associate professors are acting as supervisors, which contributes to the academic quality. According to the application, about 15 of the associate professors are expected to apply for promotion as full professor in the year of 2020, at the latest. Nevertheless, as we were informed during the interviews, one criterion for professor promotion is supervision of PhD students (usually at least two). Becoming a full professor can take time.

We conclude that the criterion of at least 50 per cent of academic staff having professor or docent qualifications is not fulfilled.

## Conclusion

No, the criteria and the demands specific to the cycle of the educational programme are not fulfilled.

The institution is required to:

- increase the professor quota to at least 50 per cent

The institution is advised to

- encourage and support associate professors to apply for promotion to full professor

### **3.4.10 The academic environment's external participation**

§ 2-3 (6) The academic environment for programmes that lead to a degree must actively participate in national and international partnerships and networks that are relevant for the programme.

#### **Assessment**

Appendix 12 of the application indicates that the academic environment is involved in a large number of national and international partnerships, networks and collaborations. Based on this list and the publication list in appendix 11, it appears that many of these collaborations result in joint publications in peer-reviewed journals, showing the active participation of the academic environment and the relevance of the partnerships and networks for the programme.

#### **Conclusion**

Yes, the academic environment does actively participate in national and international collaborations and networks relevant for the programme.

### **3.4.11 Supervision of professional training**

§ 2-3 (7) For programmes involving mandatory supervised professional training, the members of the academic environment must have relevant and updated knowledge from the field of the professional training. The institution must ensure that professional training supervisors have relevant competence and experience in the field of the professional training.

#### **Assessment**

Not relevant.

## **4 Conclusion**

Based on the written application with attached documentation and supplementary information the expert committee concludes the following:

**The committee does not recommend accreditation of the PhD in Life Sciences at Inland Norway University of Applied Sciences (INN).**

The expert assessment states which demands the institution is required to meet in order to achieve accreditation. In addition, the committee has provided advice for the further development of this study programme.

The following requirements are not satisfied:

- § 2-1 (1) The requirements of the Act relating to Universities and University Colleges and its corresponding regulations must be met.
- § 2-1 (2) Information provided about the programme must be correct and show the programme's content, structure and progression, as well as opportunities for student exchanges.
- § 2-2 (1) The learning outcomes for the programme must be in accordance with the National Qualifications Framework for Lifelong Learning, and the programme must have an appropriate title.
- § 2-2 (2) The programme must be academically up-to-date and have clear academic relevance for further studies and/or employment.
- § 2-2 (4) The programme's content, structure and infrastructure must be adapted to the programme's learning outcomes.
- § 2-2 (8) Programmes that lead to a degree must have arrangements for international student exchanges. The content of the exchange programme must be academically relevant.
- § 2-3 (1) The academic environment for each programme must be of a size proportionate to the number of students and the programme's characteristics, be stable over time in terms of competence and have a composition that covers the programme's topics and subjects.
- § 2-3 (4) At least 50 per cent of the academic full-time equivalents affiliated to the programme must be staff with their primary employment at the institution. Of these, academic staff with at least associate professor qualifications must be represented among those who teach the core elements of the programme. In addition, the following requirements apply to the academic environment's level of competence:
  - c) For third-cycle programmes, the academic environment must consist of academic staff with at least associate professor qualifications. At least 50 per cent must have professor or docent qualifications.
- § 2-3 (5) The academic environment must be actively engaged in research and academic development work and/or artistic research, and be able to demonstrate documented results with a satisfactory quality and scope in relation to the programme's content and level.
- § 3-3 (1) The institution shall offer education and research in the doctoral programme's field of study of a quality and scope that ensure that the programme can be completed at a high academic level. The institution shall offer a wide range of first and second-level degree programmes within the doctoral degree programme's field of study.
- § 3-3 (2) The doctoral degree programme's field of study shall constitute a scientific whole, and the individual parts that make up the programme shall be internally coherent.
- § 3-3 (3) The doctoral degree programme shall be affiliated to an academic environment with a high level of expertise in education and research. The academic environment shall be able to document research results, including publication, at a high international level, and results from collaborations with other national and international academic environments.

- § 3-3 (4) The academic environment shall have depth and breadth in all important parts of the doctoral degree programme, so that the doctoral candidates can participate actively in different academic relations and be introduced to different perspectives.
- § 3-3 (5) The doctoral degree programme shall be affiliated to a stable academic environment consisting of a sufficient number of staff with professor and associated professor qualifications within the breadth of the field of study. An overall assessment shall be carried out of whether the academic environment has a sufficient number of employees to cover subjects and courses and the supervision provided in the field of study. The academic environment shall consist of employees with the relevant expertise. The institution's assessments shall be documented so that NOKUT can use them in its work.

**The following requirements must be satisfied in order to achieve accreditation:**

- make the information given to students and supervisors consistent with the "Forskrift", with regard to the progress reporting (annual vs. semi-annual, oral in addition to written, 3rd/4th semester evaluation)
- correct the page number information in the diploma
- give correct and consistent information about the ECTS of the course "Man and the environment"
- clarify whether the following courses are to be offered with 5 or 7.5 ECTS
  - Adaptive ecological monitoring
  - Applied models for fish and wildlife management
- give a definition of what is meant by health, and describe the aspects of health included in the PhD programme
- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture, see also:
  - requirements regarding course clarification in 3.3.4 and 3.3.8
  - requirements for necessary upgrade of the academic breadth in agriculture and forestry in 3.4.1 and 3.4.5
- clarify how the content, structure and infrastructure in biotechnology will fulfil the aim of providing a PhD training directed towards solving problems of human health
- describe how students in especially Forestry, Agriculture and Biotechnology will gain necessary scientific insight and depth in their respective subject areas
- provide more information about laboratory facilities and capacity at Evenstad and Blæstad, and describe how the student's needs are covered if the capacity and equipment at these campuses are insufficient
- clarify whether the following courses will continue to be offered or replaced:
  - Seminars in applied ecology
  - Spatiotemporal scaling in ecosystem management
  - Large herbivores and ecosystem interactions – top-down or bottom-up
  - Environmental and human dimension of nature tourism, outdoor recreation and related ecosystem services
- ensure that the course portfolio of IRSAE makes the research school relevant for students without an ecological research project

- clarify if yearly participation in a research school is compulsory
- present at least one legally relevant binding agreement for student exchange
- change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture
- provide a plan for joint courses and projects between subject areas
- increase the professor quota to at least 50 per cent

**The committee offers the following advice to develop the study programme further:**

- in relevant cases, include recommended or prescribed background knowledge for courses
- rephrase the learning outcomes, or add phrases, to highlight the importance of the independence of the candidate's knowledge and skills
- change the English name of the programme to PhD in Environment and Biosciences, or something similar, to better reflect both the content and the Norwegian name
- if the name of the programme is changed, the formulations in the learning outcomes should be changed accordingly
- develop a strategy for interaction between end-users and students
- offer mandatory and optional courses on a more frequent basis
- reconsider the following learning outcome of "PhD introduction seminars": The candidate can contribute to professional debates in their field in international fora
- clarify if students already having the competence from previous education are offered the opportunity to exchange mandatory courses, except for the PhD introduction seminar
- employ a matrix of how and when the different learning outcomes are examined
- reflect on how the student's learning process is affected when the students are scattered at different locations and within different disciplines
- invite international guest lecturers to give lectures and seminars relevant for the biotechnology students
- establish relevant arrangements for taking courses abroad for the biotechnology students
- develop a bachelor's programme in biotechnology
- develop a master's programme in forestry if the competence in this specialisation is sufficiently increased
- develop a strategy for networking and collaboration between different specialisations and campuses
- increase the associate professors' experience with supervision of PhD students by promoting their chances of being (main) supervisors
- introduce procedures to record staff employments, subject areas, activity degrees, scientific achievements (research grants, scientific publications, citations etc.) and teaching activities, in a format that can be used for NOKUT follow-ups
- take measures to encourage common activities for the PhD students at the different locations, such as organised transport between the locations
- prioritise the efforts to establish a bachelor's programme in biotechnology in Hamar
- if the specialisation in forestry is kept as part of the PhD programme, establish a master's programme in forestry

- make the allocation of the internal PhD financing transparent between and within departments
- increase the scientific staff's experience with supervision of PhD students
- encourage and support associate professors to apply for promotion to full professor



## 5 Commentary from the institution

### Tilsvar på NOKUTs utkast til rapport 17/09100

We refer to NOKUT's report and the expert committee's assessment of the PhD in Life Sciences.

We are grateful for the thorough evaluation and valuable recommendations made by the expert committee, and appreciate the conclusion to ask for a revision of the application. We hereby resubmit a revised application for a PhD programme in Applied Ecology and Biotechnology in accordance with the recommendations (See the attached Søknad and 15 appendices). We have addressed all the required changes and recommendations made by the expert committee, and our detailed responses to the individual requirements and recommendations are listed point-by-point in appendix 15. Below we describe what we see as the most important revisions:

We agree with the committee that a change of the PhD programme to a focus towards applied ecology and biotechnology makes the programme stronger. By removing the specialisations of forestry and agriculture from the programme, and changing the programme name to PhD in Applied Ecology and Biotechnology, the revised application meets the most important requirements in the committee's report (paragraphs 3.3.2., 3.3.4, 3.4.1, 3.4.3, 3.4.4, and 3.4.5). We also agree that the subject of human health issues is not an important part of the PhD programme, and all aspects of human health in the PhD programme have now been removed and hence the committee's requirement and recommendations in paragraph 3.3.1 are met. The change of focus and name has resulted in changes in the description of the field of study in the revised application, an updated curriculum (appendix 6) and revised descriptions of learning outcomes (appendix 6 and 8). The revision of learning outcomes also follows the recommendation (3.3.1) to highlight the importance of the independence of the candidate's knowledge and skills. The revised application and curricula (appendix 6) describe how students in Biotechnology will gain necessary scientific insight and depth in their subject area as required in the report paragraph 3.3.4. In the updated documents (appendix 3, 4, 6 and 8) the information about the courses offered is correct and consistent, with reference to the requirement in paragraph 3.2.2 in the report. As recommended in 3.3.4 the frequency of courses is changed to be yearly for mandatory courses and every second year, or on demand, for the elective courses. Appendix 15 clarifies whether and how the courses mentioned in paragraph 3.3.4 in the report will continue to be offered or replaced.

We now describe the field of study as follows: The PhD in Applied Ecology and Biotechnology is an interdisciplinary programme that will foster competence in sustainable management, production and utilization of biological resources. By "biological resources", we mean forests, wildlife, fish, cultivated plants, livestock animals, microorganisms and other biobased products in, or originating from, agriculture, forestry, aquatic systems and wildlife areas. In the training programme, we will focus on the harvest and on monitoring of

biological resources in the specialisation of Applied Ecology. The structure and function of biological macromolecules are focal points in the specialisation of Biotechnology.

In paragraph 3.4.2 the expert committee requires that the institution provides a clear and detailed plan for joint courses and projects between these two specialisations. The institution is also advised to develop a strategy for networking and collaboration between different specialisations and campuses. In the application and the appendices this requirement is met by continuing the work to increase joint courses, seminars and shared research groups. An important aspect of extending the PhD programme is the potential synergy in courses and research projects that have not been fully realized despite ongoing joint projects. Certain aspects of ecological research are dependent on an understanding of molecular biology and biochemical processes. The veterinarian research group at Evenstad campus is an example of this, and an important step is to promote research groups that include competence on the microcosm and ecosystem. We have plans to formalize this and promote research groups that include both specializations and shared PhD candidates. We believe that the experience of interacting in an interdisciplinary environment will be important for the PhD candidates.

The two mandatory courses are joint for both specializations, and form a common understanding of scientific values and theory in biological research. This way the PhD candidates will be able to share and discuss the ethical dilemmas of doing research on living organisms. The elective course Man and the environment is developed specifically to cover the interest of both specializations and further strengthen the interdisciplinary framework that keeps the entire PhD candidate group together.

The committee expresses worries that the PhD candidates of the proposed programme will not profit from a student environment, given the proposed four specialisation branches. Now the specialisation branches are reduced to two, and the number of students at each branch will increase. The institution will nonetheless follow up the committee's advice in paragraph 3.4.6 and take measures to encourage common activities for the PhD students at the different locations, including organised transport between the locations. Physical meetings will be facilitated by providing transport free of charge between the campuses. There are weekly seminars in Evenstad arranged by PhD candidates, and similar seminars in biotechnology at Hamar at less regular interval. We also plan to have a PhD day at the faculty each year where PhD candidates will present their recent progress and engage in scientific discussions. We also believe that the rapidly developing digital methods and high-speed Wi-Fi will make it possible to have high quality virtual meetings.

In paragraph 3.3.2 the institution is advised to develop a strategy for interaction between end-users and students. We will coach PhD candidates to improve their end-user network at meetings, either in seminars and conferences or in discussions in the research groups to which end-users are invited. There are often project meetings with end-users where PhD candidates participate. Many of the PhD candidates in biotechnology will be connected to end-users in the agroindustry through their research project. End users are vital to our communication element of our profile, and we see the need to constantly improve the interaction between end-users and PhD candidates. We will develop a more concrete strategy for interaction between end-users and students after evaluating the present efforts.

The requirement in the report paragraph 3.3.4 becomes partly obsolete as Blæstad is no longer a campus in the PhD programme. Until now the limitations in laboratory facilities and facilities to store scientific material at Evenstad have caused minor problems, but in a longer term we might need to improve laboratory facilities. Presently, we can utilise the excellent laboratory facilities at Biotechnology at Hamar when needed. This will also further increase the interaction among the Faculty at the two departments.

Regarding paragraph 3.3.8 in the expert committee's report, the course portfolio of IRSAE is related to transferable skills and ecological problems, including molecular techniques frequently used in ecological research, which are of relevance also for the students in Biotechnology. Most of the partner institutions also offer specialised PhD courses in biotechnology, and these will be announced at IRSAE. Furthermore, IRSAE will begin to actively scan and increase the awareness of available biotechnology PhD courses elsewhere. IRSAE will be evaluated for the next two years and the need to increase the focus on biotechnology will be part of the evaluation. In appendix 7 we present a prolonged version of the IRSAE agreement for several of our partners. These are legally binding agreements for student exchange.

Inland Norway University of Applied Sciences (INN University) has assigned 10 professors and 10 associate professors to the PhD in Applied Ecology and Biotechnology (i.e. 50% professors) and hence meets the expert committee's requirement (paragraph 3.4.9).

INN University is now well into the second year of its merger of two smaller institutions, and has updated formal regulations that provide the application a stronger support. (Appendices 1, 1.2, 3, 4, 5). Thus, the inconsistencies addressed in the committee's report paragraph 3.2.1 are now resolved. The inconsistent information on the webpages has been corrected in conjunction with an update of the PhD webpages and forms on June 22 this year. Today, all the information given to students and supervisors is consistent with INN University's PhD Regulations [Forskrift for graden philosophiae doctor (ph.d.)]. See especially the updated "[Step-by-step-guide](#)" and progress report forms in the [PhD Handbook on INN University's website](#). Also, a new example of the diploma with correct page number information is enclosed (see appendix 3).

We are certain that the major revisions described above, in addition to the detailed responses presented in appendix 15, will provide a strengthened PhD programme where students will develop the necessary skills to meet future challenges.

Sincerely Yours,  
Høgskolen i Innlandet

Attachments:

- SØKNAD om akkreditering
- Vedlegg 1; Forskrift for graden philosophiae doctor (ph.d)
- Vedlegg 2; Reglement phd
- Vedlegg 3; Vitnemål
- Vedlegg 4; DS
- Vedlegg 5; Kvalitetssystembeskrivelse
- Vedlegg 6; Curriculum
- Vedlegg 7; Avtaler
- Vedlegg 8; Learning outcome
- Vedlegg 9; Teaching and evaluation
- Vedlegg 10; CV
- Vedlegg 11; Publikasjonslister
- Vedlegg 12; Nettverk
- Vedlegg 13; Nivå på publikasjoner
- Vedlegg 14; Supplement om fagansatte
- Vedlegg 15; Responses to requirements and advises

## 6 Additional assessment

### 6.1 Additional assessment

#### The doctoral degree programme's field of study

In their reply, INN has reduced the number of specialisations and changed the name of the programme to PhD in Applied Ecology and Biotechnology. Consequently, the doctoral degree programme's field of study has been adjusted. The new definition reads: *“The PhD in Applied Ecology and Biotechnology is an interdisciplinary programme that will foster competence in sustainable management, production and utilization of biological resources. With biological resources we mean forests, wildlife, fish, cultivated plants, livestock animals, microorganisms and other biobased products in, or originating from, agriculture, forestry, aquatic systems and wildlife areas. In the training programme we will focus on the harvest and on monitoring of biological resources in the specialisation of Applied Ecology. The structure and function of biological macromolecules are focal points in the specialisation of Biotechnology”*. The evaluation committee finds this definition well formulated and relevant. It stresses the multidisciplinary character, the applied context within natural resource management, and clarifies the specific directions of Applied Ecology and Biotechnology, respectively. The competence of the staff in Applied Ecology as well as Biotechnology is large enough and has a high standard enough to guarantee a successful PhD programme. The suggested course programme and the associated teaching capacity match the new direction well.

#### From the Ministerial Regulations:

**§ 3-1 (4) It is a condition for accreditation being granted that the requirements of the Universities and University Colleges Act are met. Regulations adopted under the authority of Section 3-2 of the Universities and University Colleges Act shall form the basis for the accreditation.**

#### From the Quality Assurance Regulation:

**§ 2-1 (1) The requirements of the Act relating to Universities and University Colleges and its corresponding regulations must be met.**

- *make the information given to students and supervisors consistent with the "Forskrift", with regard to the progress reporting (annual vs. semi-annual, oral in addition to written, 3rd/4th semester evaluation)*
- *correct the page number information in the diploma*

#### **Assessment**

The information available on the web for students and supervisors (the step-by-step guide and the PhD handbook) has been updated and is now consistent with the Regulations. The missing page in the diploma supplement turned out to be due to a mishap during submission of the application. The page number information is correct in the intact document.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 2-1 (2) Information provided about the programme must be correct and show the programme's content, structure and progression, as well as opportunities for student exchanges.**

- *give correct and consistent information about the ECTS of the course "Man and the environment"*
- *clarify whether the following courses are to be offered with 5 or 7.5 ECTS*
  - *Adaptive ecological monitoring*
  - *Applied models for fish and wildlife management*

## Assessment

In their reply, HINN clarified that all three courses are offered with 5 ECTS. The credits for the course "Man and the environment" has been reduced from 7.5 ECTS to 5 ECTS and is now an optional course for both specialisations.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 2-2 (1) The learning outcomes for the programme must be in accordance with the National Qualifications Framework for Lifelong Learning, and the programme must have an appropriate title.**

- *give a definition of what is meant by health, and describe the aspects of health included in the PhD programme*

## Assessment

Learning outcome of PhD programme in Applied Ecology and Biotechnology:

### *Knowledge*

The candidate

- is in the forefront of applied ecology or biotechnology knowledge important to solve local and global problems concerning the environment, food production and/or sustainability
- shows intellectual independence in evaluating the appropriateness and applicability of different methods and processes in research projects
- can contribute to the development of new knowledge, theories, methods and interpretations concerning the environment, food production and/or sustainability

### *Skills*

The candidate

- can formulate research questions, plan and carry out research and development work within applied ecology or biotechnology conforming to high international standards

- can independently handle complex academic issues and challenge established knowledge and practices in applied ecology or biotechnology which are important to solve local and global problems concerning the environment, food production and/or sustainability
- is capable of utilizing, or of obtaining the necessary skills to utilize, the most advanced and specialized methods and techniques in applied ecology or biotechnology

*General competence*

The candidate

- can identify new relevant ethical issues and carry out research with scholarly integrity
- can manage complex multi- or interdisciplinary scientific assignments related to the environment, food production and/or sustainability
- can assess the need for, and initiate, innovation
- has substantial scientific independence and authority to advise public management in problems concerning the environment, food production and/or sustainability
- can communicate research through recognized international peer-reviewed scientific journals
- can participate in relevant professional debates in international fora
- can communicate scientific actions to different target audiences, such as scientists within the candidate's field, scientists in other fields, users of the scientific results, and the general public

The name and the overall learning outcome of the PhD programme has changed as a consequence of the reduced number of specialisations. The new name of the programme is PhD in Applied Ecology and Biotechnology. The institution has removed all aspects of human health from the programme and modified some of the learning outcomes in accordance to the more specialized focus on applied ecology and biotechnology. We find the new name of the programme appropriate.

The revised learning outcomes are well adapted to the reduced number of specialisations and are in accordance with international practice. The evaluation matrix in Appendix 8 gives a good overview of when these learning outcomes are evaluated.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 2-2 (2) The programme must be academically up-to-date and have clear academic relevance for further studies and/or employment.**

- *change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture, see also:*
  - *requirements regarding course clarification in 3.3.4 and 3.3.8*
  - *requirements for necessary upgrade of the academic breadth in agriculture and forestry in 3.4.1 and 3.4.5*

## Assessment

The focus of the PhD programme has been changed towards applied ecology and biotechnology, and the specialisations in forestry and agriculture have been removed. A revision has been made of the description of the field of study that matches the new direction.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 2-2 (4) The programme's content, structure and infrastructure must be adapted to the programme's learning outcomes.**

- *clarify how the content, structure and infrastructure in Biotechnology will fulfil the aim of providing a PhD training directed towards solving problems of human health*
- *describe how students in especially Forestry, Agriculture and Biotechnology will gain necessary scientific insight and depth in their respective subject areas*
- *provide more information about laboratory facilities and capacity at Evenstad and Blæstad, and describe how the student's needs are covered if the capacity and equipment at these campuses are insufficient*
- *clarify whether the following courses will continue to be offered or replaced:*
  - *Seminars in applied ecology*
  - *Spatiotemporal scaling in ecosystem management*
  - *Large herbivores and ecosystem interactions – top-down or bottom-up*
  - *Environmental and human dimension of nature tourism, outdoor recreation and related ecosystem services*

## Assessment

The aspects related to the human health perspective has been removed from the PhD programme, thus the question is no longer relevant.

Narrowing the scope of the PhD programme to Applied Ecology and Biotechnology has made questions regarding students in Forestry and Agriculture as well as laboratory facilities at Blæstad no longer relevant. The reply from INN states that the somewhat limited laboratory and sample-storage facilities at Evenstad so far only have caused minor problems, and that the facilities in Hamar may be used by students in Applied Ecology as well. The laboratory facilities and capacity of the faculty are thus considered to be sufficient.

Continuation of courses was clarified in the reply:

- *Seminars in applied ecology will be replaced by PhD introduction seminars.*
- *Spatiotemporal scaling in ecosystem management may be offered as an IRSAE course, but will not be offered on a permanent basis.*
- *Large herbivores and ecosystem interactions – top-down or bottom-up will not be offered as the interest has been low, but might appear in a new version.*

- Environmental and human dimension of nature tourism, outdoor recreation and related ecosystem services will not be offered anymore, as the interest has been low.

Although three of these courses will be discontinued, the committee finds that the total number of courses provided at the institution will provide the students with a sufficient number of courses. In addition, the PhD students will be given the opportunity to take courses at other institutions through the IRSEA (see also next paragraph).

The programme's content, structure and infrastructure seem to be well adapted to the programme's learning outcome.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 2-2 (8) Programmes that lead to a degree must have arrangements for international student exchanges. The content of the exchange programme must be academically relevant.**

- *ensure that the course portfolio of IRSAE makes the research school relevant for students without an ecological research project*
- *clarify if yearly participation in a research school is compulsory*
- *present at least one legally relevant binding agreement for student exchange*

## Assessment

In their reply, INN states that IRSAE will have courses in molecular techniques that are relevant for students in Biotechnology. There are thus arrangements for international student exchange that are academically relevant for the students in biotechnology. INN also state that other PhD courses in biotechnology at partner institutions will be announced through IRSAE. This can make students in Biotechnology aware of scientifically relevant courses they can attend, and is as such a useful service.

Yearly participation in the IRSAE research school is not compulsory. This seems reasonable, as PhD students should not have to spend time on courses if they are not relevant.

Legally binding agreements are presented from eight IRSAE partner institutions, of which five are international. Thus, there is a legally binding agreement for student exchange.

## Conclusion

Yes, the institution's response is satisfactory.

### **§ 3-3 (1) The institution shall offer education and research in the doctoral programme's field of study of a quality and scope that ensure that the programme can be completed at a high academic level. The institution shall offer a wide range of first and second-level degree programmes within the doctoral degree programme's field of study.**



- *change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture*

## **Assessment**

The focus of the PhD programme has been changed towards Applied Ecology and Biotechnology, and the specialisations in Forestry and Agriculture have been removed. There is one master's programme in Applied Ecology, and one in Applied and Commercial Biotechnology. A total of about 12 master's students have graduated per year in applied ecology as well as in biotechnology the last years. This demonstrates that the basis for internal recruitment of PhD candidates will be good. As stated in the initial report, we stress the importance to develop a Bachelor programme in Biotechnology. This is even more urgent and motivated given the new and narrower PhD programme direction, with an even larger focus on Biotechnology.

## **Conclusion**

Yes, the institution's response is satisfactory.

The institution is advised to:

- develop a bachelor's programme in biotechnology

**§ 3-3 (2) The doctoral degree programme's field of study shall constitute a scientific whole, and the individual parts that make up the programme shall be internally coherent.**

- *provide a plan for joint courses and projects between subject areas*

## **Assessment**

Generally, the reduction of the scope of the PhD programme to Applied Ecology and Biotechnology will lead to a more coherent programme. The institution foresees the potential for synergy by including biotechnology with the already established PhD programme in Applied Ecology, both with regard to courses and research projects. Regarding the evaluation committee's demand for a plan for joint courses, the institution points to the two mandatory courses ("PhD introduction seminars" and "Bioinformatics and biostatistics", totalling 10 ECTS). INN also points out that the content of the two mandatory courses in the Ecology specialisation ("Applied models for fish and wildlife management" and "Adaptive ecological monitoring") have a content that is relevant for the Biotechnology specialisation, and might be chosen as an optional course by some of the biotechnology students. Conversely, the obligatory biotechnology course "Structure and function of biological macromolecules" could be chosen as an optional course by ecology students that use molecular methods in their projects.

Regarding common projects, the institution points out that two of the research groups at the faculty already encompass members from both biotechnology and applied ecology. The faculty will further encourage such collaborative efforts by allocating PhD positions, starting with two positions, to joint research projects in Applied Ecology and Biotechnology with supervisors from both campuses. The institution further points to two recently started PhD projects in Applied Ecology, for which a cooperation with the biotechnology environment would be natural. Finally, the institution mentions two biotechnology projects that might benefit from ecological input, and a project in development that also would need input from both disciplines.

The evaluation committee considers the response of the institution to be adequate. We expect that the two PhD positions allocated to joint projects will contribute to a continuous dialogue between the two disciplines. We anticipate that the increased number of joint projects over time will lead to a wider selection of joint courses as well.

## **Conclusion**

Yes, the institution's response is satisfactory.

The institution is advised

- to keep a continuous focus on the collaboration between the two specialisations and encourage the establishment of further joint courses and projects

### **From the Ministerial Regulations:**

**§ 3-3 (3) The doctoral degree programme shall be affiliated to an academic environment with a high level of expertise in education and research. The academic environment shall be able to document research results, including publication, at a high international level, and results from collaborations with other national and international academic environments.**

### **From the Quality Assurance Regulation:**

**§ 2-3 (5) The academic environment must be actively engaged in research and academic development work and/or artistic research, and be able to demonstrate documented results with a satisfactory quality and scope in relation to the programme's content and level.**

- *change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture*

## **Assessment**

The focus of the PhD programme has been changed toward applied ecology and biotechnology, and forestry and agriculture have been taken out of the programme. The academic environments in Applied Ecology and Biotechnology are considered to fulfil the criteria regarding educational and research expertise as assessed in the initial report.

## Conclusion

Yes, the institution's response is satisfactory.

**§ 3-3 (4) The academic environment shall have depth and breadth in all important parts of the doctoral degree programme, so that the doctoral candidates can participate actively in different academic relations and be introduced to different perspectives.**

- *change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture*

## Assessment

The institution has changed the focus of the programme according to our suggestion. The remaining disciplines, Applied Ecology and Biotechnology, have the required depth and breadth to support a PhD programme of high quality, as stated in the initial report.

## Conclusion

Yes, the institution's response is satisfactory.

### From the Ministerial Regulations:

**§ 3-3 (5) The doctoral degree programme shall be affiliated to a stable academic environment consisting of a sufficient number of staff with professor and associated professor qualifications within the breadth of the field of study. An overall assessment shall be carried out of whether the academic environment has a sufficient number of employees to cover subjects and courses and the supervision provided in the field of study. The academic environment shall consist of employees with the relevant expertise. The institution's assessments shall be documented so that NOKUT can use them in its work.**

### From the Quality Assurance Regulation:

**§ 2-3 (1) The academic environment for each programme must be of a size proportionate to the number of students and the programme's characteristics, be stable over time in terms of competence and have a composition that covers the programme's topics and subjects.**

- *change the focus of the PhD programme towards applied ecology and biotechnology, and consequently reduce the emphasis on forestry and agriculture, or alternatively increase the competence in forestry and agriculture*

## Assessment

The focus of the PhD programme has been restricted to applied ecology and biotechnology, and the specialisations in forestry and agriculture have been removed. We note that the number of full-time equivalents (FTE) in the programme has been reduced (from 15.25 to 12.75), although the number of PhD students will be the same. Also, the partitioning of FTE between Applied Ecology and

Biotechnology is uneven (8.35 and 4.4, respectively). This implies that supervisor and teaching capacity per PhD student has been reduced compared to the first application, and also that Biotechnology has considerably less staff capacity than Applied Ecology. Although this raises some concerns, we still we evaluate that the research and teaching expertise and capacity in applied ecology as well as biotechnology is satisfactory.

## Conclusion

Yes, the institution's response is satisfactory.

**§ 2-3 (4) At least 50 per cent of the academic full-time equivalents affiliated to the programme must be staff with their primary employment at the institution. Of these, academic staff with at least associate professor qualifications must be represented among those who teach the core elements of the programme. In addition, the following requirements apply to the academic environment's level of competence:**

**c) For third-cycle programmes, the academic environment must consist of academic staff with at least associate professor qualifications. At least 50 per cent must have professor or docent qualifications.**

- *increase the professor quota to at least 50 per cent*

## Assessment

In total, 10 professors (6.5 full-time equivalents) and 10 associate professors (6.25 full-time equivalents) have been assigned to the PhD programme in Applied Ecology and Biotechnology. Thus, the professor full-time equivalent quota is 51%. Due to these changes, the requirement is now met. There are 6 professors and 6 associate professors in Applied Ecology (4.2 and 4.15 full-time equivalents, respectively), and 4 professors and 4 associate professors in Biotechnology (2.3 and 2.1 full-time equivalents, respectively).

## Conclusion

Yes, the institution's response is satisfactory.

## 6.2 Conclusion

Based on the written application with attached documentation, supplementary information and the institution's commentary with attachments, the expert committee concludes that all requirements have been met. Consequently, the **committee recommends accreditation of the PhD in Applied Ecology and Biotechnology at Inland Norway University of Applied Sciences (INN)**. We are also pleased to see that many of our advices for improvement have been considered and implemented.

## 7 Decision

The PhD in Applied Ecology and Biotechnology fulfils all criteria for accreditation regulated in the Quality Assurance Regulation on Higher Education of February 9<sup>th</sup> 2017 and the Ministerial Regulations of February 1<sup>st</sup> 2010.

The PhD in Applied Ecology and Biotechnology at Inland Norway University of Applied Sciences is accredited.

## 8 Documentation

17/09100-1 Høgskolen i Innlandet - Søknad om akkreditering av ph.d.-studiet in Life Sciences

17/09100-4 Vedr supplering av søknad – Høgskolen i Innlandet – akkreditering av ph.d.-studiet in Life Sciences

17/09100-15 Vedrørende ettersendelse av dokumentasjon – akkreditering av ph.d.-studiet in Life Sciences

17/09100-20 Supplering av søknad – Høgskolen i Innlandet- akkreditering av ph.d.-studiet in Life Sciences

17/09100-21 Oversending av styregodkjent system for kvalitetssikring – Høgskolen i Innlandet – akkreditering av ph.d.-studiet in Life sciences

17/09100-24 Tilsvar på NOKUTs utkast til rapport – akkreditering av ph.d.-studiet in Life Sciences ved Høgskolen i Innlandet

17/09100-26 Vedr tilsvar på NOKUTs utkast til rapport – Høgskolen i Innlandet – akkreditering av ph.d.-studiet in Life Sciences

## 9 Presentation of the expert committee

### **Professor Lena Gustafsson, Department of Ecology, Swedish University of Agricultural Sciences (SLU)**

Professor Gustafsson's research concerns biodiversity in forest environments. From 2001 to 2017 she held a professor's chair at SLU, Uppsala and was leader of for the section of Conservation Biology at the Department of Ecology. Since 2017 she is *professor emerita* at the same department, and is also guest professor at University of Freiburg, Germany. Gustafsson has been affiliated with SLU since 1977, except for the period between 1994 to 2001, when she held a position as forest ecologist at SkogForsk. Her main current research direction is integration of biodiversity conservation in forest management. Gustafsson has coordinated several larger research programs and organised research schools. She has previously participated in NOKUTs expert committee for accreditation of a PhD programme in applied ecology.

### **Professor Jon Moen, Department of Ecology and Environmental Science, Umeå University**

Moen is professor of ecology at the Department of Ecology and Environmental Science, Umeå University, and deputy head of department and responsible for the PhD programmes. His background is within plant ecology, but he has worked mainly in interdisciplinary research groups with a focus on

sustainable use of natural resources. Moen's main focus has been on interactions between reindeer husbandry and forest management. He has participated in the management of several large research projects, such as «Sustainable Management of the Mountain Region» (Fjäll-Mistra) and «Future Forests», and he is currently one of the project managers of Nordic Centre of Excellence with the project «ReiGN-Reindeer husbandry in a globalizing north». Moen has published more than 80 peer reviewed articles and book chapters, and he has supervised more than 10 PhD students and over 20 bachelor's and master's students. He teaches applied ecology and sustainability science at bachelor's, master's and PhD level. Furthermore, Moen has been an external evaluator of University of East Anglia's (UK) master's and MSc programmes in sustainable development, and he is currently chairing the Environmental Research Council (Miljöforskningsnämnden) at the Swedish Environmental Protection Agency.

**Professor Tom Kristensen, Department of Biosciences, University of Oslo (UiO)**

Tom Kristensen held a position as professor at UiO from 1993 to 2015. Before that, he was a PhD research fellow at the Department of Biochemistry, the Institute of Clinical Medicine and the Centre of Biotechnology (UiO). He spent two years at the European Molecular Biology Laboratory (EMBL), in Heidelberg. Kristensen has a background as a biochemist, and worked initially with purification and characterisation of enzymes. From the mid 1970s, his research started to address DNA technology, primarily studies of DNA replication in eukaryotic cells, techniques for DNA sequencing and PCR techniques. Kristensen has extensive experience with applied bioinformatics, and he has been responsible for an introductory course in bioinformatics at UiO from the beginning of the 2000s until 2018. His current research comprises the analysis of bacterial genomes to uncover proteins of importance to bacteria's sensitivity for bacteriocins.

**PhD student Frøydis Meen Wærsted, Norwegian University of Life Sciences (NMBU)**

Frøydis Meen Wærsted holds a BSc in Environmental Science and an MSc in chemistry, both from the University of Oslo. In her MSc thesis, she investigated eutrophication in the lake of Vansjø in Østfold, Norway. Wærsted has been part of the expert committees at the Department of Environmental Sciences and the faculty board at the Faculty of Environmental Sciences and Natural Resource Management, both at NMBU. She is currently affiliated to the Centre for Environmental Radioactivity (CERAD SFF) at the Faculty of Environmental Sciences and Natural Resource Management, NMBU, where she is working on a PhD in environmental chemistry. Her PhD project concerns mobility and bioavailability of heavy metals and natural radioactivity in alum shale formations.

### **Attachment 1 Programme during site visit**

Institution: Inland Norway University of Applied Sciences

Application: PhD in Life Sciences

Date: May 23<sup>rd</sup>-24<sup>th</sup> 2018

Place: Campus Evenstad, room Elvestua (May 23<sup>rd</sup>)

Campus Hamar, Biohuset, room 303 Dr Sopp (May 24<sup>th</sup>)

| <b>DAY 1 – May 23<sup>rd</sup></b> |             |  |  |
|------------------------------------|-------------|--|--|
| <b>Duration</b>                    | <b>Time</b> | <b>Event</b>   | <b>Name of participants<br/>(maximum 6<br/>participants per<br/>meeting)</b> |
| 30 min                             | 09:30       | <i>Preliminary meeting for the committee</i>   |  |
| 45 min                             | 10:00       | Meeting with <b>the leadership</b> at the institution (Rector, Director, Dean, Head of Studies, R&D Coordinator, Student Union representative)             |  |
| 45 min                             | 11:15       | Meeting with <b>master students</b><br><br>(From relevant master's degree programs for recruitment for the PhD. They should represent different campuses.) |  |
| 45 min                             | 12:15       | Meeting with <b>PhD students</b><br><br>(From biotechnology, agriculture and applied ecology)  |  |
| 45 min                             | 14:00       | Meeting with <b>academic leadership</b><br><br>(Faculty, department, section. They should represent different campuses)                                    |  |
| 45 min                             | 15:00       | Meeting with <b>administrative staff</b>   |  |
| 45 min                             | 16:00       | Meeting with <b>academic staff</b> (Applied Ecology and Forestry)  |  |
| 20 min                             | 17:00       | <b>Infrastructure</b> , Evenstad   |  |
|                                    | 17:20-18:00 | <i>Committee meeting</i>   |  |

| <b>DAY 2 – May 24<sup>th</sup></b> |             |  |  |
|------------------------------------|-------------|--|--|
| <b>Duration</b>                    | <b>Time</b> |  |  |
| 20 min                             | 09:00       | <b>Infrastructure</b> , Hamar, Biotechnology                       |  |
| 10 min                             | 09:20       | <b>Infrastructure</b> , Presentation Blæstad                       |  |
| 45 min                             | 09:45       | Meeting with <b>academic staff</b> (Biotechnology and Agriculture) |  |
| 45 min                             | 10:45       | Meeting with <b>possible employers</b>                             |  |
| 45 min                             | 11:30       | <i>Committee meeting</i>   |  |
| 60 min                             | 13:00       | Final meeting with <b>the leadership</b><br>(the same as in day 1) |  |
|                                    | 14:00-      | <i>Committee meeting and departure</i>                             |  |