

Strategy for the Sustainable Development of Mendel University in Brno

Initial Considerations:

The strategy for the sustainable development of the Czech Republic approved by the Czech government on 8 December 2004 forms the main framework for this conceptual document.

What is the purpose of the strategy:

This is a framework document for the strategic decision-making of the university within individual scientific fields as well as for interdisciplinary cooperation and collaboration with the application sphere in relation to sustainable development.

Content:

The strategy defines the main (strategic) goals as well as sub-goals and tools, includes analyses, and defines the appropriate measures. The goals are formulated in a way that minimizes the imbalances in the mutual relations between the economic, environmental, and social pillars of sustainability. They are aimed at ensuring the maximum quality of life for the current generation and at building prerequisites for a high quality of life of future generations.

Present Situation in the Area of Research and Development with Respect to Sustainability

Research and development in the Czech Republic is carried out predominantly at universities, facilities of the Czech Academy of Sciences and sectoral research institutes, with the private sector also providing a contribution.

The main challenge for the sustainable development of the Czech Republic in the area of research and development and education is to ensure a high level of education in society, leading to an economy with greater competitive strength. Moreover this includes support for research and development aimed at the development of new technologies which will help increase the competitive strength of the Czech economy as a whole.

The **strengths** of the Czech Republic in the area of research and development and education in the area of sustainability include notably:

- High engagement in primary and secondary education.
- Relatively dense networks of schools of all types with suitable regional accessibility.
- Currently available capacities for the education of adults and counselling centers.
- High human potential in the area of research and development and art.
- A significant share of research is carried out in sectoral research institutes.
- The implemented system for the teaching of ecology and education towards sustainable development begins already in pre-school.
- The gradual increase of the length of education, focus on sustainable development already on every level of education.

The **weaknesses** of the Czech Republic in the area of research and development and education in the area of sustainability include notably:

- Insufficient collaboration of the economic sphere with schools and scientific institutions, low participation of the economic sector in research funding, insufficiently effective use of the results of research and development.

- Insufficient societal and financial support for research and development (compared to the EU and especially the U.S.), in many cases the equipment/resources at universities and research institutes are not on the required technical, personnel and financial level.
- Insufficient interconnection between research and development and innovation policies.
- Insufficient involvement of the private research sphere in research and development activities.
- Lagging behind in technical foundations within the area of research and development and education.
- Continuing drain of highly qualified young experts from research to other fields.
- Lack of flexibility to react to current global challenges in research and development (notably concerning the creation of new multidisciplinary programmes).

Risks that threaten the sustainable development of the Czech Republic in the area of research and development and education include notably:

- The development of the education system will lag behind the needs of the economy (lack of focus on technical fields).
- Low motivation of adults to proceed in further education.
- Research and development will lag behind the needs of the national economy and the “education level of society” as a whole, departure of Czech specialists abroad.

Opportunities that arise for the sustainable development of the Czech Republic in the area of research and development and education include notably:

- The timely incorporation of forecasts and adaptation of the education system on all levels to the needs of the job market and the “education level of society” as a whole.
- Direct and indirect support for further education.
- Direct and indirect support for research and development.
- Direct and indirect support for the provision of public cultural services and assets.
- Strengthening of international collaboration in the area of research and development.
- Focusing research into the development of new progressive technologies with low material and energy demands which reduce the environmental burden, the dependency of the economy on imported raw materials and the foreign trade deficit.

Present Situation in the Area of Research and Development with Respect to Sustainability in Mendel University in Brno
SWOT analysis

	Positive factors	Negative factors
	Strengths	Weaknesses
Internal influences	<ul style="list-style-type: none"> • long tradition of specialized research dating back to the foundation of the university (agriculture, food production, forestry and wood industry, 	<ul style="list-style-type: none"> • absence of strategic and conceptual materials for R&D, development of HR in R&D and international collaboration in R&D

	<p>business economics, development of the countryside, gardening, landscape and garden architecture) and the associated image of the university</p> <ul style="list-style-type: none"> • research focusing on environmental topics and developmental aid to third countries, with many years of practical experience in these fields • Dynamic development of fields with high scientific-research potential • high diversity of research topics, increase of interdisciplinarity in research • constituted research programs of most faculties as the outcome of pursuing research plans • high professional level of a range of academic employees and their recognition in the scientific community as well as among the professional public • existence of excellent worksites and excellent research teams achieving results that are of European quality • long-term collaboration with universities and research institutes in similar areas, both domestic and international • systematic use of collaboration with foreign academic employees, hosted at the university in order to develop research and science • increasing participation of foreign experts in research projects at the university • experiences of top researchers from international research and European projects 	<ul style="list-style-type: none"> • absence of standardized procedures for activities in the area of process management and R&D administration • lack of knowledge about management and planning of scientific-research activities • management methods do not correspond to the current trends and needs for improving quality • low flexibility of line management – a barrier for assigning employees to projects • low level of specialization as a competitive weakness • unclear position of certain new disciplines that combine applied, basic and industrial research • lingering traditionalism and conservatism in research • low interdisciplinary collaboration • lack of high-quality and well thought out work with human resources in R&D and systems for their education • limited capabilities of faculties and of the university to meet the requirements of NAZV and TA ČR for supplementary financing of projects from non-public sources. • Underdeveloped methods for evaluation and self-evaluation as a research institution • insufficient level of teamwork, relatively large amount of isolation of research teams inside MENDELU • uneven amounts of work carried out by individual academic employees • low competitive strength in terms of international research-scientific activities, and lower interest by international partners
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	<ul style="list-style-type: none"> • implementation of quality and excellence criteria into the design and motivational tools for supporting the systematic development of scientific, developmental and other creative activities of university employees contributing to the innovation of scientific, research and development work • tradition in educating young scientists • increasing support for young researchers and their motivation to work in excellent teams • supporting scientific-research, artistic and creative work with the required infrastructure (lab equipment, biotechnological pavilion, collections of plants and recognized gene funds, IT equipment, study funds and available information databases, the university's service centres, kindergarten) • publication activities and citations of top employees in R&D • implementation of IGA • introduction of an office for grant support and technology transfer • MENDELU's participation in large national and international projects (CEITEC, science-technology parks, Moravian Science centre, the Lednice Chateau Multifunctional centre, collaboration with CzechGlobe) • implementation of outputs of applied research by first manufacturers and processors • collaboration with businesses, (regional) public institutions, interest and professional units and chambers as well as other relevant entities in regions 	<ul style="list-style-type: none"> • low participation of university employees in large international projects to date • low mobility of researchers within the possibilities offered by international collaboration - a fairly closed environment - significant in-breeding of employees in R&D • low participation in international platforms and organizations in the area of managing and administrating R&D • lack of ability to present project plans/aims and R&D results on international forums • low attractiveness of the R&D environment for foreign researchers • low quality of supporting administrative processes • absence of a transparent system for recruiting high-quality employees in R&D • lack of experience of employees responsible for commercialization of research activities • unfamiliarity with standard grant management methods used in R&D on an international level • low share of employees with experience from the private sector • insufficient level or scope of services provided to academic employees (project management, financial, legal and project counseling, information sharing, coordination of activities etc.) • lack of human resources allocated to supporting processes for R&D • underdeveloped material infrastructure for support of R&D – lack of databases, grant software... • Absence of links between the grant office and international (or even
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	<ul style="list-style-type: none"> • participation in JIC and RIS, link to regional innovation programs 	<p>domestic) partners; low mobility of grant management employees</p> <ul style="list-style-type: none"> • lack of motivation to aim for external funding • low level of collaboration with the application sphere • lack of motivation and motivational programs for young as well as experienced researchers • difficult and strenuous application of the results of theoretical research into practice, lack of experience with technology transfer • limited space for the establishment of new or extension of current worksites (research laboratories, a modern library, studios etc.) • low level of foreign language communication • lack of soft skill development for R&D employees • low applicability of PhD graduates in research in their field • Low quality of preparation of young researchers
External influences	Opportunities	Threats
	<ul style="list-style-type: none"> • global support for basic research in the area of sustainable development, advanced materials, genome editing, molecular biology and omics sciences • support for research activities in the area of evaluating the impacts of climate change on controlled ecosystems, quality and food safety • growing competition as a factor for changing the behavior of the educational and research environment; pressure on 	<ul style="list-style-type: none"> • lack of financial support for R&D from the Czech state and its long-term stability • reduction of financing of research activities from other external sources, leading to a further drop of their quality • lack of internal motivation for carrying out work, for beginning as well as established researchers and teams • lack of interest and/or preparation of the corporate sphere to financially contribute to applied research, low demand for the

	<p>monitoring qualitative performance indicators</p> <ul style="list-style-type: none"> • motivational programs to support talented PhD students towards more flexible professional and career growth and towards becoming excellent postdocs • existence of partner international networks and development of internationalization inside as well as outside the EU • requirements on the development of innovations as a prerequisite for the competitive strength of companies, growing need for connecting the research and application spheres, need for knowledge and technology transfer • participation in the activities of the regional innovation strategy • possibility for creating a central virtual laboratory for the university • development of new forms of international research collaboration based on partner networks and creation of an integrated European knowledge system (European innovation partnership, operational groups for operating the countryside, knowledge clusters) • establishment of new fields and interdisciplinary approaches in a range of disciplines • introduction of a new generation of young research teams, recruitment of foreigners as postdocs • introduction of modern HR tools in R&D that meet European standards 	<p>development of new products or technologies</p> <ul style="list-style-type: none"> • long-term underestimation of the significance and of financing of research infrastructure, including service worksites • low awareness of excellent research at the university • loss of competitive strength when carrying out contractual research via supplementary activities, as a consequence of setting inadequately high overhead costs • reduced interest of foreign partners in collaboration • conservation of the status of HR management, not meeting the needs for the development of a modern research organization • continued in-breeding of researchers at the cost of quality of research and professional development of worksites • survival of old opinions and thought among leading R&D employees which go against contemporary needs • deepening of the gap between the quality of research at MENDELU and at other research organizations • growth of the fissure between national and foreign elements in the environment of the research organization • reduced mobility of researchers due to them not being able to utilize mobility tools • devaluation of the experience of R&D and research support employees obtained notably by participating in OP VK and OP R&Dfl projects • low motivation of R&D employees to achieve excellence
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	<ul style="list-style-type: none"> • increase of the professionalism of employees in R&D and administrative support • increase the capabilities of leaders and managers to define strategy and vision for research activities • increasing the quality of provided services in R&D • increasing the internationalization of the research environment and provided services • improving the ability of R&D employees to take part in international networks, platforms and project activities • follow up on the good practices for project management recently established in the previous ESF program period • making the research environment more attractive for foreigners in all phases of their career development • making the research environment more attractive for women • increasing the motivation of HR in R&D to seek out new research opportunities, including abroad • increasing motivation for mobility • introduction of mobility as a required performance standard of work in R&D and project management • support mobility with the aim of securing an inflow of new ideas, visions and projects • increasing the confidence of employees in R&D as a precondition for increasing their prominence in international competition 	<ul style="list-style-type: none"> • increase of the failure rate for submitted grant support applications for R&D • departure of the best R&D employees to other organizations (possibly also to non-research organizations) • lack of interest of the corporate sphere to collaborate with MENDELU • lack of interest of foreign researchers to work at MENDELU • inability to communicate with the international community, inability to take part in international activities and projects • further drop of the ability to actively use English language • loss of research traditions that have been part of MENDELU since its foundation • preservation of line management as a system that goes against modern HR and project management
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	<ul style="list-style-type: none"> • increasing the ability to coordinate international activities and projects • greater transparency of the R&D environment via the adoption of new strategies and their implementation tools • introduction of modern management systems, including electronic tools • introduction of process management as a tool towards improving project management and more efficient utilization of HR • opening of the research environment to foreign researchers • creation of links between the grant office and international grant support and project management organizations • strengthening the participation of researchers on international platforms and networks • creation of modern programs for guiding young researchers • creation of a system for educating leaders/managers • introduction of evaluation and self-evaluation processes for participants of the research environment 	
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Strategic Goals of Mendel University in Brno

MENDELU has a long-term aim of shaping itself as a research university with a tradition of carrying out high-quality research already since its foundation in 1919. While in its early years the research carried out at the faculty was primarily associated with biological foundations for the breeding of livestock, growing of plants and agriculture in general, over the decades the range of fields underwent significant diversification.

The university's scientific potential comprises about 600 scientific-research employees who are mostly part of AF, LDF, PEF and ZF. The share of foreign researchers is on the rise, and the quality of education of young scientists via the appropriate DSP is also growing. A research environment is being gradually cultivated; there are elements of process, project as well as portfolio management tied to the gradual incorporation into national as well as international research programs and activities. At the same time, the inclusion of individual researchers in fundamental societal challenges such as, notably, climate change and loss of rainfall, quality of agricultural products and the threats faced by forest ecosystems, is on the rise. Changes are being made to old management structures that have not changed for many years, and the responsibility of individuals for the outcomes of their own activities is growing. The evaluation systems are also changing, with a growing emphasis on quality of research work and publication activities.

While the interconnection between research and education is well developed, the links to practice and the application of R&D outputs is currently lackluster. There is neither a serious strategy for collaborating with users of R&D outputs, nor a concept for professional growth of involved persons. A similar situation is also predominant in the area of popularization activities, where we find only a handful of excellent popularisers in their specific fields.

The scientific-research activities of MENDELU employees is financed from several types of sources, whereas the projects of grant agencies and resort orders are one of the most prominent categories. The successful and clearly declared completion of these projects will not only deepen collaboration with entities outside of the university, but also help secure prominent results that will form the building block for further grant applications and for seeking out new collaborations not only on a national level, but especially on the international one.

On a general level, Mendel University in Brno wishes to

- Expand the knowledge economy, quickly improve the education system, support modern research and development, and substantially increase innovation outputs.
- Contribute to the long-term growth of quality of life and the development of ethical values, create a knowledge-drive society respecting the mechanisms and limits of sustainable development.
- Support the competitive strength of the Czech economy in the area of research of development, notably via modern technologies and services.

In close relation to the national and regional Innovation Strategy of the Czech Republic and the accompanying "The Czech Republic: The Country For The Future" document, the following R&D&I goals for the upcoming period have been determined:

- Via evaluations, support participation in Horizon Europe and maintain sustainable financing of research from European funds.
- Support research topics which generally meet the following criteria: internationally competitive foundational research - sufficient capacity for follow-up applied research - successful applications (new solutions for quality of life, patents, sold licenses, products) - real connections to a company environment in the corresponding field and to fields with a potential for breakthrough technologies.
- Support the securing of resources from non-public sources via financial instruments.
- Simplify the conditions and speed up the process for employing highly qualified foreign employees.
- Create specific elements for supporting the creation and sustainability of start-ups and spin-

offs.

- Introduce education towards entrepreneurship into the curriculum.
- Focus support on key trends on the intersection between research excellence, the potential of Czech companies and future technological trends = a strategy of smart specialization which reacts to society-wide challenges arising from climate change and its impacts, modern genome editing, digitization, robotization and resistance to antibiotics.
- Increase awareness on the protection of intellectual property – setup closer collaboration with all levels of education both in lecturing activities and when creating study programs.
- Increase the use of tools for protecting intellectual property, especially patents with commercial potential.
- Use of patent information before formulating scientific, research and innovative intents.

Sub-goals of Mendel University in Brno

The designated sub-goals include:

- Development of teaching education, intellectual capabilities and standpoints of students with respect to, e.g., their responsibility towards their own health and the environment.
- Complete the reform of study programmes.
- Create new education concepts.
- Support the creation of a high-quality educational system for adults with the aim of expanding their knowledge of sustainable development.
- Support key teams and significant personalities in research and development, support the creation and development of centers of excellence that would also be attractive for foreign researchers.
- Systematically support the collaboration of public and private research, provide financial security for research and development via public and private sources based on the achieved results.
- Improve the rules for the collaboration between research and development worksites and the private sector in order to quickly improvement new findings and technologies into practice and to create and develop technologically oriented companies (protection of intellectual property, proper allocation of rewards).
- Support active participation of employees of the private sphere in the innovation processes within research and universities.
- Use financial and organizational tools of innovation to strengthen sustainable development, the development of information and communication technology, improve the position of women in science and research.

Measures

The identified goals in the area of **science, research and education** will be achieved by:

- Supporting the modernization of education by making use of interactive education methods, emphasis on the efficient application of obtained findings (functional literacy), the development of so-called soft skills (communication, teamwork and project work, independence in problem-solving) including active knowledge of foreign languages and the ability to use information and communication technology.
- Obtaining and keeping high-quality teachers able to provide a creative approach and continue their self-education.

- Improving the quality of provided education via bachelor study programmes whose focus must reflect the specific demands placed on graduates, with a close connection to practice.
- Reforming the management and funding of individual research-scientific worksites.
- Greater engagement in the scientific and innovation process.
- Expanding MENDELU's funding sources.
- Improving the quality of the university's lecturers by obtaining and keeping top-level young talent that can be expected to become academic personnel at least on the level corresponding to international standards.
- Improving the quality of research and development, which requires effective support for developing the quality of human resources, and especially the younger generation of researchers already in the phase of their master and doctoral studies.
- Strengthening the use of research outputs in practice.

Sources

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National and Regional Innovation Strategy, the Czech Republic “Country for the Future” Strategy

List of Abbreviations

CEITEC – Central European Institute of Technology

DSP – Doctoral Study Programme

EU – European Union

FA – Faculty of AgriScience

FBE – Faculty of Business and Economics

FFWT – Faculty of Forestry and Wood Technology

FoH – Faculty of Horticulture

IGA – Internal Grant Agency

IT – Information Technology

MENDELU – Mendel University in Brno

NAZV – National Agency for Agricultural Research

OP EC – Operational Programme Education for Competitiveness

OP RDI – Operational Programme Research and Development for Innovation

R&D – Research and Development

R&D&I – Research, Development and Innovation

RIS – Regional Innovation Strategy

SIC – South-Moravian Innovation Centre

TA CR – Technology Agency of the Czech Republic