Development Goals and Measures (UMV) 2022-2025

The National Food Institute

1 Summary

The National Food Institute conducts research into and disseminates—through advice, innovation, and teaching—sustainable and value-creating solutions in the area of food and health for the benefit of society. This is the Institute's mission.

The National Food Institute's vision is to make a difference by generating future prosperity through food and health research. The Institute prevents disease and promotes health, develops new and better foods for the growing population, and creates sustainable technological solutions. See Figure 1.

The vision is in line with the UN Sustainable Development Goals, where the Institute's activities especially contribute to meeting the following goals: Zero Hunger (2), Good Health and Well-being (3), Quality Education (4), Industry, Innovation, and Infrastructure (9), Responsible Consumption and Production, with particular focus on circular bioeconomy (12) and Climate Action (13). See Figure 2.

The Institute's vision therefore seeks to solve some of the biggest social challenges the world is facing, including the green transition.

The National Food Institute is also known for employing high academic competency in and across a wide range of disciplines, and for its interdisciplinary approach, which allows the Institute across disciplines to present research-based proposals for solutions to significant food and health challenges. The Institute delivers its outcomes through interdisciplinary collaboration in, for example, nutrition, chemistry, toxicology, microbiology, epidemiology, modelling, and technology.

The National Food Institute is an organization with big ambitions, and its research areas have been selected as beacons in a bid to meet the above societal challenges and support DTU's strategy. The Institute's research provides the basis for the socially relevant teaching, credible scientific advice giving, and value-adding innovation which the Institute also provides. The core of all the Institute's activities is its dedicated employees who make up and support the knowledge-based organization.

In summary, the strategic research, teaching, scientific advice giving, and innovation objectives for the coming years are that the Institute:

Ambitious research	• creates solutions for a sustainable transition of food production
	• uses the opportunities offered by digitalization in food and health research
	• prevents disease and promotes health through an interdisciplinary approach to research into healthy food products

Socially relevant teaching	• creates strong study programmes which meet the need in society for graduates with relevant engineering competences in food production, technology, and innovation
	• provides the students with a strong basis for future innovation and entrepreneurship
	• develops a teaching environment with an emphasis on the lecturers' didactic development
Credible scientific advice	• converts research-based knowledge at the highest level into relevant advice aimed at promoting a healthy, safe, and sustainable diet, as well as a sustainable food supply
	• disseminates research-based knowledge as credible, transparent, and value-creating advice to relevant authorities, companies, and industries, nationally and internationally
	• increases the effect of scientific advice for requestors
Value-adding innovation	• creates innovation through new food technologies and digital solutions in circularity and sustainability
	• drives the green transition through public-private partnerships and knowledge-based alliances
	• seeks innovation opportunities through DTU's strategic partnerships

Figure 1. The National Food Institute's vision

Figure 2. The SDGs to which the Institute contributes

2 Research

The National Food Institute creates sustainable technological solutions, develops new and better food products for the growing population, prevents diseases, and promotes health. The Institute's vision forms the basis for the strategic objectives for the Institute's research. These goals support DTU's strategic objectives that DTU will develop technologies for sustainable change and lead by example in the realization of the opportunities offered by digitalization. To show the interaction between the Institute's vision and DTU's strategy, the Institute's research strategy for the next four years is that the institute:

Creates solutions for a sustainable transition of food production
The food system from farm to table—including the food loss that occurs in the production chain—has a major impact on Denmark and the global use of resources, carbon emissions, and climate change.

The Institute's vision is therefore to create sustainable technological solutions and to develop new and better (sustainable and safe) food products. The solutions—and the Institute's research—ranges from optimizing existing food production methods and processes to completely rethinking the current food industry to minimize the climate footprint of the sector.

A sustainable diet should not only be climate-friendly in terms of carbon emissions and resource consumption. It must also be nutritious, safe with a low content of harmful substances, and of a high quality to meet consumer preferences. The Institute consequently conducts research into the creation of healthy, safe, and sustainable high-quality products that taste good.

The Institute develops mathematical models that can be used to, e.g., reduce the consumption of resources such as water and energy in food production, to avoid food waste and food loss, and to maintain and preferably increase food safety.

The Institute also develops new technologies for testing and documenting food and feed quality and safety, as well as generic processes in resource optimization. In addition, the Institute develops new sustainable food products, ingredients, and food packaging that entail new requirements for approval and protection of food safety.

Utilization of side streams in food production will be a key focus area in the coming years. In fact, the focus is on reducing waste throughout the value chain and improving the utilization of scarce resources by limiting food losses through the use of new chemical, microbiological, and digital technologies.

The Institute also contributes to rethinking sustainable production in one of the most environmentally-unfriendly sectors by, for example, conducting research in and developing brand-new, nutritious, and plant-based food products and beverages, using cell factories to create new ingredients and biotechnology-based food production, and using new raw materials from underutilized marine resources, invasive species, and insects, which can be used as new food products in themselves, or as a basis for extracting health promoting substances.

Uses the opportunities offered by digitalization in food and health research
The Institute's focus on controlling and reducing the spread of infectious diseases and antimicrobial resistance is about looking across sectors and at the correlations between animals, food, humans, and the environment (One Health). This requires complex bioinformatic models and the collection of gigantic data volumes globally.

In addition, the Institute has a unique holistic view of food products, where the Institute looks at both harmful and beneficial health effects and calculates an overall risk-benefit balance based on mathematical models. In the coming years, the Institute will increasingly collect and process complex data and exploit opportunities in AI, including machine learning.

The Institute creates or collects large volumes of data on behalf of Denmark that are of importance to research and advice in health, sustainability, and food safety- These data are communicated to the EU. Other data are collected worldwide to create global monitoring of infections and antimicrobial resistance, and others are obtained in research projects. During the UMV period, the Institute will make several of these data collections available and visualize them, so that other researchers and society in general can benefit more from these extensive resources collected over many years.

The Institute develops models for predicting quality, microbiological and chemical safety, degradation of bioactives, and much more to increase research in promotion of health and to improve sustainable food production. The Institute will work to develop virtual models such as digital twins for food processes to conduct research in optimization of resource consumption in food production. During the UMV period, the Institute will also look at how it can interact with the many other models for, for example, prediction of microbiological food safety.

Prevents disease and promotes health through an interdisciplinary approach to research into healthy food products
There is talk globally of a food crisis with food shortages due to growing populations, with malnutrition and overnutrition, and with diseases related to harmful chemical substances or microorganisms in the environment and in food. The major challenges of climate change, urbanization, and industrialization of all food systems affect the health of all people and create a risk of exposure to harmful substances.

The Institute's research has a interdisciplinary approach to healthy food products, food safety, and disease prevention throughout research in 1) healthy nutrition and sustainable diet, 2) protection of the population against exposure to harmful chemicals and allergens, 3) development of new and better methods for risk assessment, infectious diseases, and antimicrobial resistance, and 4) the complex correlations between food, health, and elements that are harmful to health in interaction with the surrounding environment.

Health promotion and disease prevention require knowledge of the exposure to good or harmful chemical substances and microorganisms. This requires research in cross-border exposure, and the Institute's research in chemistry and microbiology is consequently anchored in Europe or globally via networks and collections of samples worldwide. In addition, the Institute's research in food technology can develop processes that increase the level of beneficial substances and microorganisms and inhibit the development of harmful substances.

To understand the mechanisms behind disease development or health promotion, the Institute will strengthen its mechanistic understanding and research of everything, ranging from intestinal ecology, the effects of microorganisms on the conversion of substances, the development of food allergies, factors affecting the bioavailability of healthy substances such as vitamins, and to the understanding of how exposure to mixtures of chemical substances can lead to cocktail effects in the foetus.

In the development of new food products from alternative sources, it is essential that health and food safety are incorporated as factors from the outset. The Institute will work even more on this in the coming years by focusing on bioactives, circular economy, and the development of new food products and ingredients. New food products must not only be sustainable, but also promote health.

Continuously increases the value for society with higher quality and focus on research
The research conducted by the Institute was evaluated in November 2019, and the research groups continue to work with—among other activities—focusing the research based on a portfolio approach.

The Institute's research objectives are not to achieve significantly higher outputs measured quantitatively. The objective is instead to increase the quality of both projects and publications for the benefit of society as well as the students and researchers involved.

3 Study programmes

With focus on meeting the need for highly-qualified staff in the food processing industry and related sectors, the National Food Institute wants to contribute to DTU's goal of offering Europe's best engineering education. The Institute's ambition is that graduates should have high professional and relevant engineering competences as well as a inquisitive, innovative, and creative mindset that will prepare them for entering the world of business for the benefit of society and the solution of future national and global challenges.

The National Food Institute will ensure that more programmes and courses are offered in food science, technology, safety, and innovation. This will be achieved through a twofold approach: firstly through cooperation with other departments and contributions to the new B.Sc Life Science Technology and DTU School of Innovation initiatives, and secondly through further involvement of the Institute's researchers, consultants, lecturers, and especially supervisors.

The Institute will develop and support its lecturers so that they can continue to increase the quality of their teaching. The supply of courses is planned based on an objective of increasing the number of students on the individual courses, strengthening the students' general competences, and ensuring that they are given an actual choice and opportunity for specialization.

The strategic objectives for the UMV period are that the Institute:

Creates strong study programmes which meet the need in society for graduates with relevant engineering competences in food production, technology, and innovation
It is an ongoing task to clearly profile DTU's food study programmes, update graduates' competences to keep up with the needs of society, and foster links between the study programmes and the Institute's strong research areas.

DTU's strategy will be directional for the development of the courses. The Institute's courses in—among other fields—technologies for sustainable transition, development of new safe food products, and circular economy and bioeconomy must have clear learning objectives for sustainability and digitalization. New engineers must be able to identify and implement technological solutions that reduce the climate footprint of the food sector, promote sustainability, maintain a high level of safety, and strengthen the profitability of the sector.

Provides the students with a strong basis for future innovation and entrepreneurship
With food products as the foundation, the Institute has a unique platform for combining practical learning that is based on actual societal challenges with in-depth academic studies and innovation. The Institute focuses on including learning outcomes on innovation and entrepreneurship in relevant courses, and on

creating clear courses that support student innovation through both intra-curricular and extra-curricular activities. The Institute also focuses on ensuring that the students experience interdisciplinary and inspiring collaboration between companies and the University's researchers during their studies.

Develops a teaching environment with an emphasis on the lecturers' didactic development
The National Food Institute will continue to develop high-quality, academically challenging courses based on a strong pedagogical culture among lecturers, and by working towards peer supervision and the development of pedagogical and didactic methods.

The closure of the campus during the coronavirus lockdown has resulted in a quantum leap in the use of digital methods for teaching, supervision, and feedback. The experience from this will be included in the assessment of how the students' on-site time with the lecturers is utilized optimally.

During the UMV period, the focus will also be on faculty rejuvenation and development of the lecturers' didactic methods. In this connection, the Board of Studies will update the practice used to evaluate the quality of the courses taught and to recognize best teaching practices.

3.1 PhD programme

An expected continued increase in externally funded projects will increase the number of PhD students in the Institute with the goal being to transfer research-based knowledge within the Institute's areas to the industry and elsewhere in society after the students have completed their PhD programme. The Institute's PhD programme is based on the Institute's vision goals and the UN Sustainable Development Goals, which the students must use in relation to their project. In the coming years, the Institute will increase the PhD students' well-being, as this is regarded as essential to a well-performed project.

The Institute has participated in the steering committee for DTU's future organization and requirements for the PhD programme and is looking forward to greater focus on the individual student's research development and talent care. The Institute's PhD programme received a good assessment in the international research evaluation in 2019, and the new framework and initiatives at DTU are a good follow-up on the evaluation.

During the Institute's mandatory internal PhD course, the students are presented with a number of important support functions at DTU, including the research librarians, innovation partners, and DTU Skylab. This supports the innovation potential of their projects, the impact of the project on 'technology for people', as well as their career opportunities and talent development.

The PhD students must all have direct teaching as an agreed part of their study plan and be more involved in classroom teaching activities. Some will also be involved in the research-based public sector consultancy. Finally, the PhD students play an important role in the practical co-supervision of BSc students and MSc students in their final laboratory projects, which is regarded as important for their career development.

3.2 Lifelong Learning

The National Food Institute will contribute to the development of the area of continuing education and has established a collaboration with DTU Learn for Life. The Institute's strategy focuses on further and continuing education in food safety, where the Institute has extensive experience in training and conducts extensive research activities. During the UMV period, the establishment of the 'Master in Safe and Sustainable Food Production' programme in collaboration with the University of Copenhagen will also be a priority, but the Institute will be open to the implementation of tailored courses for specific companies.

The MSc programme has an international aim, is offered in English, and is based on e-learning combined with an annual on-campus conference. The plan is to enrol the first students in early 2022.

The Institute also forms part of an EFSA-based consortium aimed at establishing the 'European Excellence Label in Food Safety Risk Assessment'. The Institute expects that it will strengthen the profiling and marketing of DTU as a global provider of (continuing and further) education in food risk assessment. The Institute expects to be able to offer courses in food safety and risk assessment, both as a comprehensive study programme and as individual modules, which can provide great mutual synergy.

The Institute offers the majority of its ordinary courses as open education, which can contribute strategically to meeting the needs of the industry and public authorities for further and continuing education. The Institute will also hold individual seminars, webinars, and workshops where relevant, and develop the Institute's portfolio of MOOCs (Massive Open Online Courses).

4 Scientific advice

One of the Institute's strengths is its ability to create added value in its scientific advice through close collaboration between the academic focus areas: chemical food safety, chemical product safety and GMOs, microbiological food safety and nutrition. Data from studies of the Danes' diets are thus central to nutrition, sustainability, and health promotion, as well as chemical and toxicological risk assessments, and in risk-benefit analyses. In addition, there is potential for close interaction between food technology and modelling for use in evaluation of microbiological and chemical food safety. This is a national position of strength held exclusively by the Institute.

For the coming years, the strategic objectives for scientific advice are that the Institute:

Converts research-based knowledge at the highest level into relevant advice aimed at promoting a healthy, safe, and sustainable diet, as well as a sustainable food supply
The National Food Institute will still convert research-based knowledge about sustainable diet and food supply, maintain its position as the preferred supplier of academic advisory services in food safety to Danish authorities (the Danish Veterinary and Food Administration (FVST), the Danish Environmental Protection Agency (MST), and the Danish Agricultural Agency (LBST)), and expand its position as the preferred Danish partner for both national and international companies and authorities in food technology and innovation as well as food safety and nutrition.

The Institute undertakes international advisory assignments—especially for the EU, WHO, FAO, and the OECD—but also for the Nordic Council of Ministers. Many tasks are performed under the auspices of the European Food Safety Authority (EFSA), and the close partnership means that the Institute's research and expertise influence the European food safety agenda. The Institute leads the way in, for example, risk assessment of endocrine-disrupting substances and new methods for testing chemicals, which provides a wide footprint across risk assessment of chemicals in a broad sense. Because of the close contact with the Institute's sister organizations in Germany and France, the latest knowledge and thinking about food safety in Europe can be made available to those receiving scientific advice from the Institute.

Disseminates research-based knowledge as credible, transparent, and value-creating advice to relevant authorities, companies, and industries, nationally and internationally
One of the ways in which the Institute will meet this objective is by disseminating the scientific basis for the Institute's scientific advice to public authorities, while—where possible— also creating a basis for commercial advisory services to industries and companies with great focus on impartiality when performing such assignments.

The Institute has cooperation agreements with sister organizations in countries that are important export markets for Danish food companies. Through these agreements, the Institute will help increase the capacity in food safety, risk assessment, and monitoring in the countries concerned, which the Institute expects will indirectly benefit Danish companies. In close synergy with the Institute's activities in lifelong learning, the initiative will contribute to bringing Danish experiences and results in food safety into play in a global context.

In 2019, the economic basis for the EFSA's activities was significantly increased, which is expected to strengthen the Institute's opportunities in the future collaboration. Here, special focus areas will be to work for acceptance of methods in gene sequencing for monitoring of antimicrobial resistance and food-borne pathogens, expanding One Health collaborations, disseminating knowledge of risk-benefit assessment methods, and expanding the collaboration in the field of QSAR.

Increases the effect of research-based advice for requesters
The Institute will meet the goal of increasing the effect of scientific advice for requesters by developing its advisory services, effect measures, and decision-making support systems in a number of areas. In this connection, the Institute will

- assess the significance of combining chemical substances to better advise on the potential risk to human health
- drive the development of integration of data from new testing methods into risk assessment of chemicals
- include sustainability aspects in risk-benefit analyses and strengthen the weighing of possible harmful effects against the beneficial effects of the food product(s) in which they occur
- further develop methods that include different sustainability aspects in nutrient and dietary recommendations and implement them in different arenas
- create value through recycling and upcycling of low-value streams from primary production and food production into high-value products, for example in relation to food contact materials
- develop and assess plant-based diets and alternative protein sources
- develop predictive models in microbiology and food technology for the benefit of both public and private employers
- strengthen the One Health-based approach to addressing food safety issues to ensure the best possible societal impact of initiatives
- assess new foods (processes and products) from sustainability and food safety perspectives
- strengthen the monitoring of antimicrobial resistance and related capacity building in the EU and third world countries
- promote significant parts of the public availability of monitoring data in more real time than previously.

5 Innovation

Development in science and new technology is essential to our ability to adapt to a future warmer climate and the rapid changes in the food system. Innovation occurs across research, education, and scientific advice giving. The National Food Institute's innovation activities therefore focus on contributing to the green transition by creating the foundation for a healthy population through healthy, safe, and sustainable food products.

These initiatives require cooperation, and the strategic objectives for innovation are therefore that the Institute:

Creates innovation through new food technologies and digital solutions in circularity and sustainability
The Institute will achieve this through strategic build-up of its research capacity and infrastructure in selected areas. This includes strategic build-up of our pilot plant facilities around a learning platform for digital twins.

Furthermore, the Institute will focus the students' learning by putting the green transition in the theoretical context of circularity and sustainability. The students acquire a practical understanding in connection with internships and projects with companies and organizations. The Institute thus forges even closer ties with the important partners in the companies.

Drives the green transition through public-private partnerships and knowledge-based alliances
The Institute will achieve this by being an active partner in the business promotion organisation Food and Biocluster Denmark and will, through this partnership, work to increase the innovation capacity of the sector. A maturation of the partnership is in process.

The Institute will also work with other companies, partners, and specific programmes to create knowledge transfer to industrial development and innovation centres. Scaling is necessary, and acceleration is the challenge. At DTU, DTU Skylab is a natural partner, also when it comes to internationalization.

Seeks innovation opportunities through DTU's strategic partnerships
The Institute will promote innovation opportunities by actively seeking the possibilities for collaboration offered by DTU's strategic partnerships, including Nordic Five Tech, EUROTECH, collaboration with Greenland Self-Government and the Institute's partners BfR and ANSES.

The Institute is also to work determinedly to contribute to making DTU Industrial Partnerships an activity that provides value for the Institute's partners. This is done through joint study programmes, PhD projects, and research and development projects. The Institute is particularly strong in the marine area, which results in strong Nordic relations.

6 Partnerships

The National Food Institute has a large network among Danish and international research institutions, companies, and authorities.

The Institute enjoys good cooperation with the large research environments at the University of Copenhagen (UCPH) and Aarhus University (AU) on—for example—research projects, infrastructure, and educational activities. AU has initiated a National Centre for the Sustainable Conversion of the Agricultural Sector (CBOL). The Institute is working to get DTU involved in a wide range of the centre's activities.

On behalf of DTU, the Institute participates in the business promotion organisation Food and BioCluster Denmark (FBCD) to increase DTU's visibility and cooperation with—in particular—SMEs in Denmark. It will be interesting to follow how this can support the transfer of knowledge from universities to small enterprises.

The Institute has several joint PhD projects with DTU's international strategic partners and a strategic partnership with the two main independent food organisations in Europe—BfR in Germany and ANSES in France—with which the Department will continue to hold conferences, exchange staff, and launch joint projects. CDC and FDA in the USA, EFSA and ECDC in Europe, and RIVM in Hollands are also strategically important partners.

The Institute participates in Med-Vet-Net, a network among 13 European countries with focus on research and advice on zoonoses, and the Institute will continue its involvement in the Global Centre for Food Safety and Quality (DISH) in partnership with The Hong Kong Polytechnic University in China, Lund University in Sweden, and the University of Bologna in Italy. This initiative will potentially lead to greater cooperation with and access to the Chinese market in particular, as well as student exchanges. In addition, the Institute is involved in various networks and forums in the EU in the fields of health, food, and sustainability.

7 Organization

The National Food Institute's strategy supports its ambition to be a leading institution with strong groups which are rooted in excellent research and contribute to teaching, advisory services, and innovation.

The organization is structured in four academic divisions, thirteen research groups, and three supporting units (see Figure 3). The aim is to have a small number of focused research groups, which support the vision and the strategic goals. In addition, the Institute has three units that are important in supporting the Institute's activities: the Institute Secretariat and Research Promotion well as the Service Unit, which handle several of the nstitute's needs.

Interdisciplinary coordination of research, teaching, advice, innovation, administration, and finance processes is embedded in the management team. The coordinating leadership task extends across the Institute and clearly defines responsibility both internally and externally. The leadership task is thus located both in the line organization (staff) and across (academic disciplines) in a matrix illustrated in Figure 4.

The Institute generally focuses on promoting collaboration across DTU in various working groups and collaboration on academic activities to a great extent.

The international research evaluation supported the choice of the research groups' areas. The organizational framework for the research groups has been created based on the intention of eliminating as much administration as possible in relation to financial follow-ups and HR tasks, etc.

Figure 3. The National Food Institute's organization

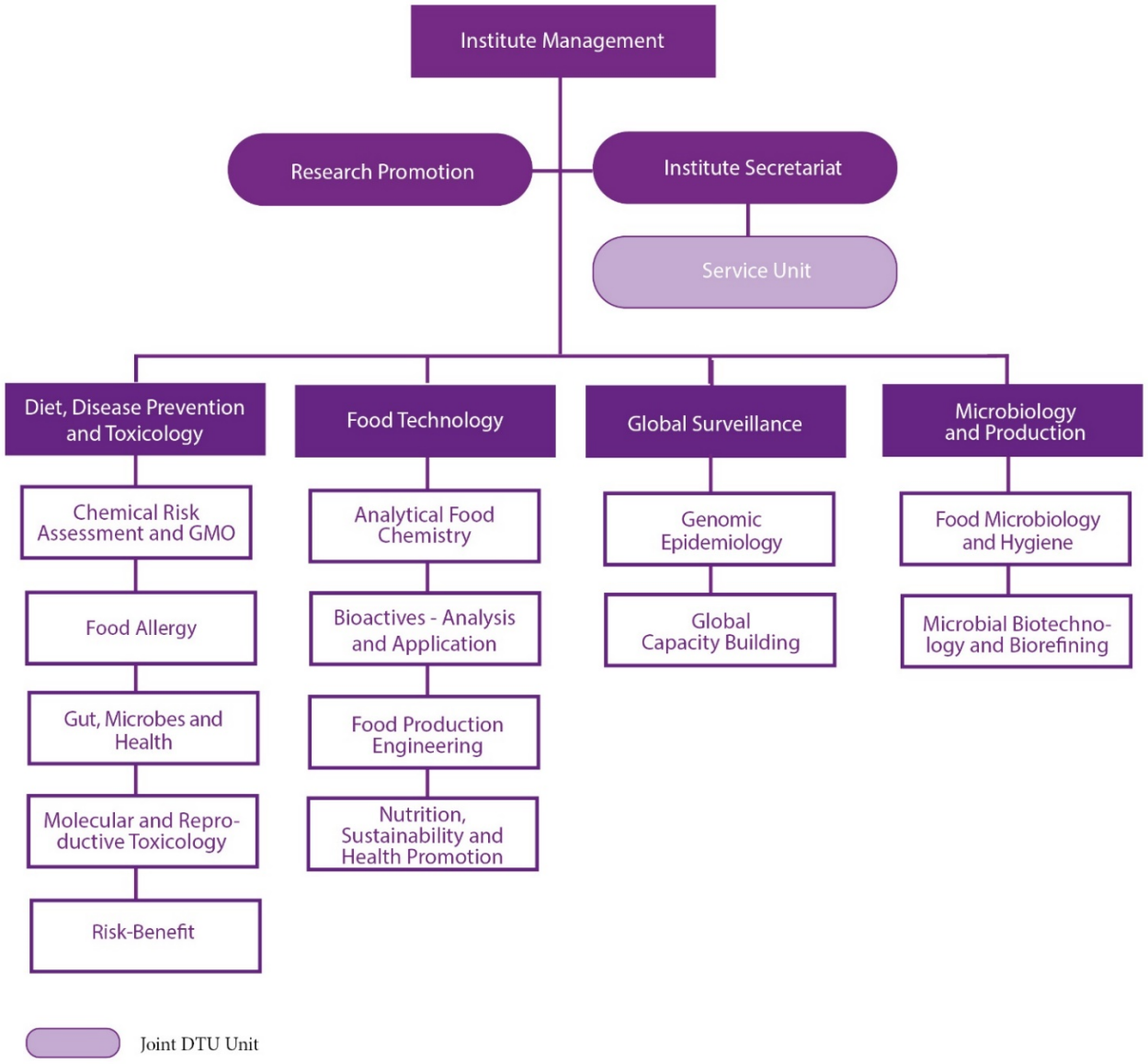
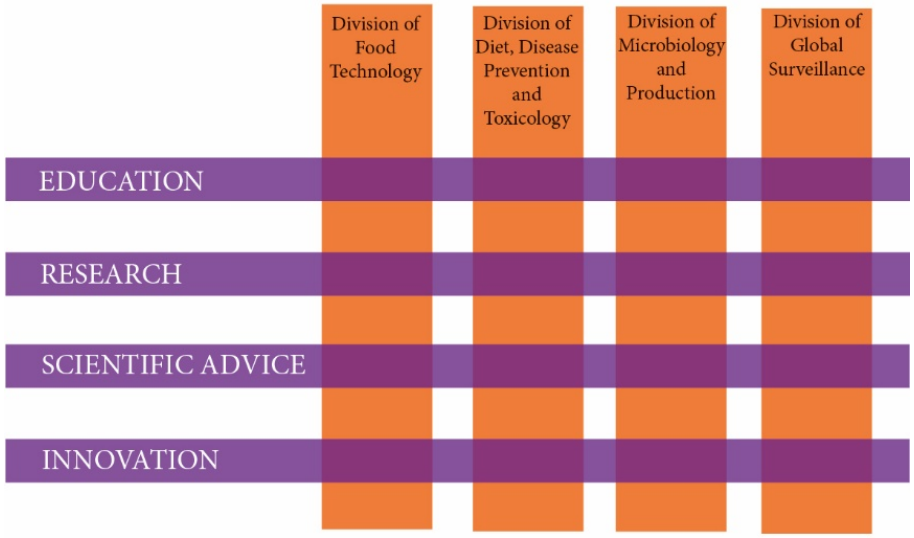


Figure 4. Matrix-organized leadership responsibility



7.1 Management and executive development

In the coming UMV period, the focus will still be on implementing the outcome of the international research evaluation (autumn 2019) and on talent development. Commitment and motivation are driven by academically exciting projects aimed at solving societal challenges. The work is meaningful and takes place in an environment in which individual employees are able to enter into a dialogue with management and are involved in the strategic work which is relevant to their day-to-day activities.

The group leaders are research managers and role models and—to strengthen them further in their management field—the aim is to have an even higher degree of discussion of relevant subjects and challenges to increase knowledge sharing at the group leader meetings. Here, they will have the opportunity to discuss subjects of current interest and relevance in a joint community of like-minded people.

7.2 Employee development

In future, employees at the National Food Institute are to talk and work even more together across academic competences, and cultures to create an inspiring working life. In a developing working life, employees continuously assess their own work performance, so that they constantly work to improve in their field, while also thriving. Therefore, the Institute wishes to preserve a stimulating working environment with competent and helpful colleagues who support diversity, mutual respect, and recognition of each other as a natural part of their work culture.

DTU tenure track will support the career development of the Institute’s young, talented researchers and ensure a clear common thread in accordance with the

expectations of the group and the National Food Institute. The annual review and mid-term evaluation must ensure that the best employees are attracted and remain, and that fewer leave prematurely. This will be done on the basis of essential criteria for research publications, attraction of funding, generation of original ideas, research/innovation on an international scale, the establishment of international networks, and the ability to teach and communicate research and innovation.

All other employee development will also be based on the good dialogue between employee and manager.

During the coming UMV period, the focus will also be on faculty rejuvenation and development of the lecturers' didactic methods.

7.3 Attraction and recruitment

Via the National Food Institute's level of research and visibility in the research community, the Institute will increase its attraction of the best talents, and thus expectedly also be able to boost DTU's diversity. With the implementation of the tenure track programme, the Institute also hopes to attract international talents and offer focused management attention.

The research evaluation in 2019 pointed out that the Institute needs to revitalize its recruitment strategy with focus on a future succession process. Therefore, the Institute will draw inspiration from the tenure track programme in relation to qualification of job advertisements, choice of advertising channels, and the further recruitment process to ensure that all job advertisements support the Institute's strategy and reach a field of applicants who are as qualified as possible.

The Institute continuously assesses the areas in which increased research activities are required to utilize opportunities and contribute to the Institute's mission. Therefore, the Institute will be strengthened with a professor in digital support of the food technology area. In the long term, a further professorship will also be established to strengthen the sustainable nutrition area.

7.4 Working environment

The coronavirus pandemic and the periods with restrictions and partial sending home of employees have forced the Institute's employees to work under other forms. The aim is to continue working on this realisation and use the experience to acquire greater flexibility in working from home, but also to take the reduced environmental impact into consideration.

The focus will be on the employees' well-being and performance based on a differentiated approach, which must also take into account that a number of tasks require presence on campus and use of colleagues as sounding boards. In future, the exercise will be to learn from our experience in balancing motivation and work performance in a changing culture, while ensuring social cohesion at the Institute.

8 Material resources

8.1 Research infrastructure and laboratories

The National Food Institute's research infrastructure has been developed to supply and maintain data about foods, health, and production processes, and it is a key hub for all the Institute's activities, including participation in international partnerships, and attraction of competent researchers from Denmark and abroad.

The Institute was one of the main applicants behind the national research platform FOODHAY in 2019. Therefore, the Institute's investments in research infrastructure will especially be characterized by this grant in the coming years. The investments are made in cooperation and after consulting with the food environments at UCPH and AU, and the Institute's investments are distributed on four laboratory types: Health Effect Lab, Food Microbio Lab, Food Analysis Lab, and Food Design Lab.

In addition, the National Food Institute prioritizes annually to invest in continuous renewal of research infrastructure, both by replacing obsolete equipment and purchasing new equipment.

The National Food Institute's growth in research grants and student numbers is leading to investment in more and more new equipment. This creates the need for more special laboratories, and generally for more space for equipment and more people in the laboratories. In addition, the facilities must increasingly be open and presentable for external parties, so that there is sufficient space to visit them and for external parties to have analyses and parts of their own projects performed via cooperation agreements. For example, it must be possible to make equipment purchased via the Foodhay grant available to companies and others in the event of unutilized capacity. In future, the same will also apply among the Eurotech partners. The specific needs are described under premises.

8.2 Premises

In particular, the activities in the chemical and biotechnological laboratories in building 202 are cramped, not least because of a densification of the activities in connection with relocation from the first floor and second floor in building in 221. The Institute's algae laboratory for research into plant-based food products and marine ingredients in building 221 and the food technology facilities for research and teaching in building 227 also need upgrading, and it might be an advantage to locate them closer to the other activities in building 202.

In addition, the Institute needs more space for new freezers to be able to store materials for new research trials and teaching purposes, research results from studies and valuable collections such as strain collections and histology samples.

The National Food Institute also needs more space for more elements in the microbiological areas, but hopes to be able to find solutions internally in the Institute when DTU Bioengineering vacates building 204.

Finally, more single-course students and the food-related study programmes generally create a need for extra space in both the specialist laboratories—where students need to get their hands on advanced research equipment—and in the teaching laboratories.

The National Food Institute hopes to find solutions to the most acute needs together with Campus Service, and that funding and solutions can be found at DTU to meet the increasing needs for space, which probably applies to several life science departments.

8.3 IT and GDPR

Databases: The Institute's databases contain considerable research capital. It is therefore important to continually safeguard data management and accessibility. The Institute collaborates with—among other partners—DTU Compute on databases for global monitoring of infections and antimicrobial resistance, as well as with the WHO and EFSA on dietary and food data. The aim is to ensure better coherence between data across the Institute's disciplines and to increase digitalization by making more data available and visualizing them. The result will be increased utilization of data for the benefit of the Institute and other researchers as well as better presentation of data for the general public. In addition, the Institute is still working to find the most suitable and secure infrastructure for collection, sharing, and quality assurance of data.

GDPR: The National Food Institute has implemented DTU's GDPR rules, and the need for increased focus on storage of personal data is widely accepted among the staff. The Institute's implementation of data management plans for storage of research data has provided synergies for implementing the GDPR rules.

Laboratory and research systems: A large part of the Institute's IT infrastructure is found in the laboratory environment, where many specific requirements exist with regard to hardware and the IT environment. The objective is for data and instruments to be accessible from all workplaces, and for raw data and metadata to be acquired centrally in the Institute's database environment. The Institute collaborates with other DTU departments on specialist software—for example regarding SAS, Origin Pro, and ACD. In addition, AIT is helping with an IT landscape analysis to ensure a better overview and greater strategic use of both data and systems.

9 Communication

The Institute's overall communication objective for the coming years is to support DTU's basic narrative on the development of sustainable technology for people. This will be implemented by showing how the Institute's research results, advice, teaching, and innovation activities make a difference by preventing illness and promoting health, producing sustainable technological solutions, and developing new and improved foods for the growing world population—thereby contributing to meeting several of the UN Sustainable Development Goals.

In addition, a separate communication goal is to contribute to the recruitment of students for a new Master's programme in sustainable and safe food production with start in January 2022.

The Institute will continue to focus on news coverage and press work through the Institute's website, food.dtu.dk, and thus also dtu.dk, but will increasingly communicate via the Institute's Twitter and LinkedIn profiles. The Institute is also intending to make more extensive use of video and image animations.

In this connection, the Institute will still work with the authorities to coordinate the way important food safety and nutritional health messages are communicated in Denmark. The Institute will also disseminate the results of risk assessments and other news from the European Food Safety Authority (EFSA) in Denmark, which is one of the duties of an EFSA focal point in Denmark.

Another communication objective is to support internal communication at the Institute. This will mainly be done via DTU Inside, which the Institute uses as the primary internal communication channel for essential employee information.

10 Process and employee involvement

The National Food Institute's development goals and measures (UMV) have been prepared as part of a lengthy process, in which the Institute's employees have been involved in many ways.

In connection with the UMV process, all research groups have updated the strategy plans for their own group, including descriptions of their strategic focus for the next UMV period in connection with their support for DTU's strategy and the Institute's vision. At a meeting with group leaders and the management team, input has also been given to the Institute's research strategy with focus on being a driving force for digital and sustainable change in a global world. The Institute's heads of studies have contributed to the preparation of Chapter 3 on study programmes, and the Institute's group leaders have also provided input on Chapter 4 on scientific advice.

The employee side of the Collaboration Committee has provided input for Chapter 7 on human resources. A coordinator for the management team has prepared the individual parts of the development goals and measures, and the management team has discussed the Institute's development goals and measures. The final draft of the development goals and measures was prepared by the Institute's secretariat and approved by the Director of the Institute.

Following the presentation of the development goals and measures to the Executive Board of DTU, the Director of the Institute will present an outline to the employee.