

**Decision on the certification  
of the PhD-programmes**

- **Doctoral Programme in Science, major in Applied Cellular and Molecular Biology (Doctorado en Ciencias Mención Biología Celular y Molecular Aplicada)**
- **Doctoral Programme in Science of Natural Resources (Doctorado en Ciencias de Recursos Naturales)**

**offered by Universidad de la Frontera in Temuco (Chile)**

**Based on the report of the expert panel and the proceedings of the Accreditation Commission in its 69th meeting on 04./05. December 2017 the Accreditation Commission decides:**

1. The PhD-programme “**Applied Cellular and Molecular Biology**” (**Doctorado en Ciencias Mención Biología Celular y Molecular Aplicada**) offered by the **Universidad de la Frontera** in Chile is certified according to the AQAS criteria for the certification of structured doctoral programmes as the programme fully complies with the above mentioned criteria.
2. The PhD-programme “**Science of Natural Resources**” (**Doctorado en Ciencias de Recursos Naturales**) offered by the **Universidad de la Frontera** in Chile is certified according to the AQAS criteria for the certification of structured doctoral programmes as the programme fully complies with the above mentioned criteria.
3. The certification is granted for the period of **five years** and is valid until **30. September 2023**.

The following **recommendations** are given for further improvement of the programmes:

1. Practical training and the application and use of field-specific methods and equipment should be intensified.
2. To further strengthen the internationalisation of the programmes the education in and on English language should be intensified.
3. To further increase employability of graduates, cooperation with the industry should be intensified.

With regard to the reasoning of this decision the Accreditation Commission refers to the attached assessment report.



## Experts' Report

on the PhD-programmes:

- **Doctoral Programme in Science, major in Applied Cellular and Molecular Biology (Doctorado en Ciencias Mención Biología Celular y Molecular Aplicada)**
- **Doctoral Programme in Science of Natural Resources (Doctorado en Ciencias de Recursos Naturales)**

offered by **Universidad de la Frontera in Temuco/Chile**

Visit to the University: 25<sup>th</sup> to 27<sup>th</sup> of September 2017

### Panel of Experts:

<b>Dr. Elke Bloem</b>	Julius Kühn-Institut, Federal Research Centre for Cultivated Plants/Bundesforschungsinstitut für Kulturpflanzen, Institute for Crop and Soil Science, Quedlinburg (Germany)(representative of the labour market)
<b>Prof. Dra. Patricia Gandini</b>	National University of Austral Patagonia/Universidad Nacional de la Patagonia Austral, Río Gallegos (Argentina), Ecology and Biology,
<b>Prof. Dr. Robert Hänsch</b>	/Technical University Braunschweig (Germany), Molecular and Cell Biology
<b>Prof. Dr. Patricia Hidalgo</b>	Forschungszentrum Jülich/Research Centre Jülich, International Helmholtz Research School of Biophysics and Soft Matters, (Germany) (representative of the labour market), Cellular Biophysics
<b>Jorge Moreno</b>	Doctoral student of Molecular Biology at Johannes Gutenberg University Mainz & BioNtech RNA Pharmaceuticals GmbH (Germany) (doctoral student expert)

### Coordinators:

Dr. Katarina Löbel & Ronny Heintze      AQAS, Cologne (Germany)



**AQAS**

Agentur für Qualitätssicherung durch  
Akkreditierung von  
Studiengängen

## Preamble

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In recent years many higher education institutions and research institutes in the European Higher Education Area have set up doctoral programmes (PhD-programmes) in order to raise the structured qualification of early stage researchers by providing support and guidance on a range of levels i.e. subject-specific, organisational, intellectual and/or financial.

Through the accreditation of their doctoral programmes academic institutions are able to demonstrate that they not only formulated standards for the support of doctoral students but also developed measures for the systematic enhancement of doctoral students' key academic competences.

In addition, universities provide evidence that doctoral programmes are embedded into the internal QA system of their respective institution.

The accreditation and certification by AQAS is based on the following key concepts:

- The doctoral thesis is an independent, original academic piece of research. It can take the form of a monograph or a cumulative dissertation. The assessment of the originality is based on a set of criteria:
  - selection of the research topic,
  - formulation and development of questions around the research topic,
  - decision regarding the use of suitable methodological tools and methods,
  - the scientific research, and
  - the discussion and publication of research results.
- Doctoral programmes should foster subject-specific knowledge and, if possible, facilitate cross-disciplinary perspectives and inter-disciplinary exchanges.
- Doctoral programmes are carried out and completed within a specific timeframe.

AQAS carries out first-time certifications of new doctoral programmes and re-certifications of current doctoral programmes. All certifications are based on AQAS quality standards which follow the common procedures in place for external peer reviews:

- submission of a self-evaluation report, incl. all required attachments (i.e. exam regulations for doctoral programmes, for re-accreditations statistical data such as capacity levels, number of completed doctoral degrees, average duration of doctoral studies, distribution of final grades, numbers of first year doctoral students, percentage of international students, data about drop-out rates, possibly submission of already completed doctoral projects),
- evaluation of external peers, incl. an on-site visit,
- preparation of a peer evaluation,
- decision,
- follow-up (possibly examination of conditions).

## Certification procedure

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This report results from the external review of the doctoral programmes in “Doctoral Programme in Science, major in Applied Cellular and Molecular Biology (Doctorado en Ciencias Mención Biología Celular y Molecular Aplicada)” and “Doctoral Programme in Science of Natural Resources (Doctorado en Ciencias de Recursos Naturales)” offered by Universidad de la Frontera (UFRO), Temuco (Chile). It is a first-time certification. As the subject under review are PhD programmes the term certification is used instead of the term accreditation in order to reflect the specific character of PhD education.

### 1. Criteria

The programme is assessed regarding the AQAS criteria for the certification of structured doctoral programmes. To facilitate the review, each criterion features a set of indicators that can be used to demonstrate the fulfilment of the criteria. However, if single indicators are not fulfilled this does not automatically mean that a criterion is not met. The indicators need to be discussed in the context of the programme since not all indicators necessarily can be applied to a programme.

### 2. Approach and methodology

#### *The initialisation*

The university mandated AQAS to perform the certification procedure in January 2017.

The university produced a Self Evaluation Report (SER). In April 2017, the institution handed in a draft of the SER together with the relevant documentation of the doctoral programmes and an appendix.

The appendix included:

- overview of statistical data of the doctoral student body (e.g. number of applications, beginners, graduates, student drop outs),
- overview of the completed doctoral theses of the last years,
- progress and monitoring plans to carry out the doctoral research,
- results from monitorings and evaluations,
- academic regulations, e.g. Postgraduate Research Code of Practice-Exam Regulations,
- course descriptions (from compulsory, elective and speciality courses),
- diploma supplements,
- cooperation agreements,
- examples for individual time plans,
- samples of supervisory agreements between staff and doctoral students,
- CVs of the supervisors,
- research reports, and
- accreditation results from national accreditation.

AQAS assessed the SER regarding completeness, comprehensibility and transparency. The final version of the SER was delivered in August 2017.

The certification procedure was officially initialised by a decision of the AQAS Accreditation Commission on 22<sup>nd</sup>/23<sup>rd</sup> of May 2017.

#### *The nomination of the panel of expert*

The composition of the panel of experts follows the stakeholder principle. Consequently, representatives from the respective discipline/s, the labour market and doctoral students are involved. Furthermore, AQAS follows principles for the selection of experts of the European Consortium for Accreditation (ECA).

The Accreditation Commission nominated the before mentioned expert panel in July 2017. AQAS informed the university about the members of the expert panel and the University did not raise any concerns against the composition of the panel.

#### *The preparation of the site visit*

Prior to the site visit, the experts reviewed the SER and submitted a short preliminary statement including open questions and potential needs for additional information. AQAS forwarded these preliminary statements to the University and the panel members in order to increase transparency in the process and the upcoming discussions during the site visit.

#### *The site visit*

After a review of the Self Evaluation Report, from 25<sup>th</sup> till 27<sup>th</sup> of September 2017 a site visit to the University took place. On site, the experts interviewed different stakeholders, e.g. the management of the HEI, the programme management, supervisors and other staff as well as doctoral students and graduates, in separate discussions and consulted additional documentation such as statistical data and doctoral theses. In addition, the experts assessed the laboratories, infrastructure and equipment of the university. The visit concluded with the presentation of the preliminary findings by the group of experts to the university's representatives.

#### *The report writing*

Following the site visit, the expert group drafted the following report, assessing the fulfilment of the AQAS criteria for the certification of doctoral programmes. The report included a recommendation to the Accreditation Commission. The report was sent to the university for comments.

#### *The decision*

The report, together with the comments of the university, forms the basis for the AQAS Accreditation Commission to make a decision regarding the certification of the programmes. Based on these two documents the Accreditation Commission took its decision on the certification on 4<sup>th</sup>/5<sup>th</sup> of December 2017. AQAS forwarded the decision to the university. The university had the right to appeal against the decision.

In February 2018 AQAS published the report and the result of the certification as well as the names of the panel of experts.

## Assessment of the doctoral programmes

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### I. Embedding of the doctoral programmes in the university

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The doctoral programmes are embedded in Universidad de la Frontera/University of La Frontera (UFRO), a public university located in southern Chile. The university's mission is to contribute to the development of the region and the country through the generation and transmission of knowledge, the integral training of professionals and postgraduates, and the promotion of arts and culture.

At the time of application, UFRO regularly provided 44 undergraduate degrees, nine doctoral programmes, 29 master's programmes and 25 specialisation programmes. It had more than 9,300 students in its undergraduate programmes and 750 in its graduate programmes. These programmes are assisted by a staff of 603 (FTE) academics and 1,213 administrative workers.

The university is divided into six faculties: the Faculty of Engineering and Science; the Faculty of Medicine; the Faculty of Education, Social Science and Humanities; the Faculty of Agricultural and Forestry Science; the Faculty of Legal and Business Sciences as well as the Faculty of Dentistry. Furthermore, it has seven Centres of Excellence: Biotechnology of Reproduction Modelling and Scientific Computation; Training, Research and Management for Evidence Based Health; Excellence in Translational Medicine; Morphological Studies and Surgical Research; Biotechnology Research Applied to the Environment as well as Economic Psychology of Consumption in which priority is given to scientific research and technological development around a specific thematic area.

The Vice-Rector for Research and Postgraduate Studies is responsible for the generation of policies, the design of strategies and the execution of actions in the fields of scientific and technological research, postgraduate studies and international links. The academic Management of Postgraduate studies is under the supervision of the Vice-Rectorate of Research and Postgraduate Studies, which is an academic-administrative unit responsible and in charge of maintaining the tuition, coordination and administration of the programmes offered by the University of La Frontera, ensuring mainly the compliance with the normative aspects and the quality assurance. The genesis and development of the postgraduate programmes is conducted by the academic units, that is, faculties, departments and institutes.

In 2016, 299 research projects were executed at the university. Since 2004, a total of 2,200 ISI publications have been registered in the ISI Web of Science base. Associated with innovation, the university names three national patents, three patents granted internationally, two licenses and six copyright registrations as well as several spin-offs of SMEs.

### II. Status of the academic institution

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#### 1. Status and Degree-awarding powers

*Standard:*

*The institution is entitled to award a doctorate.*

#### **Description**

UFRO is a state and autonomous Higher Education institution. It is empowered to award doctoral degrees, also for cooperative doctoral programmes, by the National Law N° 156, § 41 of 1981.

The legal status of the doctoral students is postgraduate student as a regular student with a formal admission to the university.

### **Assessment**

At present, the UFRO regularly provides 44 undergraduate, 9 doctoral, 29 Master's and 25 specialisation programmes. It has more than 9,300 students in its undergraduate programmes and 750 in its graduate programmes. These programmes are assisted by a staff of 603 (FTE) academics and 1,213 administrative workers.

Doctoral programmes in Science, major in Applied Cellular and Molecular Biology, and in Natural Sciences got the National Accreditation.

Both doctorate programmes have double degree agreements with the Università di Napoli Federico II (Italy), with the University Pierre et Marie Curie in Paris (France), with the University of São Paulo (Brazil) and with the University of Leuven (Belgium). The University of La Frontera has signed a Memorandum of Understanding with these universities.

The organisation with respect to the double degree agreements (specific agreements) must comply with the current regulations of each university. In the case of UFRO, each specific agreement must be followed by the general agreement of collaboration between the partner institutions in common areas of interest. Every year the doctoral student should (re-)enrol at each partner institution. The institution where the PhD student is first admitted is designated as the main university. The tuition fee is only payable at the main university and in accordance with the main university's regulations.

For obtaining the double degree the student must meet the requirements of each institution by mutual agreement. Normally the teacher of a programme invites another teacher within the framework of the agreement in order to train students in subjects that are specific to their academic competence.

The University of La Frontera carefully selected its partners. One of the criteria is excellence, and the other is the relevant accreditation of the partner. Students get two degrees in different languages and these are different degrees coming from different universities. At the beginning this option was taken mostly by foreign students because of the lack of promotion or because of the short time (4 four years) in which students have to finish the Phd (determined by the National authorities, as a requirement to get a scholarship or money support).

The double degree option has a positive vision because of the interaction of professors, to create research connections, to enhance networks, to interact with other cultures, to learn new techniques, and to have more visibility to attract more students.

In Chile, and of course also for the University of La Frontera as an institution of higher education, the law states (art. 54, e) that *“the degree of doctor is the maximum that a university can grant. It is awarded to a student who has a licentiate or master's degree in the respective discipline and has approved a superior programme of studies and research. The doctoral degree accredits that the possessor has the necessary capacity and knowledge to carry out original research. In any case, in addition to the approval of courses or other similar activities, a doctoral programme must necessarily contemplate the elaboration, defence and approval of a thesis, consisting of an original research, developed autonomously, and that means a contribution to the respective discipline”*. Upon graduation students acquire the legal status to be Phd according to the legal requirements of Chile.

### **Summary**

On the basis of the above assessment, criterion one is fulfilled.

### III. The doctoral programme(s)

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#### 2. Aims of the doctoral programmes, qualification aims and levels of qualification

*Standard:*

*The institution defines the aims of the doctoral programme.*

*The doctoral programme is aligned with the aims of the defined qualification.*

*The doctoral theses provide evidence that the appropriate level on the European Qualifications Framework (EQF) or the respective level on the national qualifications framework for the award of Higher Education degrees have been achieved.*

#### **Description**

On a general level, the university states that graduates who hold a doctoral degree should have the capacity and knowledge necessary to carry out original research. The doctoral studies require, at least, two years of study and a thesis that is a research which constitutes an original contribution to the respective discipline.

#### Sciences major in Cellular and Applied Molecular Biology

The Doctorate in Sciences major in Cellular and Applied Molecular Biology was created in 2005. It mainly focusses on enabling doctoral students in solving transdisciplinary problems by contributing knowledge, innovation and development to various areas of Biological Sciences, such as biomedicine, biology of reproduction and biotechnology of bioregions. The university defines to train scientists of the highest level with a critical spirit, innovative, capable of leading and integrating scientific and technological research teams, performing with solvency and creativity in the field of applied cellular and molecular biology as the programmes' mission. The university presents the following specific objectives for the programme:

- train scientists capable of understanding and approaching complex biological processes within the disciplines of cellular and molecular biology, to obtain original results, protect the developed knowledge and disseminate it to the scientific community in an ethical and professional way;
- develop research based on solid methodologies and focused on priority issues with a high potential in cellular and molecular biology molecular and cellular biology in a transversal way in different areas of knowledge such as bio resources, biomedicine and biotechnology;
- provide the graduates with the academic conditions suitable for their training, stimulating academic and scientific discussion among their peers;
- promote and develop international cooperation with foreign centres of excellence, maintaining an active academic and scientific exchange.

The graduates of the doctoral programme should have an integrative vision and solid training in cellular and molecular biology. They are trained to develop applied, independent, original and creative research in institutions of higher education and national or international centres of excellence, either individually or as part of a multidisciplinary group in the area of biological sciences. The university names three main research areas of the faculty and for the programme:

- Biology & Biotechnology of Bio resources: Biotechnology of Bioactive Principles, Bioremediation, Microbial Biotechnology, Plant Physiology and Biochemistry,
- Cellular & Molecular Biology of Reproduction: Animal Reproduction, Aquaculture Biotechnology, Reproductive Physiopathology, Cellular and Molecular Andrology,

- Cellular & Molecular Biology of Priority Diseases: Molecular Biology of Cancer, Personalised Medicine and Cardiovascular Diseases.

The programme has a sustained number of applications (average of 20 applications/year in the period 2010–2017), with an average number of students in the programme of 50 doctoral students and a total number of graduates between 2005 and 2016 of 65, with a rate of average graduation of 68.5%.

#### Doctoral Programme in Science of Natural Resources

The Doctorate in Natural Sciences aims to be a multidisciplinary scientific programme with a strong component towards applied technology. This programme seeks the training of graduates with capacity to develop their professional carrier in an academic and non-academic world in areas of interface between food production, agri-food biotechnology, energies, and bioprocesses for the development of sustainable agriculture.

The university outlines that the main objective of the doctoral programme in Natural Sciences is to train researchers of the highest level in sciences, with a multidisciplinary and integral vision in the field of biology, microbiology, soil physico-chemistry and environment, plant nutrition and physiology, chemistry and environmental biotechnology, ecological chemistry of terrestrial and aquatic systems. In the past years the programme has emphasised on bioprocesses for sustainable agriculture, biotechnology in agri-food production, waste management, bioenergy and renewable energy as well as a strong emphasis on metagenomics and meta proteomics.

Upon completion of the programme graduates are supposed to

- have an integrative vision in the field of soil, water-plant, biotechnology, bioengineering and biology,
- have knowledge in soil conservation, prevention and bioremediation of contaminated areas,
- be able to generate and maintain lines of research and to join the academic staff in existing universities and institutions of the country.

Following the multidisciplinary approach of the programme and in line with the regional and national development in the field there are eight different lines of research: (1) Soil Biology and Microbiology, (2) Soil Physicochemistry and Environment, (3) Nutrition and Plant Physiology, (4) Environmental Chemistry and Biotechnology, (5) Ecological Chemistry of Terrestrial and Aquatic Systems, (6) Soil Conservation, Carbon Sequestration, Bioremediation and Sustainability, (7) Bioprocesses and Agri-food Process, and (8) Management of Agroindustrial Waste and Bioenergies.

#### **Assessment**

##### Sciences major in Cellular and Applied Molecular Biology

UFRO clearly defined the aims of the structured doctoral programme both in the written documents and within all discussions with the management of the university and the teaching staff. Questions that arose from the self-evaluation report could be answered and clarified in the discussions during the site visit and important information was given in response to the remarks of the experts (e.g. specified and clearly documented curriculum of the programme on the web-page). The intended learning outcomes of the PhD-programme are appropriately defined and are transparently published in the documents including the web-pages. The experts could easily comprehend the profile of the study programme. Moreover, the PhD students underlined in the discussion that the main reasons of choosing UFRO for their PhD are the clearly defined aims and the structure of the programme. The design of the programme evidently supports the achievement of the intended learning outcomes with respect to the substantial level of biological

competencies both in theory and in praxis. The programme fits perfectly into the research environment of UFRO and is also consistent with the profile of the department in regard to teaching. Equipment, laboratories, seminar and lecture rooms, library, etc. fulfil the requirements for a successful realisation of the programme. The experts are deeply impressed by the gymnasium, the Mensa and the recreation area, keeping PhD-students highly motivated during their studies. The university has a long tradition and wide experiences in teaching students in natural sciences, e.g. Biology, Chemistry, and Medicine, and is ranked one of the best (third place) within all universities in Chile with regard to these fields.

The different categories are clearly specified, such as the average duration of doctoral studies, numbers of doctorates, numbers and types of publications, numbers and types of internal and external colloquia/conferences. It is great to see the academic staff being involved in teaching the PhD-students: Colleagues with formidable projects and impressive reference lists. The programme reflects both the academic and the labour market requirements in an appropriate manner. The experts confirm that the academic level of the content corresponds to its full extent with the requirements of the PhD-level of the European and/or National Qualifications Framework.

The doctoral graduates have a systematic understanding of their research discipline and are able to master skills and methods which are used in their research field. The students are able to identify and to solve new problems in the areas of research. Using all the possibilities of a fully equipped library, including the online access to all the publications needed, the doctoral students can acquire a comprehensive knowledge of the relevant literature. This could easily be proven by the experts screening publications of the PhD-students and evaluating the high level PhD-theses. The PhD-programme is open to allow the doctoral students to independently identify scientific questions of research which starts early in the first months (or even before) of the 4-year programme. As learnt in the discussion with the supervisors and teachers, the PhD-students carry out critical analysis and develop new and complex ideas with respect to their scientific projects and to social-cultural aspects in an academic or non-academic professional context. The PhD-programme includes the necessity of participating at national and international conferences. So the doctoral students will present concepts in front of an academic audience and have the possibility to discuss research findings of their areas of expertise with (international) subject-specific colleagues.

#### Doctoral Programme in Science of Natural Resources

The graduate profile of the Doctorate in Natural Resources at UFRO includes training a researcher, with the scientific and technological capacity to solve complex problems associated with regional and national development in the field of eight research lines:

- 1) Soil Biology and Microbiology
- 2) Soil Physicochemistry and Environment
- 3) Nutrition and Plant Physiology
- 4) Environmental Chemistry and Biotechnology
- 5) Ecological Chemistry of Terrestrial and Aquatic Systems
- 6) Soil Conservation, Carbon Sequestration, Bioremediation and Sustainability
- 7) Bioprocesses and Agri-food processes
- 8) Management of Agro-industrial Waste and Bioenergies

According to the quality of final theses examined by the experts during the site visit, it could be verified that graduates are able to develop their skills as researchers, performing field and laboratories tasks, hypothesis approaches in original subjects and analysis of the results. They receive theoretical and practical training to be able to develop this task independently. Labs are fully equipped to perform the analysis and even there is a support laboratory (BIOREN), with special-

ised technicians to be able to complement, at the same time they teach students skills for more complex analysis.

Doctoral students have access to facilities and to the world's leading databases from 2000 onwards. Through agreements with other universities or through internships, they are also able to discuss and contrast their research with colleagues from other countries.

The theoretical formation is good, but given the interdisciplinary approach of the programme there are some basic courses (depending on the student formation) than can be replaced for advanced ones. While the programme is completed the 4-year deadline for some students can make it too short to develop their skills to work independently.

The advisors are excellent and most of them are full-time dedicated. Graduates of this programme are tutors or integrate the academic staff. Scientific publications are held in high level scientific journals which manifest a clear positive result in communication of knowledge.

The success of the programme is high (almost 90%, according to the university) and the main constraint is the funding of the students during the studies.

### **Summary**

On the basis of the above assessment, criterion two is fulfilled.

Recommendations for further improvement:

The experts recommend the university to further strengthen the successful line of practical training. It is important for the graduates to be able to work independently with their own hands using the different field-specific methods and equipment especially when planning to go abroad during or after the PhD.

### **3. Academic level of supervisory staff and human resources**

*The qualification of supervisory staff (m/f) is appropriate to ensure that doctoral students are supervised at the correct academic level.*

*The personnel are sufficient in number to safeguard supervision arrangements on the doctoral programme.*

*The remit of supervisors is clear and transparent.*

#### **Description**

##### Science, major in Applied Cellular and Molecular Biology

The Academic Supervisory Staff for the doctoral programme in Science, major in Applied Cellular and Molecular Biology is made up of 19 academics accredited to conduct thesis. The university presents in the SER the trajectory of all members in the discipline or area of research. The majority of the faculty staff consists of full-time academics (89.5%) with research lines active in the area of the programme. The average publication rate of the supervisory staff is 2.6 publications per year per academic. All staff members have obtained funding for research projects by the National Scientific Research and Technology Development Fund (FONDECYT) or equivalent.

The programme also has collaborating professors and the support of national and foreign visiting professors who have participated in international courses, workshops, qualification exams, thesis advances, co-tutoring and exams.

##### Doctoral Programme in Science of Natural Resources

The university established a system that includes criteria for the approval of academics who participate in Doctorate programmes. Following this system out of 32 academic staff members in the

doctoral programme 22 have served as academic supervisors for theses of doctoral students. Additional 15 staff members serve as “collaborative professors”, meaning these are academic members who have a partial dedication to the programme, such as occasional lectures. A maximum of 4 students per supervisor is allowed, except the group can be supported by a Postdoc in consultation with the Academic Committee of the programme.

The resources of the research centre BIOREN that was founded by the university in 2009 became available to the programme in 2010 leading to a strong increase in peer reviewed publications. Between 2011 and 2016 the number of scientific publications was 828. The academic track record includes six patents and active participation in national and international research project. A full list of staff involved in the programme, their academic profile as well as their publications is part of the SER of the university.

## **Assessment**

### Science, major in Applied Cellular and Molecular Biology

The experts positively recognize that there is a clear scheme of supervision in place and the tasks of the supervisors are well defined. It became obvious that the supervisors generally practice an “open door policy”. This approach facilitates and encourages the exchange of information between supervisors (and other members of the faculty) with the students. In the application letter of the student to the programme an agreement of the potential advisor must be included. This system allows that before starting the programme the task of the supervisors and the students is well defined and explained. Since each advisor can self-define the number of students to be accepted in his/her respective laboratories, the acceptance decision is made according to the real capacity of the potential supervisor. Coordination activities are well defined and due to the clear intake procedure major coordination happens in the very early stages of the programme. The personal communication is supported and by a clear and accessible web site providing the major information on the programme, its structure and requirements. Discussions with doctoral students also pointed to email as a well-established way of communication in case students or supervisors are not directly available in person.

Regarding the academic level of the supervisors the panel of experts is impressed of the staff portfolio available for supervision. Besides considering the criteria for becoming a member of the faculty, i.e. number of publications in peer-review journals and granted founding, the faculty has developed self-assessment strategies for their members to further ensure their high academic standards. A practice that seems well established is to have “young” scientists participate in the mentoring of undergraduates and in thesis committees to promote their skills before they become supervisors. They belong to well-established senior research groups where they start co-sharing doctoral thesis as co-supervisors. The majority of the members of the faculty, if not all, have also done internships overseas giving them the possibility to experience how supervision is done abroad. The experts believe this is good practice and encourage to further develop this exchange.

Currently there are no formal courses for continual professional training for supervisors that would focus on the supervision. Practically supervisors are made familiar with this activity in a “learning by doing” style as explained above. This approach seems to work well and the experts encourage UFRO to continue to keep up with this emerging topic in international universities. The university provides courses in “good teaching practices” for undergraduate programmes that are accessible to the doctoral programmes while clearly the focus in these courses lies on challenges in undergraduate teaching. Currently, the doctoral programmes are processing an agreement with Florida State University to get e-learning classes for their teachers that possibly can be extended to the students.

### Doctoral Program in Science of Natural Resources

The scientific staff of the Doctoral Program in Science of Natural Resources is highly professional and is well-structured with well-versed staff members and younger junior scientists. A good deal of the staff members served already as supervisors. The expert group was impressed by the open-lab atmosphere in the different working groups that enables the students to meet with their supervisors easily. According to the students it is easy to find a suitable supervisor for each topic. Many students know already when they enter the program in which field of research they will undertake their PhD work and often the contact to the supervisor is already made at this very early stage. The remits of the supervisors are well defined in the SER. In short, supervisors are responsible for financial support to guarantee the lab work, they have to help students to get an internship abroad, they have to select the Commission for the Qualification Exam and of course they have to guarantee the permanent supervision of their students.

In the SER it is clearly stated which staff members of the programme are available for academic supervision (Table 4) and the working hours dedicated to the programme are mentioned. For coordination especially of the examination there is a professor acting as Advance Coordinator and a Monitoring Committee (build out of 3 internal and 2 external professors) is evaluating the progress of the work and helps with specific advices regarding suggestions for specific topics, co-supervisors or lab exchange opportunities. The Programme Director afterwards submits the reports to students, tutors and the Commission. Not mentioned in the SER is how much additional staff such as a secretary is available to answer and help with common questions regarding the programme and the administrative organization of the PhD students. But the expert group got the impression that the programme is very well organized and that there is no lack of human resources to support the students.

The academic supervisors have in-depth subject-specific knowledge on their disposal which is proven by numerous publications in high-rated journals. Eight main research lines are covered and it was confirmed by the students that it is easily possible to find a supervisor for each topic related to the Science of Natural Resources. Nevertheless, for future extensions of the research staff the experts recommend to strengthen further topics related to natural resources. At the moment there is a focus on the field of microbiology and enzymology. Environmental issues are covered as well such as soil and air contaminations, phytoremediation, effects of pesticides and some more but to a lower extent. Topics related to water cycling, water and air pollution, climate change, soil degradation and food production could be strengthened. The interdisciplinary nature of the programme is one of the major strengths of this specific PhD programme and for the international exchange with universities from all over the world it could be important to cover the main topics such as climate change and water scarcity each country has to deal with. Such topics are already included in the programme but their visibility is low and could be strengthened when new scientists will be recruited for the programme in future. The cooperation with the Research Centre BIOREN delivers an excellent opportunity for scientists as well as students to become acquainted with modern and state of the art analytical equipment.

There are some opportunities for staff members for further education such as a programme for professors who want to stay abroad in 2016. Junior scientists are trained by senior scientists how to supervise students and in the first years junior scientists have the function of co-supervisors. The staff members have the feeling that enough advanced training courses for supervisors are available. For the internationalisation of the programme and to attract more foreign students it would be important to further improve the English skills of the supervisors and to train the staff to give their courses in English. Moreover, it is important to offer courses related to technical developments, changes in communication and information systems if necessary.

### **Summary**

On the basis of the above assessment, criterion three is fulfilled.

Recommendation for further improvement:

The experts recommend to further improve the language skills of the staff members and to encourage the staff to give more lectures of the PhD programme in English language.

## **4. Support for doctoral students**

*Sufficient and suitable guidance and supervisory systems are in place.*

### **Description**

The basic information for doctoral students such as research lines, contact information, accredited supervisors as well as theses and dissertations can be found by the applicants on the programme's website. The programmes have defined the responsibilities of each of the stakeholders involved in the academic activities (students, teacher tutors, thesis guides, and supervisors) through the *General Regulations of the Postgraduate Programme* and the *Specific Regulations of the Programme*. Both documents are available on the website of each programme.

Furthermore, an induction day has been set up in which new doctoral students are received and given the programmes regulations, their rights and obligations are shown and guided in respect of the services to which the regular doctoral students are entitled. There is also a social worker in charge of coordinating this induction activity. This culminates with a visit to the facilities and infrastructure available for the different activities of the programme (Research, Teaching and Outreach).

The university describes three instances of guidance and support for the doctoral students during their studies:

The first is by the potential thesis guide. Each doctoral student applying for the programme must be officially accepted in written form by a person of the thesis guidance category of the faculty. The potential thesis guide should assist the doctoral student in the making of initial decisions, such as the selection of elective courses, selection of topics of work and general logistical support. The potential thesis guide can be the future supervisor; however, this is not established until the presentation of the thesis project.

The second instance of guidance is carried out by three courses: "Research Unit", "Bibliographic Seminar" and "Project Formulation of FONDECYT project". The development process of the doctoral thesis starts in the third semester in last course mentioned. The project is initially formulated by the doctoral student, with the supervision of the thesis tutor professor and the professor in charge of the project formulation activity. Once it has been formulated, it is presented in written form and the student must defend it orally in front of an evaluation committee, in what is called a Qualification Exam. The thesis evaluation commissions are made up of at least four academics, two belonging to the faculty of the programme, the thesis supervisor and an external evaluator.

The third instance is made up of the thesis supervisor who is responsible for guiding the respective doctoral student, supervising her/his scientific activity and collaborating in the practical and logistic realisation of the proposed research.

### **Assessment**

Guidance mechanisms and support offers for doctoral students are well established, clearly defined and relevant information is accessible to students. The guidance is mediated by three entities, at the beginning of the programme by the potential supervisor, later on by the actual supervisor that will guide the doctoral thesis and through evaluation committees for the different mandatory academic duties during the first years (i.e. thesis project formulation). In addition, the “open door policy” for communication greatly facilitates the access to information. In this sense the experts believe that the atmosphere in the department greatly facilitates a good flow of information facilitating to solve problems before or when they arise. The web site is also a valuable source of information: it is well structured and also helps to create transparency for potential applicants and the general public.

The funding of the doctoral students is an aspect already during the admission process by prioritizing those who have been awarded with the national science foundation (CONICYT) graduate research fellowship that provides four years support. This strategy ensures funding for the doctoral students and quality by selecting the best candidates assessed by CONICYT. Additional university funding is available for students with no awarded fellowship. Reassuring funding is a vital part to support students so they can concentrate on their research and dissertation process. As the university identified that publishing in English language creates an extra barrier for students, an English editing office was established to support students with the language aspects when finishing their papers for publication.

There is a rather tight timescale for completion of the curriculum to obtain the doctoral degree. The experts conclude that the university legally ensures an appropriate time scale. At the same time it cannot be ignored that the total time available to the students practically is restricted by the time scale given by the national science foundation (CONICYT) graduate research fellowship programme. The four-year restriction is defined by the four-year support given by CONYCYT (with a potential one semester extension). Extension of the programme duration would impair the eligibility of the students for applying to the national funding system while significantly decreasing the competitiveness with doctoral programmes offered by the different universities across the country. Generally this system seems well established and in the discussions with the students some concerns were raised only with regard of the time when the programme was updated and partly restructured creating individual challenges to students and not in all cases necessities of students could be fully met.

### **Summary**

On the basis of the above assessment, criterion four is fulfilled.

## **5. Research environment**

*There is a research environment in place which facilitates the relevant research and fosters the qualification which is necessary for a future research career inside academia or outside an academic context.*

*Doctoral students have access to an appropriate infrastructure.*

### **Description**

In general, the doctoral programmes are mainly financed by state funds and students' fees.

The university describes the physical infrastructure (desks, meeting rooms, air conditioning, cafeteria, etc.) and the equipment (internet, video conference systems) which can be used by all students.

The university describes that the doctoral students participate in one of the available main research areas of each programme. This way, the doctoral students are supposed to be inserted in an environment in which the training and scientific research is a priority. In the courses, they must search for bibliographic information, synthesis of that information, produce reports and carry out literature reviews. In addition, all doctoral students are required to participate in group activities, such as thesis project defences, thesis advances, and thesis defences. Furthermore, both programmes and BIOREN periodically hold guest lecturers (national and foreign) and training workshops on a variety of topics related to scientific research as well as on writing scientific articles.

Both doctoral programmes have their own resources, which are allocated to the administration and support of academic activities. These resources are used for the support of the doctoral students to participate with their presentations in national and international congresses, for financial contributions to the research laboratories or to improve the internationalisation of the programme through support in improving English language proficiency and the establishment of international cooperation agreements and the reinforcement of double degree programmes.

In terms of infrastructure and equipment for research, each professor hosts her/his students in the infrastructure and equipment of their own laboratory. In addition, in 2009 the University of La Frontera created the Scientific and Technological Centre in Bio Resources (BIOREN-UFRO) in which equipment of high range and performance has been centralised, such as: flow cytometer, confocal microscope, electron microscopes, chromatography coupled to mass spectrometry, illumine and proteomic sequencing platform.

The centre has technical personnel who operate the equipment permanently. As of January 2017, the doctorate programme has new dependencies shared with the Doctorate in Natural Resources Sciences and the Doctorate in Engineering Sciences, major in Bioprocesses. According to the university, the doctoral students can also use these facilities such as two meeting rooms equipped with videoconferencing equipment, two classrooms with audio-visual systems, an auditorium with audio-visual system and videoconference as well as a study room with individual positions (desks, chair and locker).

#### Science, major in Applied Cellular and Molecular Biology

During the formulation of the research project in the second semester, doctoral students receive briefings related to scientific ethics and biosafety. Research projects that consider working directly with humans (or sensitive information thereof), animals, genetically modified organisms or that compromise biosafety and the environment must be evaluated by the Scientific Ethics Committee of the university. The scientific ethics committee of the university makes dissemination and organises training talks for researchers and all students of the university.

According to the SER, the doctoral students of this programme have the opportunity to dedicate a portion of the day to do teaching assistantships supporting the undergraduate teaching in the university. The university describes that they do not recommend doing teaching during the first two semesters due to the workload required by the compulsory subjects of the programme.

#### Doctoral Programme in Science

As part of the research environment the university also outlines a well established network of international internship partners allowing students to work in their particular field of specialisation. 61% of the students take their internship in Europe, 21% in North America and 10% in Asia and Oceania. Several students have also taken a second internship for a shorter period between 1 and 3 months, mainly in English-speaking countries with the aim of learning the language. Mobili-

ty is described to be fundamental in the programme, both for visiting professors, lecturers, professors and students. There is a rotation of international professors, sponsored by the International Cooperation Office from UFRO. In addition FONDECYT (*Fondo Nacional de Desarrollo Científico y Tecnológico*) projects of the faculty members generate a considerable number of international guests contributing to this programme.

### **Assessment**

The expert group was highly impressed by the research environment of the Universidad de La Frontera. The overall atmosphere of the campus is very friendly and the infrastructure is highly developed. The laboratories are modern and well equipped, the library is exemplary as well as the training units, presentation facilities, video equipment and rest areas. The expert group saw several premises from very small group rooms, over lecture rooms up to a conference facility for some hundred people. Therefore, the university delivers all possibilities to study in small groups, give lectures for different sized groups as well as big conferences. All facilities and instruments such as the video conference systems are up to date. Very positive is also the English training of the students and the organized possibilities to get help from an English teacher in writing manuscripts and the thesis.

The acquisition of projects is undertaken by the supervisors and financial resources are available to support doctoral students to participate with own presentations in national or international conferences. In this way appropriate opportunities for academic exchange are made available to doctoral students. Here it is to mention that on regular basis workshops and symposia were organized by the programme in Science of the Natural Resources and experts from all over the world were invited for oral presentations. Students participate in high numbers in this workshops and have the opportunity to present own results and to discuss their research results. Moreover, international exchange is an important part of both programs and most students attend one or even more international exchanges. Also these exchange activities bear the chance to come in contact with scientists, working in the same field of research and to build up international exchange and cooperation.

Special courses enable the students to use the research environment in an optimum way. For example, bibliographic seminars need to be attended during the first and second semester of the programme. It can be assumed that the optimum use of the library, access to literature, how to cite, etc. are seminar topics and that the students learn a good scientific practice how to use and how to cite references correctly.

Very impressive was also the technical equipment of BIOREN-UFRO which guarantees high quality analytical possibilities and therefore a broad range of research possibilities. Students can use these facilities, which moreover guarantee that the students will be highly educated with up to date analytical equipment.

### **Summary**

On the basis of the above assessment, criterion five is fulfilled.

Recommendations for further improvement:

One recommendation of the expert group is to further develop cooperation with industries and potential prospective employers to further improve the chances of PhD students on the job market. At the moment all PhD students find employment after finishing their PhD thesis according to the programme directors which is very positive. Therefore, this recommendation is primarily made to face future developments when the number of students in the programmes will further increase.

## 6. Structure of doctoral programmes

*Doctoral programmes are structured in such a way - with regards to the research content and the required time - that students are enabled to progress efficiently through all stages of their research and achieve their doctorate within an appropriate timescale.*

### Description

#### Science, major in Applied Cellular and Molecular Biology

The academic activities of the programme are established in the *Specific Regulations of the Programme*. In this, the curriculum is established and the subjects and other academic activities are described, the semester in which they are realised and the credits that these activities receive.

The doctoral programme in Science, major in Applied Cellular and Molecular Biology embraces a curriculum of eight semesters, in which compulsory subjects are conjugated with elective courses and specialisation, necessary to focus the doctoral students to more specific areas of their formation. In addition, the doctoral students receive a research training that includes a research unit from the second semester and development of a thesis project from the third semester onwards.

The whole programme includes 18 courses with a total of 100 credit points: Cellular and Molecular Biology, Applied Cellular and Molecular Biology, Specialty Course, Research Unit, Elective Course I, II and III, Literature Seminar, Thesis Project Formulation, Qualifying Exam, English Proficiency, Advance of Doctoral Thesis I, II, III and IV, Thesis Writing Thesis Review Process, Defence and Final Exam.

During the programme, the doctoral students must also do a research internship at universities or centres of international excellence, between the fourth and eight semester. Currently, the internships last between four and ten months, and can be extended in cases where students have the double degree scholarship. In the internship, the doctoral students are embedded in research groups that have demonstrated productivity in the area of development of their research. Doctoral students conduct a research unit that allows them to develop part or some objective of their doctoral thesis and/or complement their results.

Each thesis project, in addition to the initial evaluation and approval in Qualification Exam, is monitored through semi-annual progress. This allows the thesis commission to guide, correct and periodically evaluate the development of the individual research projects. During the two years of thesis contemplated in the curriculum, four thesis advances are made. The first and third are made only in written form, while the second and fourth appear before the commission in written and oral form.

#### Doctoral Programme in Science of Natural Resources

The programme takes 8 semesters and has a curricular structure of 52 credits: 12 credits of compulsory topics (general training), 8 electives (elective of specialty) and 32 credits for the thesis development. The subjects of general training that must be taken in the first semester are: Integrated Management of Natural Resources, Biogeochemical Cycles, Evolutionary Foundations and Sustainable Management of Biodiversity and Bibliographic Seminar I.

In the second semester students must take a minimum of 8 credits, two electives and Bibliographic Seminar II (including a training called Research Unit). In addition, during the first three semesters the student must complete or validate the following levelling courses: Instrumental Analysis Applied to the Environment, Biostatistics, Formulation and Evaluation of Advanced Projects. These subjects contribute to the development of generic (basic) competences that the programme expects from each student.

In the third semester the students must prepare their Qualification Exam. For this purpose, a Qualification and Monitoring Committee is appointed. The Commission is made up of three internal pro-

fessors (University of La Frontera) and two external professors. The Qualification Exam consists of two parts: Part I is an instance of knowledge that corresponds to a topic related to the research that the student will perform during his/her doctoral thesis. The student delivers a document written in English, corresponding to an exhaustive review of a potentially publishable topic. Part II is the defence of the Thesis Project.

Passing the Qualification Exam, the students must submit four progress report (one per semester) written in English. The advance reports are intended to guide and qualify the student by the examining committee that accompanies the student throughout his/her thesis process. Students have to do a research internship abroad at universities or centres of international excellence between the fourth and eighth semester. These internships last between 4 and 10 months, and can be extended when they take place at an organisation that has a double degree agreement with the university. In the internship, the student is part of research groups that have demonstrated productivity in the area of development of the doctoral students' research.

The programme has an Advance Regulation which guides the student in the preparation of his/her presentation. The General Postgraduate Regulations of the university define the basic requirements and mechanisms that are the same for all doctoral programmes of the university.

### **Assessment**

The curricula of the two programmes are clearly defined, published and easily accessible on the website of UFRO (also in English language). The structures of the programmes including all the possibilities of theoretical and practical teaching are absolutely conclusive and reasonable and the main reason why so many students (also from foreign countries) accompany the program. A time table is set up for the PhD students where it is clearly stated which courses need to be attended in the beginning of the programme to give all students the opportunity to become acquainted with the different main topics of research, the research environment and research facilities. The topic of the thesis as well as the background information for the chosen subject have to be developed in the 3<sup>rd</sup> semester and the chosen topic is presented in the "Qualification Exam". At this stage the PhD student has already trained the necessary background to undertake the PhD research work. They have already prepared a review of the chosen topic, have to make a presentation of their topic and have to defend their topic. Soft skills like literature research, writing a manuscript, preparing a presentation, giving a talk in front of a committee and English writing were already developed this way and the students became familiar with their own research topic, with open research questions and specialists in their field of research. This is a very useful structure to prepare students to undertake their PhD work.

Courses are given on general topics such as biostatistics and bibliographic seminars as well as on the specific research areas. Research in the Science of Natural Resources and Applied Cellular & Molecular Biology is highly interdisciplinary as different fields are related to each other. Therefore, it is very advantageous that the students can choose and combine different topics which are relevant for their specific field of research. The student groups in the elective courses are very often quite small which ensures a very effective training and interaction between students and teachers.

It became obvious to the panel of experts that particularly the first semesters include a number of compulsory courses that have to be taken by all students, independent from their prior degrees. There was a general agreement between the teaching staff and the expert panel that the added value of these courses differs depending on the background of the incoming doctoral students without neglecting the benefits of having students reflect on one issue with different backgrounds. This concept clearly supports the idea of interdisciplinarity. However, on a global scale the didactic justification of this concept seems to be more on the side of national regulations in Chile. While this can easily be accepted by the expert panel it should not be forgotten that challenges resulting from this regulation (like less time for the individual research and practical work – as it

starts later) might impact the students when it comes to creating their own results in limited time. The experts recognize that the departments or UFRO cannot address this issue, as it is much more a question for national regulators. It seems to the experts that the programmes under review are of such quality that a greater flexibility in the first semesters would create an even higher quality of education, as it would allow stronger individualized learning paths reflecting the diversity in the student body.

## Summary

On the basis of the above assessment, criterion six is fulfilled.

## 7. Formal criteria and transparency

*The relevant formal criteria such as admission requirements and procedures, examination conditions and the award of the degree are described and have been published.*

### Description

The call for applications is published between September and October of each year. The background assessment is carried out by the Academic Committee of the Programme. The admission requirement is the possession of the academic degree of Bachelor and/or professional title in some of the following areas: Biochemistry, Agricultural and Forestry Sciences, Biology, Biotechnology, Medical Technology, Medicine and, in general, equivalent professional careers. In addition, the application form must be accompanied by the following: Application Letter to the Programme Director, Letter of commitment to the Programme Tutor, Curriculum vitae, Degree of Licensee or Magister, Concentration of Notes and Certificate of Ranking, two letters of introduction from academics of recognised prestige, two full-sized photos with full name as well as a photocopy of the Identity Card. These pre-selection criteria are published in a guideline which is available on the programme's website.

The pre-selected applicants are invited to an interview. Finally, the selection is made based on the curricular history (60%), the score obtained in the interview (30%) and the score obtained in the English proficiency test (10%), taken by the Language Coordination Programme.

The University of La Frontera uses the scale of grades 1-7 where the minimum passing qualification for the postgraduate activities is a 5. Each course or academic activity has different examination mechanisms. The respective professor must disclose the applied mechanism at the beginning of each course or academic activity. The marks of all the academic activities and the one obtained in the examination of qualification are averaged and the average mark weighs a 40% of the final qualification. The thesis and its defence weighs the remaining 60% of the graduation final grade.

In order to possess the quality of Doctor Candidate, it is required to have satisfactorily passed the compulsory and elective courses as well as the qualification exam. After completing the thesis work and with the approval of the Evaluation Committee, the student generates a written report (Thesis) that officially delivers to the Academic Committee of the Programme. This report must comply with a thesis format established in the *General Postgraduate Regulations*. The programme also requires for the defence of the thesis and the presentation of two scientific articles that can be an integral part of the Thesis' chapters. One of the articles must be published and the other must be at least sent to a WoS indexed journal.

A copy of the final version of the Thesis and a copy of the Defence Act is given to the graduate. The latter contains the approval grade. Once the thesis defence has been approved, the doctor degree is granted accompanied by the respective diploma. This diploma is delivered in a graduation ceremony organised by the university.

All the evaluation mechanisms, weights for the different activities and graduation requirements are set out in the programme regulations.

### **Assessment**

The experts group could access all the information regarding the admission criteria that are accordingly described in the specific PhD-Programme regulations. Furthermore, the exact selection/admission process, criteria for score assignment and others are well described in the regulations. All the information regarding the process and the general regulations of the PhD, including the admission process/criteria, is both available on the website of the programme and in PDF format to be downloaded directly from any person.

The enter requirements for the programme include a degree in an EQF 5 and 6 equivalent programme, locally known as *licenciatura* (which is a four year bachelor's programme) and a *maestría* (which is a two years master programme). Examination procedure and criteria, recognition processes, deadlines and all the regulations relevant for the PhD-programme are well described in the regulations of the PhD programme (as previously stated).

Grading scale and process for the award of the PhD-title are clearly stated and known by the students. Furthermore, all this information is also included in the regulations of the PhD-programme. On the other hand, the experts group could not clearly find out the criteria for grading of the different modules and the doctoral thesis defence, thus no statement can be made on this point. Nevertheless, it is important to mention that the doctoral students have clear and transparent access to the evaluation process and scale of notes, which are both described in the general regulations of the PhD-programmes and in the respective module handbook.

Finally, doctoral students receive a diploma supplement with further information on the programme's structure such as modules, credit points, language of the programme, etc. with the PhD-title.

### **Summary**

On the basis of the above assessment, criterion seven is fulfilled.

## **8. Quality assurance**

*The results of the internal quality assurance management are taken into account for the further development of the doctoral programme.*

### **Description**

The university has established a Strategic Plan for Institutional Development, in which it is defined that the university develops its essential functions in a reflexive, critical and self-critical way, constantly evaluating the results of its actions and incorporating innovations that ensure the continuous improvement of its processes and products, rendering public account of its work.

Derived from the Strategic Plan, the university defines general guidelines with respect to quality: commitment to the installation of a policy of quality assurance, the logic of "continuous improvement", the conduction of evaluative processes as the main responsibility of the institutional units supported by central technical and administrative assistance. Therefore, the University of La Frontera has developed several instances of self-regulation and control. The developed self-evaluation mechanisms consider among others data analysis (e.g. number of doctoral students per programme, composition of the student body, success rate, drop-out rate, the student's scientific productivity and of the employability of graduates), surveys and workshops in which graduates are included.

In addition, there is a commitment that the postgraduate programmes must undergo self-evaluation and evaluation processes by external bodies such as the National Accreditation Commission or international accreditation.

According to the university, the self-evaluation and external evaluation processes allow for the analysis of strengths and weaknesses of the programmes and thus design a future improvement plan. This plan should contain verifiable indicators and a schedule of implementation whose compliance is expressly reviewed by the evaluation bodies when submitted to the next evaluation event.

The university describes that it has developed criteria for been allowed to supervise doctoral students. All supervisory staff members must have the necessary background to guide research on the highest level in the respective area of research. It is further requested to comply with the accreditation criteria of the National Accreditation Commission (CNA) which include a tracked record in the research field supported by publications (minimum eight publications over the last five years) and at least one FONDECYT project or equivalent in the same period.

#### Science, major in Applied Cellular and Molecular Biology

The doctoral programme in Science, major in Applied Cellular and Molecular Biology, was accredited on the national level twice for two years between 2006 and 2010. In 2012, it received its third accreditation, this time for five years, granted by the National Accreditation Commission (CNA).

Since its creation in 2005, the doctoral programme has been adapted with regard to diverse aspects. As an example, the university names the new equipment that was installed in 2009. Since then, the research projects include increasingly new technologies allowing analysing in greater depth and detail the problems under scrutiny. Another change was experienced by the faculty in 2011, where six academics were incorporated, reinforcing the three research areas of the programme. Furthermore, English language teaching was incorporated on a systematic level.

#### Doctoral Programme in Science of Natural Resources

The programme is headed by a Director who is elected amongst and by the academic staff members. The Director selects the Academic Committee of the Programme (ACP) that consists of four professors of the department – one of them serving as a continuity professor, meaning he was also a member of the previous ACP. The purpose of the Committee is to ensure compliance with the objectives of the programme and to support its academic management.

#### **Assessment**

The experts group was able to gain a deep insight into the quality assurance system that is currently implemented at the university. The system has been already up and running for several years, thus implemented processes could be observed. Responsibilities within the PhD-programme are well defined with mainly four different structures, to be known: the vice rector of postgraduate programmes, the faculty board, the academic committee and the board of teachers.

Generally, the quality assurance system that was implemented at this university perfectly corresponds to that of a state-of-art quality assurance model. The QA-system has defined processes that both monitor the performance of the different faculties at the university and more specifically of the different graduate and undergraduate programmes. Moreover, specific quality indicators for the meta-analysis of the programme regarding number of students, rates of success, time needed for graduation, rates of abandon, etc. are monitored systematically, as described in the specific processes. The QA-system also has defined the actions that need to be implemented in case that the indicators are outside of expected defined range. Besides the meta-analysis of the programme, more specific quality indicators regarding the teaching staff, quality of the modules, satisfaction with the programme are implemented and running. Surprisingly, the participation rates of

the students in this feedback mechanism are of 100 %. The amount of formal feedback obtained by surveys to graduated students of the PhD-programme allows the university to monitor the employability of the programme.

Students have to fill the online/anonymous surveys at the end of the semester for each module, where all the mentioned indicators are monitored. The group of experts could also observe that development plans for the PhD-programmes are formulated based on the results that are obtained from this processes. Indeed, several of the improvements suggested by the group of experts had been previously detected and included in the development plan for the upcoming frame 2017-2022. This is a very good example of a solid and strong QA-system. Since the programme has also been accredited at the national level to comply with the national standards, mechanism for assuring the selection of doctoral research, assessment of doctoral research and award of doctoral degree are given.

The rector is also integrated into the QA-system, which is under the responsibility of the unit for institutional analysis and development. This unit runs the different general processes and implements the actions plan/development plan. Is important to mention that the academic committees, as well as teachers, are included into different processes of the QA-system especially regarding the further analysis of indicators. They are highly involved in the drafting of the final reports that are a key factor for the development plan.

The university has stated its desire to move towards a more systematically-based quality assurance management-more like system. This can be easily observed in many of the processes which are currently being modified and implemented. From the different interviews and documentation, the group of experts could observe that although well thought processes are developed and implemented, there is still a lack of an inclusive map that could help harmonising the currently implemented processes, so that the QA-system reflects decentralised and centralised levels and helps transparently documenting correct and sound performance of the system. Having a map of processes in which also the specific inputs, outputs and flow through the different groups of interest/stakeholders are represented, would definitely help the university moving from quality control to quality development.

Finally the group of experts would like to summarize that the quality assurance system at the university is very positively evaluated, fulfilling all criteria and even going beyond many existing quality assurance systems at European universities. This system could easily be taken as a good practice example in the field if students were included as active stakeholders in the different structures of the QA and especially would be integrated in the decision making process, since the group of experts could observe that students of the programme are only passive elements, giving input for the analysis of the different indicators.

### **Summary**

On the basis of the above assessment, criterion eight is fulfilled.

### **Recommendation of the panel of experts**

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The panel of experts recommends the Accreditation Commission of AQAS to certify the doctoral programmes “**Doctoral Programme in Science, major in Applied Cellular and Molecular Biology** (Doctorado en Ciencias Mención Biología Celular y Molecular Aplicada)” and “**Doctoral Programme in Science of Natural Resources** (Doctorado en Ciencias de Recursos Naturales)” offered by **Universidad de la Frontera** in Temuco/Chile.

### Findings:

- The experts recommend the university to further strengthen the successful line of practical training and application and use of field-specific methods and equipment.
- To further strengthen the internationalisation the field of English language teaching should be strengthened.
- To further increase employability of graduates, cooperation with industry should be intensified.