

Status – the Department of Biology strategy 2018-2025:

Understand life – preserve the environment

The strategy status evaluation process autumn 2021

The Leader group decided on September 27th that we should do a “midway” evaluation of IBI’s strategy. The strategy evaluation process was presented in a post on Innsida and in an e-mail that was sent to everyone by the Head of department on September 30th:

- Beginning of October: Inform all employees about the process by e-mail and message on Innsida.
- Late October: Assessment meetings in the teaching (TC) and research committees (RC). We will limit the assessment to part 2: Core tasks. The TC will focus on “Education and learning environment” and “Dissemination”. The RC will focus on “Research” and “Innovation”. The assessment should answer the following three questions:
 - How close are we to reach the goals described in the “Ambition” and the “Development goals”? (E.g. Completed, on our way; not even started)
 - Has the world changed since 2018 in such a way that it requires modifications of the “Ambition” and/or “Development goals”?
 - Considering the “Ambition” and “Development goals”, which specific goals should be prioritized the next years.
- Late November: Extended leader group meeting to go through the assessment and conclude the process.

According to this plan, the Teaching Committee and Research Committee discussed where the department is relative to the goals in our strategy on October 21st and October 27th, respectively. Next, input from the two committees was discussed in the Leader group on November 8th. Finally, a summary of these discussions was presented at the Extended Leader group meeting on November 24th. Below we give a summary of the results from the midway evaluation.

Education and learning environment

IBI’s educational and learning environment strategy has three pillars:

- Educating internationally outstanding students
- Quality of education
- Effective learning environment

The strategic plan describes several specific developmental goals for the educational activity at IBI. Most of these development goals are still valid and require a continued focus in the coming period. However, the goal of developing digital teaching tools, infrastructure and assessment methods has been established, mainly as a measure in connection to the Covid-19 pandemic situation during the last 2 years. Much of the teaching today can be offered as physical, fully digital, hybrid and also with video recording. It is still a discussion which teaching method that is best in the different situations and which methods that gives the best learning outcome for the students. However, it is still a goal to upgrade laboratories and flexible teaching rooms to ensure the best possible teaching.

In the following, developmental goals of IBI that still need to be focused are listed:

It is a priority goal that IBI has learning environment that ensures that we educate outstanding BSc- and MSc-candidates who are in demand by employers. To achieve this goal, the subject portfolio of IBI must be updated regularly, so that the total portfolio reflects the professional profile at IBI. It is important that this also reflect the needs of the society. In order to succeed in this, it is important to ensure good collaboration within the department and with cooperating departments. Today this is already established in several study programs at the department.

Furthermore, it is important to continue to strengthen cooperation with outstanding international and national research and educational institutions. This will increase the quality and robustness of our education and increase student exchange. Today, experts from NINA, SINTEF, the Norwegian Veterinary Institute and IMR are used as lecturers in several subjects. These institutions collaborate also in the supervision of both MSc- and PhD-candidates. It is important to have continued priority of this goal.

It is also a developmental goal that IBI should ensure that the employees at IBI experience that the department has a good teaching environment for the employees at IBI. It is experienced by several subject teachers that there is an imbalance in teaching load among the subject teachers. An overview of the teaching load and use of teaching resources in the various subjects at the department will be made. This will be used to get a better overview of the total teaching activity and the resources the department spend in the total teaching activity. It is also important to ensure the staff's teaching and supervision competence. IBI has established the "Utdanningsklinikken" as a tool for improving the pedagogic skills of the teachers. It is a clear goal to strengthen this work so that more people participate in this activity.

It is also important to continue the work of ensuring good study administrative support. The study administration today works well, with great satisfaction among the subject teachers. This is important to continue also in the future. It is also important to continue with strong focus on good quality reporting systems, both of subjects and study programs. The routines are simplified, and it is important that these are followed up at all levels at the department.

It is a goal that IBI should be an attractive biology student environment, for students from all over the world. The various study programs at IBI have somewhat varying application numbers. Most programs experience good application numbers from Nordic students, and some also get good applications from international students (EU and outside the EU). In order to increase the recruitment of good students to our programs, it is important that our study programs are visible and correctly marketed. In this work, it is important that we have informative webpages that gives good information about the different education programs we offer. It is furthermore important that this information is regularly updated and visible on our websites. In this work, the NV faculty contributes to the profiling of several programs.

Furthermore, it is a goal to ensure that the study environment increase the proportion of students who complete their study in the standard time and at the same time prevent dropouts. For several study programs, there are good identity areas and student workplaces, and which the students give good feedback on through the "study barometer". In the BSc programs, such identity areas and workplaces have been deficient, which the students are dissatisfied with. It is therefore still a goal that there is a focus on increasing student satisfaction with the study environment within all study programs.

The strategy plan also describes that it is a development goal to develop courses for continuing and further education possibilities in several areas. This is something that can be focused on in the

coming period. Various EVU courses have been discussed at IBI, but this is also an activity that is financially demanding and will require additional resources to complete.

Based on the above discussion, especially the following areas are pointed out for further priority focus:

- To ensure the education of excellent BSc- and MSc candidates for future employers. Many of our students get jobs in national agencies related to ecology and biodiversity. There are some concerns at for example the Norwegian Environment Agency and NINA regarding the decrease in number of academic staff within basic ecological sciences at IBI. We should therefore ensure that education in fields like ecology and biodiversity is well supported also in the future.
- The department should be a good teaching environment for the staff at IBI.
- IBI should be a preferred educational institution for biology students, and at the same time prevent dropouts.

Research

IBI's research strategy builds on NTNU's research pillars:

- Developing talented researchers and excellent research environments
- Quality improvement throughout our organization
- Research within and across disciplines

The midway assessment of IBI's strategy showed that we have either fulfilled or are well on our way to fulfil our ambitions. In summary, we make important contributions to new knowledge and understanding of nature's complexity, links and mechanisms, from gene to ecosystem levels, and we carry out fundamental research of a high international standard in the basic disciplines (cell and molecular biology, physiology, behaviour, ecology and evolution). Furthermore, we have much interdisciplinary collaboration with leading national and international research groups that enable the department to contribute to greater understanding of and better ability to predict the effects of global environmental challenges (climate change, pollution and loss of biodiversity). The department's research strongly supports NTNU's strategic research areas, especially NTNU Oceans, NTNU Sustainability and NTNU Biotechnology. We have a separate marine strategy, and some of the research related to NTNU's strategic areas helps to ensure sustainable use and management of natural resources. As an example, IBI is involved in 4 out of 9 NTNU Sustainability projects that were awarded in 2021.

The quality of IBI's research is reflected in extensive publications in international scientific journals, with approximately 200 papers per year of which 40-45% were in Level 2 journals the last couple of years. Our publications include scientific papers in high-impact journals such as Nature, Nature Plants, Nature Communication and PNAS. Our publications are open source, and it also seems that most of our research data is stored and made available in accordance with current research policy.

Many of our research groups are regarded as attractive partners for national and internationally recognized research groups, industry and the public sector, and do well in national and international competition arenas. This is evident from one SFF V initiative getting to the second round, a relatively high rate of successful project grant applications to the RCN (ca. 60 mill NOK in 2021, and 15-20% successful applications annually) as well as successful EU project grant applications (ca. 30 mill NOK in 2021).

Employees in PhD, postdoctoral, research and recruitment positions constitute a very important part of the department's research. The doctoral programme generally maintains a high international level and recruits highly motivated candidates nationally and internationally. IBI produces a high number of MSc-, PhD- and postdoctoral-candidates (on average 17 PhD's per year in the period 2019-2021).

This overview shows we have already fulfilled or are clearly fulfilling most of IBI's ambitions and development objectives. However, some ambitions and development objectives were identified where improvement is needed:

- Although IBI's research groups have extensive intra- and interdisciplinary collaboration in national and international arenas, our research groups need to become more inclusive and cooperate more closely within and across departmental subject areas, both scientifically and socially.
- We are relatively successful in competition for funding of our research through for example the Research Council of Norway, and the scores of our project applications is usually high. However, there is still room for improving quality of applications and hence our success rate, and an internal support system for this should be established at IBI.
- In general, IBI focuses on close guidance and follow-up with PhD candidates, and the programme completion levels are high. However, the time spent on completing a PhD-thesis is on average longer than normal and should be reduced, and we should reduce the number of PhD-candidates that quit before they finish. Some measures to achieve this could be to facilitate research-stays abroad and attendance of conferences by providing travel grants from IBI, improve course portfolio and organization and management of existing PhD-courses, revise information about the midterm evaluation, and develop some guidelines about the expectations for a PhD-thesis.
- IBI has highly specialized research laboratories equipped with modern scientific equipment, which is available to all relevant users. These laboratories are managed by highly qualified technical staff, but there is still a need to streamline and optimize our technical research support and increase the visibility/access of existing support and infrastructure. A first step could be to make a better overview of the existing research instruments and research laboratories, and the expertise of contact persons.
- Research groups at IBI manage and maintain several unique long-term data series from natural terrestrial and aquatic systems. These research infrastructures have already been the foundation for many successful project grant applications and make IBI an attractive partner in interdisciplinary and national and international cooperation. The long-term data series are also used in teaching at IBI and other departments at NTNU. However, there is need for support from IBI and/or higher levels at NTNU to maintain and manage such important infrastructure.
- Our collaborative work with the business and public sectors is highly relevant for our strategic research focus but its extent could be improved.
- Career plans have been implemented for postdocs, but there is still a need for implementing similar career plans for researchers.

Innovation

The innovation strategy rests on three pillars:

- Collaborating with established business
- Collaborating with the public sector
- Helping to create new business

The midway assessment shows that IBI contributes to sustainable development in society through our research and education. Our employees and students help to identify new business opportunities and inventions, innovative improvements to existing processes, and see their own field of study in a wider societal context. For example, an internship program has been established for NARM students to increase societal engagement and impact, and models for sustainable harvesting developed at IBI are used in both fish and wildlife management.

IBI's education and research in the basic biological disciplines and interdisciplinary areas – including selected global challenges, marine food production, mapping, use and management of food production and natural resources, plus technology and method development – are key factors in ensuring sustainable development and innovation in society. During their studies the students at IBI face issues that are relevant to working life, and they acquire tools and methods that are important for innovation. Thus, IBI's candidates have the possibility to become attractive employees who acquire tools and methods that are important for innovation and are able to contribute to the sustainable development of society.

Although it appears that most ambitions and development objectives regarding innovation are fulfilled, there are some points that should be improved:

- Employees at IBI should be better informed about what innovation means (in a wider sense), as this will show that we are generally more involved in innovation than most currently believe. One relevant action would be to invite NTNU Technology Transfer AS (TTO) to give a presentation about how IBI can contribute to innovation.
- The interdisciplinary research and collaboration with public and private sectors can be increased, for example by better use of "Næringslivs-PhD" and "Public Sector PhD project" funded by the RCN.

Dissemination

The dissemination strategy is based on three pillars:

- Dissemination of results from research and artistic development to the research community and to students.
- Communication and outreach to share knowledge with the public.
- User-oriented communication of research aimed at specific groups who can apply the knowledge and technology in their work practice.

The strategy plan of IBI has prioritized several development goals for dissemination, and when reviewed in connection with the mid-term evaluation, these were considered to be still relevant and should be further prioritized.

There is a varying degree of whether the department has achieved these goals or not. One development goal deal with the development of communication and communication skills for students and staff. The goal is to integrate communication activities as part of the study programs / work assignments. This is now established in all MSc programs, where all programs have seminar series where students give two presentations of their projects. Here they will gain experience in presenting their work and get feedback from fellow students. In addition to these seminar series, students are encouraged to give presentations in various scientific forums.

Areas where IBI has started activity, but where it is still important to prioritize further activity, is to develop and contribute to initiatives particularly aimed at children and young people, as well as to increase dissemination activity in general in order to increase the interest of biology in the society. In the long run, this will increase the recruitment of students. Today, personnel from IBI are active with presenting their research in scientific - and general society forums. Several employees at IBI actively participate in dissemination through various newspapers and Gemini. In addition, IBI personnel are active in disseminating knowledge to young people (ground school and upper secondary school) through events such as "Forskningstorget" and "Science Night", as well as to children through e.g. "Barnas Fjæredag".

It is also a described a development goal to increase our participation in fact-based public debate, through articles, chronicles, and published opinions. Some professionals at IBI participate in this with articles in newspapers and magazines. It is a goal to increase this activity and be more visible in this field.