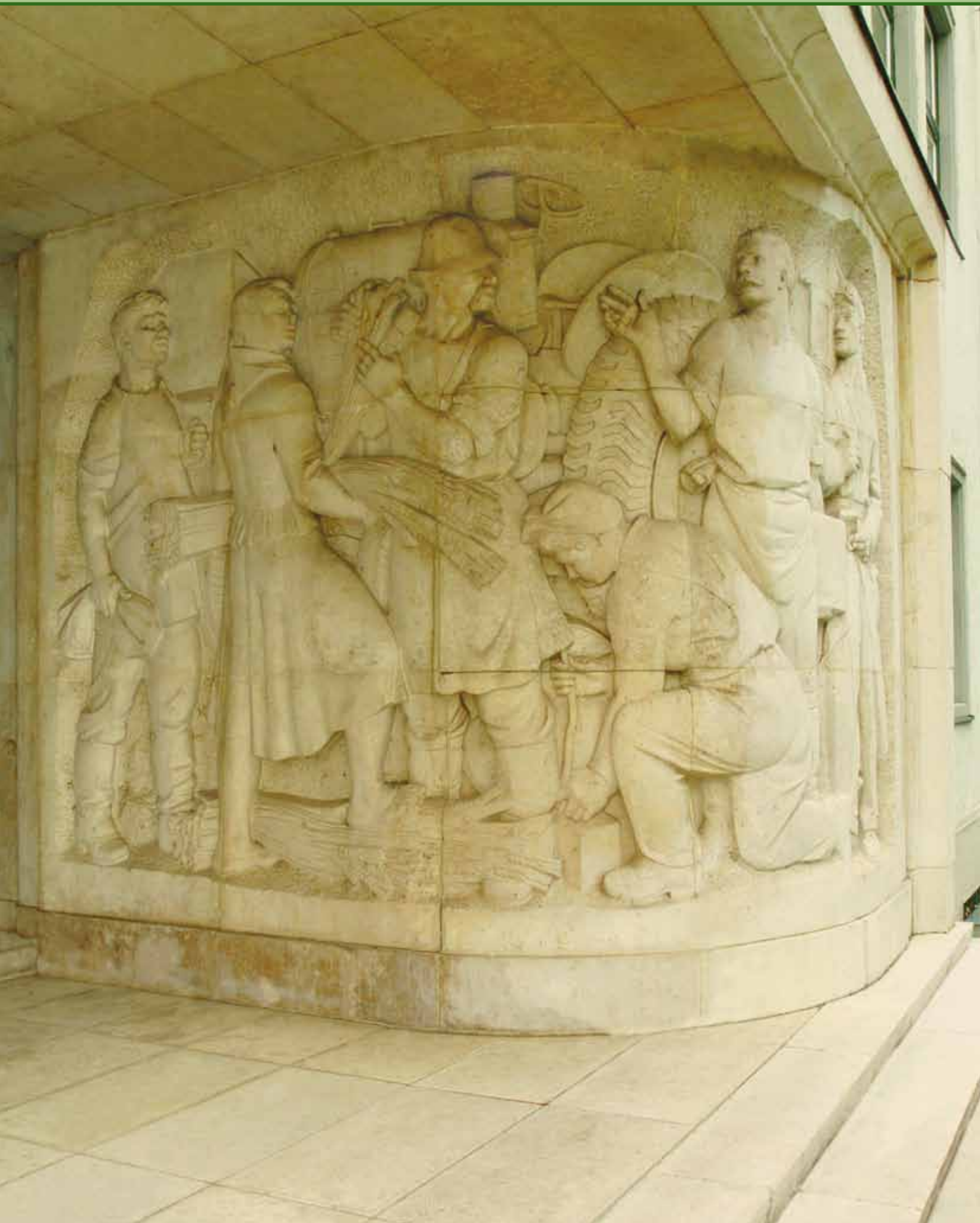




UNIVERSITY OF DEBRECEN  
CENTRE FOR AGRICULTURAL  
AND APPLIED ECONOMIC  
SCIENCES





# ■ GREETINGS ■ ■ ■

Dear Reader,

It is our honor to welcome you on behalf of the management of the University of Debrecen and the Center for Agricultural and Applied Economic Sciences and to thank you for your interest in our historical university and our agricultural higher education activities, the latter of which date back almost 150 years.



The integrated University of Debrecen (DE) provides the widest array of education to its more than 30 thousand students. The 15 faculties, 1400 teachers and 6000 employees of the University aim to provide elite university level education to all those who choose our institution. The University is one of the most significant intellectual centers of Hungary and the knowledge center of the region, where students can enter the Hungarian and international labor market with modern knowledge and competitive degrees. Our institution is also special in comparison with other Hungarian universities in that it carries out research and teaches students in nearly all scientific areas.

The University of Debrecen strives to support its most talented students. The Talent Development Program of the University of Debrecen (DETEP) involves scientific student group activities and colleges for advanced studies. Those most talented can continue to pursue their education in the University's 25 doctoral schools. In an average year, 150 students obtain doctoral (PhD) degrees, in six areas of science. Our institute considers it especially important to broaden its international relations. 3500 foreign students from 76 countries visit courses here. Based on the report of the QS World University Rankings, the University of Debrecen is demonstrating increasing success from year to year.

The 15 faculties of the University carry out their activities in three large organizational units: the Center for Agricultural and Applied Economic Sciences (AGTC), the Medical and Health Science Center (OEC) and the Center of Arts, Humanities and Sciences

(TEK). AGTC is a significant unit of the University of Debrecen, and one of the largest scientific, agricultural and rural development centers in Hungary. The Center is one of the leading units in the ranking of agricultural higher education institutions and is growing in international comparisons, too. The Center provides outstanding conditions for students to become skilled professionals and obtain a marketable degree due to the institution's infrastructure and the level of education we provide. Due to our range of trainings and the diversity of specializations, as well as the wide array of employment opportunities after graduation, many students choose the faculties of the Center for Agricultural and Applied Economic Sciences.

In this brochure, we provide a comprehensive view of the teaching and research activities, various trainings, optional BSc and MSc courses, specialized higher education trainings and PhD training carried out in our faculties and institutions. Furthermore, we provide information on the research work performed at the faculties and research institutes of the Center, as well as the scientific umbrella programs and current European Union projects.

Prof. Dr. János Nagy  
President of the Center





The city of Debrecen has more than 200 000 inhabitants, making it the second largest in Hungary. Debrecen is the county seat of Hajdú-Bihar County, often referred to as the “Calvinist Rome”. Debrecen is the intellectual, cultural, economic, tourism and traffic hub of Eastern Hungary. The city has managed to renew itself several times during its more than 650 year-long history.

Debrecen was first referred to in writing in the 13<sup>th</sup> century. In 1361, the city was awarded market town status and, in 1693, the status of a royal free borough. Debrecen was well-known throughout Europe, owing to its famous fairs and Reformed school, which was considered to be exceptional even in European terms. During its history, the city twice served as the seat of the national assembly, in 1848-1849 and in 1944. Debrecen burned several times and suffered major damage during the Second World War. Today, Debrecen is one of the most dynamically developing cities in Hungary.

Debrecen provides countless places of interest for visitors. In addition to the Great Church, which is the symbol of the city, Kossuth square, the Aranybika hotel, the Debrecen Reformed College and the Déri Museum can all be found in the center of Debrecen. The Medgyessy Ferenc Memorial Museum, the old City hall and the old County hall can be reached within a few minutes’ walk. The heart of Debrecen is the Great Forest, where the imposing buildings and the campuses of the University of Debrecen are located. In addition to the Mediterranean and thermal spas, a zoo and an amusement park provide alternatives for recreation.

Due to its dynamic development, the county seat of the Hajdúság region was enriched by new establishments: the multifunctional Főnix hall is able to host 8000 people and is the host of numerous Hungarian and international sports and cultural programs; the Kölcsey Center can host 1150 people and is the biggest conference center in Eastern Hungary, while MODEM, a three-story gallery, is the center for modern and contemporary arts.

Debrecen is a city of festivals, which is also attractive to people living on other continents. The city receives hundreds of thousands of visitors every year during its festivals, which include the Béla Bartók International Choir Contest, Debrecen’s Jazz Days, the Hungarian language and cultural courses of the Debrecen Summer School, or the Flower Carnival, held each year on August 20<sup>th</sup>. Thousands of students attending college or university-level faculties choose to live and study in our city each academic year. The accessibility of the city is greatly improved by Debrecen Airport, and the number of flights to and from here are expanding.





# CHRONOLOGY ■ ■ ■

- 1868** Foundation of the Debrecen National School of Agriculture
- 1876** Operation as Royal Hungarian Debrecen Secondary School of Agriculture
- 1883** Utilization of the Fűvészkert street building
- 1901** School year opening in Pallag
- 1906** Operation as the Royal Hungarian Debrecen Academy of Agriculture
- 1945** Hungarian Agricultural University, Debrecen Division of the Faculty of Agricultural Sciences
- 1953** Re-establishment as Agricultural Academy of Debrecen, located on Böszörményi Street
- 1962** Foundation of the Agricultural College
- 1970** Foundation of the Agricultural University of Debrecen with the University Faculty of Agriculture at Debrecen and the Agricultural College Faculty of Irrigation and Amelioration at Szarvas (member of the institution until 1999)
- 1972** Foundation of the Institute for Production Development (legal predecessor of the Institute for Research and Development)  
The College Faculty of Agricultural Mechanical Engineering (Mezőtúr) was a part of the institution (until 1986)
- 1976** Joining of the Karcag Research Institute
- 1986** The College Faculty of Animal Husbandry (Hódmezővásárhely) is a part of the institute (until 1999)
- 1991** Joining of the Nyíregyháza Research Center
- 2000** Establishment of the University of Debrecen





Foundation of the Center of Agricultural Sciences (Faculty of Agriculture, Institute of Agricultural Economics and Rural Development, Debrecen Farm and Regional Research Institute, Karcag Research Institute, Nyíregyháza Research Center)

Inauguration of the Extension building

**2002** Inauguration of the building of Regional and Rural Development Center

Foundation of the Faculty of Agricultural Economics and Rural Development

**2003** Inauguration of the Student Hotel

**2005** Celebration of the Student Hotel (Sándor Arany Student Apartments)

Establishment of the Center for Adult and Distance Education (legal predecessor Institute for Further and Distance Education)

Establishment of the Regional Consultancy Center and the University Knowledge Center of Regional Development

**2006** Joining of the College Faculty of Engineering (a member of the institution until 2009)

Renovation of the Building of Food Science Education and the IT Center

**2007** Operating as "Center for Agricultural Sciences and Engineering"

**2009** Taking over the Balásházy János Specialized Secondary School of Agriculture and Economics

Integration of research institutes (establishment of KIT)

New organizational units: Innovation organizations, Agro economics Program Directorate

**2010** Operating as "Center for Agricultural and Applied Economic Sciences"

**2011** Bringing the Interregional Technical-Agricultural Center for Consultancy and Further Education (MAG Ház) into use

**2012** Bringing the Climate Center (Center for Water Management and Irrigation) into use

**2013** The economic and agricultural higher education in Debrecen celebrates its 145<sup>th</sup> year



# ■ ■ ■ CENTER FOR AGRICULTURAL AND APPLIED ECONOMIC SCIENCES



Economic and agricultural higher education in Debrecen have traditions spanning some one and half centuries. The Debrecen National School of Agriculture, which is the legal predecessor of the center, was opened in 1868. Later, the institution became internationally renowned by the name of Hungarian Royal Academy of Agriculture.

1970 was a major milestone in the history of agricultural higher education, when a five-year-long training was established from the previous three-year-long academic and four-year-long college trainings. The Agricultural University of Debrecen was established, providing the agricultural sector with professionals renowned at the European level.





The social and economic changes at the end of the last century transformed the structure and education system of higher education. The need for international competitiveness necessitated the integration of the University of Debrecen. Within the integrated university, the Center for Agricultural Sciences was established on 1st January 2000. The faculties, institutes and the high school of the center serve the objectives of multi-level educa-



tion (BSc, MSc, PhD), research and innovation and consultancy in a close unity. On a yearly basis, we train several hundreds of skilled engineers in the area of agriculture, environmental protection and agroeconomics. Based on the feedback of diverse employees, these professionals perform outstandingly at their jobs. The Center for Agricultural and Applied Economic Sciences (AGTC) of the University of Debrecen has the following organizational



search and consultancy. The mission of the Center is the development of the agricultural sector and its related economic and social branches, as well as the agricultural food economy, the environment and the rural areas. The activity of the Center serves the development of Hungary and the strengthening of its international reputation. The institution trains innovative professionals for the agricultural sector, the food industry, environmental management, environmental protection, game management, commerce, management, as well as financial institutions and sports organizations. Several freshly graduated students successfully apply for jobs in state administration and at municipalities, due to the convertible degree they obtain.

Currently, the faculties of the Center provide 14 BSc, 14 MSc and 8 accredited higher education specialized courses, of which 2 BSc and 6 MSc courses have authorization to be launched in English. The wide network of cooperating enterprises makes it possible to carry out high level practical training. The Tormay Béla and Kerpelely Kálmán Colleges for Advanced Studies pay increased attention to highly talented students. Our students also have great achievements in the activity of the Scientific Students' Association. The activity of the four accredited

units in education and research: the Faculty of Agricultural and Food Sciences and Environmental Management (MÉK) and the Faculty of Applied Economics and Rural Development (GVK). The research at the center is carried out by the three research institutes of the Research Institutes and Study Farm (KIT): the Research Institute of Karcag (KKI) on heavy meadow soil and under unfavorable circumstances, the Research Institute of Nyíregyháza (NYKK) on sandy soil and the Debrecen Study Farm and Regional Research Institute (DTTI) with animal husbandry, crop production and horticultural departments, operating on good quality moderately heavy adobe soil. There are further units which serve educational and research purposes, such as the Center for Adult and Distance Education, the Research and Development Institute and the University Knowledge Center of Regional Development. The North Great Plain Regional Consultancy Center coordinates the consultancy activities and the innovation of the region.

The Center for Agricultural and Applied Economic Sciences of the University of Debrecen is one of the centers and coordinators of agricultural higher education, re-





doctoral schools of the Center continues to be significant in the scientific replacement of the staff.

In its educational and scientific activities, the institution utilizes the results of agricultural and economic sciences, as well as the related sciences, applies the principles of the sustainable use and development of economic and natural resources, and the results of national and international progress. The Center is devoted to European integration and via its activities it contributes to the development of sustainable economy and the scientific foundation of the exploration and effective utilization of the environment.

In order to perform the basic duties at a higher level and to fulfill its mission, the institution maintains an open and mutually beneficial network of relations with the centers, faculties and institutes of the University of Debrecen in

each area of education and research, as well as with Hungarian and international universities, profit and non-profit organizations.

The Center for Agricultural and Applied Economic Sciences takes part in five FP7 programs in cooperation with renowned European universities in the areas of land use, crop protection, food safety, precision crop production and habitat mapping.

The R&D activity of the Center is carried out in accordance with the structure conforming to the integrated research umbrella programs. The units of the center are in close cooperation with each other to successfully implement the five scientific umbrella programs. It was our expressed objective to strengthen our research activity and to successfully participate in further Hungarian and EU projects.





Due to its international reputation in science, the center has a wide relation system all over the world. We have a long-term relationship with the universities in the Middle-Eastern-European region. In the recent decade, the number of educational and research cooperation with other European, as well as Brazilian, Chinese, Mongolian and Japanese universities significantly increased. The Center entered into bilateral contracts with nearly 70 foreign universities and these agreements greatly improve the successfulness of the training and research programs, as well as teacher-student mobility.

The most significant mobility programs are the Socrates/Erasmus and Ceepus programs. Currently, we have bilateral Erasmus contracts with 58 institutions from 21 countries, including the Wageningen University, the Humboldt University in Berlin, the Scottish University of Agriculture and the Reims University. Also, we have bilateral cooperation agreements with more than 20 universities, the most

# INTERNATIONAL RELATIONS



significant of which include the Friedrich Schiller University, the Polish Academy of Science, the Technical University of Vienna, the Lincoln University, the University of Ghent, the Japanese Chiba University, the Russian Volgograd State University of Agriculture, the Egyptian Kafr El-Sheik University and the Chinese Inner Mongolia University.

We also have outstanding relations with neighboring countries. The Hungarian agricultural engineer training launched by the Faculty of Agricultural Sciences in 2005 on the basis of an agreement with Partium Christian University in Nagyvárad, is a perfect example for cross-border relationships.

Our international relations make it possible for our students to participate in partial trainings and practical courses at foreign educational institutions during their studies. Based on the cooperation agreement with the Dutch University of Wageningen and the Finnish University of Jyväskylä, we issue a dual certificate. We launched the Team Academy training, which is an innovative, modern learning opportunity for students who are active in the business area in higher education.

The EU Commission-supported "Sustainable foraging" MSc course is of great significance for the Center, as it provides a dual certificate in cooperation with the Universities of Wageningen, Aarhus and El Purpan within the framework of the Erasmus Mundus program.



We also have a wide range of relations in the area of research and our scientific findings are internationally renowned. Previously, the Center successfully participated in international projects (TEMPUS, Phare, FP5, FP6). The teachers and researchers of the Center currently take part in five FP7 programs in cooperation with renowned European universities and we are the lead partner of one of these projects.





partly as advisors, partly as teachers. The flexibility of the doctoral training is improved by the different training forms (full-time, part-time, individual). The four doctoral schools of the Center carry out their activities within the framework of two boards of different scientific fields.

Three doctoral schools belong to the Doctoral Board of Agricultural Sciences:

- Doctoral School of Animal Husbandry (animal husbandry sciences)
- Hankóczy Jenő Doctoral School (crop production and horticultural sciences, food sciences)
- Kerpely Kálmán Doctoral School (crop production and horticultural sciences, regional sciences)

## DOCTORAL PROGRAM ■ ■ ■

Of all Hungarian universities, the University of Debrecen runs doctoral (PhD) programs in most scientific areas. In an average year, 150 students obtain doctoral degrees in 25 doctoral schools in 25 branches of science in agricultural, natural, medical, social science and humanities.

Currently, more than 800 students study at PhD courses at the University of Debrecen. Of them, around 140 students study at the four doctoral schools of the Center. The standard of the education carried out in the doctoral schools is guaranteed by the nearly 50 regular members, the majority of whom are active as professors and head teachers or researchers,

The following doctoral school belongs to the Doctoral Board of Social Sciences:

- Ihrig Károly Doctoral School (management and business sciences)

Wide-range interdisciplinary research is carried out in the doctoral schools of the AGTC in the fields of agricultural, food, regional and business sciences. The doctoral schools have a significant role in the scientific activity of AGTC. The new findings obtained in the doctoral theses are utilized on an increasingly wide scale in various areas of practice as a result of the innovation process.

The doctoral schools have an increasing range of relations with Hungarian and foreign scientific research institutes. A large number of doctoral candidates participate in the implementation of the successful Hungarian and international EU projects, as well as the educational activities.

The successfulness of the doctoral training carried out in the Center is well shown by the fact that nearly 75% of PhD students obtain their diplomas as "Summa cum laude". The graduated PhD students greatly contribute to the teaching and researcher staff replacement of the faculties and research institutes of the Center and increasing number of our graduated students start to work in other Hungarian higher educational institutions, research institutes, as well as multinational and other enterprises.



# FACULTY OF APPLIED ECONOMICS AND RURAL DEVELOPMENT ■ ■ ■

The Faculty of Applied Economics and Rural Development (GVK) carries out training in the field of economics which can be applied in a wider range of business life. The Faculty intends to adapt to the current challenges by training professionals in the field of finance, accounting, commerce, marketing, tourism, hospitality, business, rural development, information technology, management, sports management and logistics.

## Education

In addition to courses related to agribusiness, the training array of GVK also covers business trainings, as the faculty trains agricultural engineers and economists. The faculty builds its business trainings on the traditional scientific areas related to farming. By launching

the sports management course in the field of sports sciences, the faculty tries to conform to the current challenges.

## Accredited BSc courses of the faculty:

- Farm business management and rural development
- Information specialist and agricultural management engineer
- Commerce and marketing
- Finance and accounting
- Tourism – hospitality
- Sports management





In addition to the BSc courses, the Faculty offers six master courses:

- Human resources consultant
- Logistics management
- Accounting
- Enterprise development (also in English)
- Farm business management engineer
- Rural development agricultural engineer



The 14 specialized further education trainings are further learning opportunities for those who already have higher education degrees.

The Faculty of Applied Economics and Rural Development of the Center – in cooperation with the Finnish JAMK University (Jyväskylä University of Applied Sciences) – introduced the “Team Academy” training in 2010, which is an innovative and modern learning opportunity for students in higher education who are interested in the business field. The basic principle of Team Academy is that the knowledge needed in business life can be most efficiently and successfully attained in practice.

The novelty of this training lies in the fact that the students of Team Academy try out their talent in a real business environment; therefore, they improve their knowledge and achieve experience in business life. Students launch businesses at the time of beginning their studies and they have to arrange all aspects of founding and maintaining the company. The students at Team Academy learn to cooperate in teams, to educate themselves in their own area of business interest, as well as to speak the foreign languages used in the business sector. The students’ work is guided by professionally prepared university professionals (trainers). Students of the “Team Academy” take part in a dual training. Once they finish the training, they can obtain an internationally renowned Finnish business (master) degree





called "Master's Degree Program in International Business Management, Master of Business Administration" in addition to the BA or MSc degree they are entitled to. This internationally acknowledged business degree and the obtained market knowledge and experience significantly improve the job opportunities of graduated students. The high level training is provided by 70 outstanding and certified teachers and researchers at the Faculty.

### Research work

GVK takes part in the unified research framework program of the Center. The Faculty is connected to the fifth group of topics (AP5) of the research umbrella program of AGTC entitled "Farming and rural development supporting regional innovation". The Faculty defined the duties to be performed in seven projects:

- Regional research connected to agro-economy
- Applied information technological and economy evaluation-methodological research
- Transparency of the food supply chain: economic examination of horizontal and vertical phases
- Regional resources of rural development and their utilization
- Innovative leadership and organizational innovation
- Marketing and enterprise economic research along each agribusiness product path
- Financial and accounting-related questions of financing farming and rural development





The aim of the educational, research and development activities at the Faculty of Agricultural and Food Sciences and Environmental Management (MÉK) is to satisfy the present and medium term requirements of Hungary, the agricultural sector and the society. Via creative work in these fields, the Faculty contributes to the enrichment of national and international results and values and by offering diverse educational programs, it trains graduates for the highest level organizational and administrative tasks of the agricultural sector.

With its scientific activity, MÉK contributes to the sustainable utilization of regional values and resources. Based on their active professional public activities and their relations to agro-economy, they undertake a leading role in making production more efficient and improving the competitiveness of enterprises. With the diverse activities of the faculty, they support the development of the

# FACULTY OF AGRICULTURAL AND FOOD SCIENCES AND ENVIRONMENTAL MANAGEMENT



human resources and tangible conditions of the agriculture-focused eastern part of the country and they utilize their accumulated knowledge also in the international scene.

### Education

The Faculty trains experts at the BSc, MSc and PhD levels in numerous fields of agricultural sciences: classical fields (animal husbandry, crop production, horticulture), environmental management, food processing, game management, nature conservation and crop protection are included in the diverse educational programs. The first four steps of the training structure developed at the Faculty are represented by the four-term-long **specialized higher education programs**: animal husbandry engineer (specializations: poultry breeding, fishery, horse breeding, hog raising), environmental management (specializations: waste management, environmental management), agricultural engineer and crop production engineering.

The following accredited BSc courses are available:

- animal breeding engineering
- food engineering
- horticulture
- environmental management
- agricultural engineering
- crop production engineering
- nature conservation
- game management

In order to be present in the international education market, we provide the following BSc courses in English: food engineering and environmental management agricultural engineering.

With consideration to the expectations of society and economic life, the accredited master courses (MSc) will enable students to obtain special skills in a specialized agricultural field:

- agricultural engineering
- animal husbandry engineering
- food security and quality engineering
- horticultural engineering
- environmental management agricultural engineering
- crop production engineering
- plant protection
- environmental protection engineering



Of the MSc courses, students can apply for training in English in agricultural engineering, animal husbandry engineering, food security and quality engineering, environmental management agricultural engineering and plant protection courses.

### Research Work

The research strategy of the Faculty is closely related to the strategic fields of education and extension. Among the classical special agricultural fields, traditional plant production sciences and the complex evaluation of field crop, fruit and vegetable species, as well as varieties and hybrids adapted to specific ecological conditions are of special importance. In the field of animal husbandry and related sciences, in addition to traditional research (pig, poultry, cattle, sheep, fish), new interdisciplinary fields (biotechnology, organic animal keeping, precision foraging) are of increasing significance. In each research area, the fundamental aim is to enforce the principles of climate change, environmental, biological, technological and economic sustainability.

One field that is highlighted is the economic study of the environmental aspects of agricultural research, the factors and parameters influencing product quality, and the basic and supplementary agricultural activities. Via its involvement in rural development programs, the Faculty plays a role in the scientific foundation of regional developments. Research is also focused on the quality of agricultural products and food products, the scientific foundation of healthy nutrition and quality control.

In comparison with other Hungarian higher education institutes, it is an advantage of AGTC that a unique edu-



cation and research infrastructure was established which covers the whole area of natural and social sciences.

*The teachers and researchers of the Faculty are active in four groups of topics in relation to the umbrella programs of the Center.*

### Climate change and actions

- The causes, expected trends of and adaptation to climate change
- The bases of crop production and its interactive technology development in various agroecological systems
- Adaptation to climate and weather change in horticultural production
- Bioenergetics research, developments and applications
- Preservation of biological bases, as well as their development with traditional and biotechnological methods
- Development of products, technologies and services based on the examination of biological and technical interactions
- Environmentally friendly crop protection in sustainable crop production technologies
- Development of the technological bases of floriculture and green area management

### Healthy nutrition

- Research projects serving the production of quality and functional vegetable products and foods



- Development of the analytical and microbiological methods of food industry products
- Development of processing technologies reducing food safety risks

### Sustainable agricultural environment

- Protection of soil quality
- Reservoir-based integrated water stock management
- Complex practical protection of the functions of agroecosystems
- Material- and energy-saving environmental technology
- Sustainable biodiversity and habitat protection

### Animal husbandry, animal keeping, animal welfare

- Research serving quality and functional animal product and food production (nutrigenomics, molecular genetics)
- Research of genetics, foraging and animal husbandry technology serving the efficiency of quality animal husbandry
- Research of healthy livestock products in relation to nutrition based on genetic parameters
- Raising and breeding sheep which conform to market needs and climate



# ONGOING RESEARCH AT THE CENTER OF AGRICULTURAL AND APPLIED ECONOMIC SCIENCES

## RESEARCH IN FP7 PROJECTS IN COOPERATION WITH EU COUNTRIES

Currently, DE AGTC takes part in five EU FP7 research projects in the fields of land use, crop protection, food safety, precision crop production and habitat mapping in cooperation with renowned European universities. The Center is consortium leader in one project, while the Polish Academy of Science and the Regional Research Center of the Hungarian Academy of Science are cooperating partners in the implementation of the project.





### **Precision crop production, land use evaluation**

*Consortium leader: University of Debrecen, Center for Agricultural and Applied Economic Sciences (Hungary)*

*Project manager: Prof. Dr. János Nagy*

*EU partners: University of Ghent (Belgium), University of Tübingen (Germany), Friedrich-Schiller University, Jena (Germany), Polish Academy of Science (Poland), Technical University of Vienna (Austria), University of Lincoln (United Kingdom), Regional Research Center of the Hungarian Academy of Science (Hungary)*

“The long-term objective of the project is to survey the soil, land use and climatic circumstances, as well as to organize them into an integrated GIS monitoring system. Consequently, it is possible to determine the region-specific land use structure and sowing structure of each area adapting to their given ecological conditions. As a result of the research work, an agro-environmental management plan can be prepared in field crop production which involves the preparation of an environmentally friendly nutrient management plan that also takes the alternatives of regional management into consideration. Furthermore, crop protection, tillage, sowing structure and regionally adapted variety use plans can also be prepared. One of our most important duties is to establish a geo-information consultancy system based on producers and farmers, thereby supporting efficient agronomic interventions in an environmentally friendly way.”



### **Healthy foods and physical activity for a modern lifestyle**

*Consortium leader: Wirtschaftsfoerderung Region Stuttgart GmbH (Germany)*

*Project manager: Dr. Zoltán Bács*

*EU partners: Universiteit Gent (Belgium), Association Agropolis (France), Liverpool John Moores University (United Kingdom), Stichting Katholieke Universiteit (The Netherlands), Innova (Hungary), DE AGTC (Hungary), Innovatív Élelmiszeripari Klaszter Kft. (Hungary)*

“We work out a research program with the aim to connect sports to nutrition, thereby examining how the spreading of endemics (cardiovascular and tumor diseases) can be stopped in Europe. A series of scientific research projects show that unhealthy nutrition and the lack of physical activity can cause numerous illnesses. We develop foods whose ingestion is verified to contribute to maintaining good health and wellbeing.”



### **Working out a new integrated crop protection system in Europe**

*Consortium leader: Institut National de la Recherche Aronomique (France)*

*Project manager: Prof. Dr. Imre Holb*

*EU partners: Wageningen Universiteit (The Netherlands), University of Sheffield (United Kingdom), Rothamsted Research Limited (United Kingdom), Aarhus Universitet (Denmark), INRA Transfert S.A (France), BLGG Agroxpertus B.V. (The Netherlands), Bayer Cropscience AG (Germany), DE AGTC (Hungary)*

“We plan to introduce a new environmentally friendly crop protection system which uses new biological basic research and innovative environmentally friendly crop protection together. As a result, new biological, biotechnological, molecular biological and nanotechnological systems will also be included, thereby reducing the use of chemicals. This system involves the environmental protection and human health care points in a modern approach, as well as the social and economic relations.”



### **Improving the innovativity of SMEs in the food sector**

*Consortium leader: Ghent University (Belgium)*

*Project manager: Dr. János Felföldi*

*EU partners: Teagasc-Ashtown Food Research Center (Ireland), Food Valley (The Netherlands), Skåne Food Innovation Network (Sweden), Institute for Food Studies & Agro Industrial Development (Denmark), Bologna University (Italy), LaSalle Beauvais Polytechnic Institute (France), Bonn University (Germany), DE AGTC (Hungary)*



“The aim of the project is to explore the network behavior affecting the innovativity of SMEs in the food sector, thereby identifying the aspects influencing their performance. Based on these findings, the project aims to develop a method which can be used in evaluating network performance and SME performance. Within the framework of the project, we establish a common database of Dutch, Danish, Swedish and Irish research institutes, as well as Italian, Belgian and German universities. Furthermore, we actively participate in different development tasks.”



### **Habitat field monitoring supported by remote sensing data of aerial images**

*Consortium leader: Technische Universität Freiberg (Germany)*

*Project manager: Prof. Dr. János Tamás*

*EU partners: ATMOTERM S.A. (Poland), YGGDRASIL Dr. Rahner (Germany), YGGDRASIL Diemer (Germany), Technische Universität Wien (Austria), RIEGL Research Forschungsgesellschaft mbH. (Austria), DE AGTC (Hungary)*

“The aim of the project is to maintain a professional exchange link between the experts of the participating industrial and university experts. The professional lead partner of the hyperspectral aerial material analysis technology is the Institute for Water and Environmental Management of the Center for Agricultural and Applied Economic Sciences. The aerial laser mapping is performed by the Photogrammetric Institute of the Technical University of Vienna, while the ecological GIS land mapping is developed by the experts of the Technical University of Freiberg. In addition to two German ecomapping enterprises, RIEGL also participates in the work as one of the most significant LIDAR technological instrument manufacturer and developer companies of the world. Currently, the already mapped sample areas of Sopron – Tisza lake – Hortobágy-Nagyerdő – Uckermark (Germany) are being evaluated and different methodological developments are in process. As the closing of the project, the consortium works out a technical-ecological solution for the new remote sensing condition evaluation of the EU NATURA 2000 areas.”

## THE FIVE SCIENTIFIC UMBRELLA PROGRAMS AT THE CENTER FOR AGRICULTURAL AND APPLIED ECONOMIC SCIENCES OF THE UNIVERSITY OF DEBRECEN

In order to carry out integrated research activity and uniform research potential, the scientific umbrella programs of the Center were launched in 2010. During the harmonization of the research structure, the R&D activity carried out in the units of the Research Institutes and Study Farm (KIT) also integrated organically into the research structure of AGTC. The faculties and research institutes of the Center closely cooperate in the successful implementation of the five scientific umbrella programs that are in accordance with the current EU research topics. The aim of this cooperation is the increasing competitiveness and the better utilization of intellectual performance and research potentials. The scientific research umbrella programs are closely linked to the RDI strategy of the Center. Among others, the main areas of research are the analysis and development of biological bases, as well as RDI tasks related to climate change, biomass utilization, green branches of industry, water management, environmental management, food and nutrition science.

The high level interdisciplinary research projects embrace the basic and applied research and developments. Our achieved research findings are utilized in the fields of education, innovation and consultancy. The utilization of research findings is an important task from the economic aspect. The prerequisite of utilizing these results is to be able to present them as marketable “products”. Research and development serve practical usability in the framework of cooperation with enterprises.

The successfulness is mainly shown by patents, know-hows, efficient technologies, state-recognized plant and animal varieties

### **CLIMATE CHANGE AND ACTIONS**

**Project manager: Prof. Dr. János Nagy**

Project: Causes and expected trends of climate change and the adaptation to climate change

*Project manager: Prof. Dr. János Nagy*



Project: The bases and interactive technology development of crop production in different agroecological systems

*Project manager: Prof. Dr. Péter Pepó*

Project: Exploring and mitigating the impacts of climate change in fruit and vegetable production

*Project manager: Prof. Dr. Imre Holb*

Project: Bioenergetics research, developments and applications

*Project manager: Dr. Tamás Rátonyi*

Project (Nyíregyháza): Preservation and development of biological bases with traditional and biotechnological methods

*Project manager: Dr. Judit Dobránszki*





Project (Karcag): Preservation and development of biological bases with traditional and biotechnological methods  
*Project manager: Árpád Puskás*

Project: Development of processing technologies reducing food safety risks  
*Project manager: Dr. Péter Sipos*

Project: Development of products, technologies and services based on the examination of biological and technical interactions  
*Project manager: Prof. Dr. Botond Sinóros-Szabó*



**SUSTAINABLE AGROENVIRONMENT**  
**Project manager:**  
**Prof. Dr. János Tamás**

Project: Alternatives of environmentally friendly protection of culture crops in sustainable farming  
*Project manager: Dr. György Kövics*

Project: Working out and development of novel soil use systems in the Nagykunság region

Project: Development of the technological bases of floriculture and green area management  
*Project manager: Prof. Dr. Miklós Fári*

*Project manager: Dr. József Zsembeli*

Soil biological research  
*Project manager: Dr. Marianna Makádi*

Project: Reservoir-based integrated water stock management  
*Project manager: Prof. Dr. János Tamás*

Project: Material- and energy-saving environmental technology  
*Project manager: Dr. Csaba Juhász*



**HEALTHY NUTRITION**  
**Project manager:**  
**Prof. Dr. Béla Kovács**

Project: Research projects serving the production of quality and functional vegetable products and foods Development of the analytical and microbiological methods of

food industry products  
*Project manager: Prof. Dr. Béla Kovács*

Project: Sustainable biodiversity and habitat protection  
*Project manager: Dr. Lajos Juhász*





**ANIMAL HUSBANDRY, ANIMAL KEEPING, ANIMAL WELFARE**  
**Project manager: Prof. Dr. András Jávör**

Project (Debrecen): Research serving quality and functional animal product and food production (nutrigenomics, molecular genetics)

*Project manager: Prof. Dr. András Jávör*

Project (Karcag): Research serving quality and functional animal product and food production (nutrigenomics, molecular genetics)

*Project manager: Dr. István Csízi*

Project: Research of genetics, foraging and animal husbandry technology serving the efficiency of quality animal husbandry

*Project manager: Prof. Dr. István Komlósi*

Project: Research of healthy livestock products in relation to nutrition based on genetic parameters  
 Project manager: Prof. Dr. László Babinszky

Project: Raising and breeding sheep which conforms to market needs and climate

*Project manager: Prof. Dr. András Kovács*



**MANAGEMENT AND RURAL DEVELOPMENT SUPPORTING REGIONAL INNOVATION**  
**Project manager: Prof. Dr. András Nábrádi**

Project: Regional research connected to agro economy

*Project manager: Prof. Dr. Béla Baranyi*

Project: Applied information technological and economy evaluation-methodological research

*Project manager: Prof. Dr. Miklós Herdon*

Project: Transparency of the food supply chain: economic examination of horizontal and vertical phases

*Project manager: Prof. Dr. József Popp*

Project: Regional resources of rural development and their utilization

*Project manager: Prof. Dr. Géza Nagy*

Project: Innovative leadership and organizational innovation

*Project manager: Prof. Dr. Csaba Berde*

Project: Marketing and enterprise economic research, sectorial and product path research

*Project manager: Prof. Dr. András Nábrádi*

Project: Financial and accounting-related questions of financing farming and rural development

*Project manager: Dr. Zoltán Bács*



The projects in the umbrella programs of the Center are in line with the main streams of agricultural research. In accordance with the R&D strategy of the EU, the increasing of competitiveness is served by the innovation efforts of the rural development strategy.

The R&D umbrella program helps the implementation of the Sustainable Development Strategy passed at the Gothenburg Summit of the EU, as well as the protection of natural resources and the protection and improvement of soil conditions. The innovation which supports regional management and rural de-

velopment provides help in the strengthening of the socio-economic links of agricultural and the widely interpreted rural areas.

The research of the Center related to environmental protection and land use well supplement the Lisbon Strategy which deals with the social and economic aspects of sustainability. By means of rational land use, the research carried out at the Center contributes to the preservation of biodiversity, the protection of natural waters and the enforcement of international environmental protection strategies and regulations related to the mitigation of climate change.





# KIT DEBRECEN STUDY FARM AND REGIONAL RESEARCH INSTITUTE ■ ■ ■

The Farm and Regional Research Institute (DTTI) serves as a research site; it provides a basis for practical training and its market revenues help financing. The Institute performs diverse activities in three basic fields of agriculture at the crop production farm at Látókép, the animal breeding farm at Kismacs, and at the horticultural site at Pallag. The sites are managed by the competent, complementary departments, but they also serve as a research background for six other departments.

It is an important objective to provide the students with a university-level practical training. The Institute provides the professional background for preparing scientific studies, theses and 10-15 PhD theses annually.

### **Látókép Experimental Farm**

This farm is located 15 km from Debrecen, along main road No. 33. It consists of 193 ha arable land of good

quality, out of which 146 ha can be irrigated with a modern linear system. The experimental area is 45 ha. On 80 ha, soil- and environmentally-friendly biotechnology is applied. The experimental farm is equipped with the necessary machinery and the special equipment for research.

### **Major research fields:**

- Development of the major elements (e.g., fertilization, crop rotation) of region-specific production technology for promoting quality wheat production
- Study of winter wheat crop models with different intensity
- Long-term, polyfactorial crop production experiments
- Development of environmentally-friendly new production procedures with low chemical and energy requirements
- Development of complex production technologies, assisting the utilization of biological bases

- Testing of yielding capacity and crop density qualities of maize hybrids
- Development of variety-specific maize production technologies

#### **Animal Breeding Experimental Farm**

This farm is located along main road No. 35, near Kismacs. At the experimental farm, the gene preservation of several varieties of three animal species is carried out. The maintained varieties include the white, yellow, partridge-colored, speckled of the indigenous Hungarian chicken, the white, black and speckled Transylvanian naked neck chicken, the bronze- and brass-coloured Hungarian common turkey, as well as the Csóka tsigai sheep which is also indigenous.

With the help of a Jedlik Ányos grant, the shedding wool sheep experiment was performed, resulting in the propagation of the black and white dorper sheep population.

#### **Pallag Horticultural Site**

The ecological conditions and soil type of the experimental site of 70 ha area represent the characteristics of the Southern Nyírség area. In the past few years, about 6 hectares of orchards were established. The number of cultivars at the orchard is above 250, the site serves as a cultivar collection and gene bank. A demonstration garden was established presenting the diversity and genetic values of endemic, wild fruit species. The site offers an opportunity for the students to get acquainted with and practice the technological phases and procedures.

#### **Major research fields:**

- Increasing intensity in apple, pear, sweet and sour cherry, plum
- Development and improvement of environmentally-benign fruit production technologies
- Research on ornamental plants, breeding of Canna cultivars





and working out their respective production technologies, utilization of grasslands of the Great Plain and the improvement of sheep keeping technologies. The institute has a rich tradition in the scientific foundation of the chemical and physical amelioration and water balance control of saline and acidic soils. It has expanded its R&D profile to include rural development programs which offer opportunities for applying new research results in a wide-ranging manner as well as preparing and implementing rural development plans based on these results. During its operation, the Institute has produced numerous research results which are not only of scientific value, but are also important from the point of view of practical applicability.

The following R&D topics well represent the activity of the research institute:

- Periodic deep-cultivation of soils.
- Soil-protective and cost-effective tillage methods.
- Chemical and mechanical amelioration methods for acidic and saline soils.
- Complex method and cheap equipment of sheep grazing.
- Creation of plant cultivars and hybrids adapting to the extreme ecological conditions of the Great Plain.
- Environmentally-benign utilization of liquid manure and sewage via the soil.
- Development of land utilization methods assisting and maintaining the efficacy of soil amelioration.

# KIT KARCAG RESEARCH INSTITUTE

The basic activities of the research institute include agricultural research, development, education and extension. Due to its location, its major task is agricultural research amid the unfavorable ecological conditions of the Central Tisza region. Its research activity involves the development of soil amelioration, cultivation and nutrient management of heavy soils with unfavorable physical and chemical characteristics.

An important task of the institute is to breed plant cultivars adapting to the ecological conditions of the region

- Improvement of the nutrient management system of soils with unfavorable physical and chemical characteristics.
- Working out the large-scale application technology of multi-component, complex soil amelioration materials.
- Analysis of the main characteristics of cultivation, inputs, costs and work organization questions of machinery.



The area of the Institute, with its more than 1000 ha, is a good representative of the characteristics of the soils found in the Great Plain. Its size, together with the existing sites, provides a good opportunity for the practical training of students and for establishing model farms, demonstration areas and extension bases. The research institute has a great innovative role in the development of the region's agriculture, in education and rural development.

The most important future tasks include: dry farming, the scientific foundation of sustainable agricultural development under more frequent dry periods, and consideration of regional development requirements. The operation of the institute is based on government support, winning applications and own income. The institute strives to develop and strengthen its research staff.

The institute carries out its R&D tasks in co-operation with other units of the University of Debrecen, Hungarian scientific institutions, professional organizations and numerous foreign institutes.





In 2000, the research institute was integrated into the organizational system of the Center of Agricultural and Applied Economic Sciences and the University of Debrecen.

The mission of the R&D activities of the research institute is to perform successful regional agricultural research mostly in relation to less favored areas. Keywords of research are: biotechnology, sustainable agriculture, breeding, regionalism, regional research, regional economy, biological bases, quality, and environmental protection.

# KIT NYÍREGYHÁZA RESEARCH INSTITUTE



**The major research tracks of the institute are as follows:**

- breeding of plants adapting to regional conditions
- providing biological bases
- plant biotechnology research

Major crops: potato, sunflower, rye, triticale, oat, broad-bean, green and dry beans, green and dry peas, lupine, alfalfa, hairy and common vetch, bird's foot trefoil, millet, annual canary grass, buckwheat, setaria. The breeding activity of the institution is qualified by more than 50 registered cultivars whose variety maintenance is also performed. The in vitro basic research carried out in the Biotechnological Laboratory contributes to the development of the regional area, the more efficient breeding work and the production of virus-free propagation material of high biological value.

The institute has an important role in the development of cultivation methods for sandy soils, in the study of the mineral nutrition of plants and in working out environmentally-friendly agrotechniques. This embraces the study of possibilities in complex and rational land use and the development of procedures





for maintaining and increasing soil fertility and the soil microbiology examinations.

**Significant tasks in these fields are:**

- Maintaining the Westsik long-term field experiment
- Development of alternative, environmentally-friendly, cultivar-specific production technology procedures, soil-protective agrotechnical and chemical methods and their applications, which minimize the physical and chemical burden of soils in addition to ensuring optimal conditions for plants.
- Researching the agricultural utilization opportunities of various wastes and byproducts as soil improvement material and nutrients
- Ecological farming, breeding and selection of cultivars suitable for organic growing on sandy soils.

- Development of sustainable farming on sandy soils, complex soil production capacity management. Improvement of soil fertility through complex, environmentally-friendly soil conservation.

With the establishment of a regional contact network, the research institute aims to assist in the implementation of the medium- and long-term strategy of the region and to enhance its research, development, extension and educational activities by taking into consideration the traditions, the special opportunities, regional needs and the priorities of the EU regulations. During the realization of the above objectives, the research institute has developed a close co-operation with the leading and determining agricultural firms and a large number of farmers in the region.





# RESEARCH AND DEVELOPMENT INSTITUTE

The development strategy is represented by the collective of systematized approach and practical implementations. The research and development activity is manifested in strategic projects. These projects are of high standards and the solutions to be developed give answers to the complex questions posed by practice.



The high level intellectual background is provided by the outstanding relations with other university research and development units and the professors of the Non-profit Association of the Eastern Tri-border Area Research and Development Center (31 professors and their research units).

The projects linked to the strategy are rather diverse, but each can be characterized by the effort to solve the most significant problems of Hungary and Europe from a practical aspect. Energy production, food supply and employment are especially important issues of the strategy-driven projects. It was defined as an important objective to be able to adapt, extend and sustain these strategic projects.

Of the achievements of the Research and Development Institute, the "Improving the employment and quality of life of those living in extreme poverty in the eastern tri-border area of Hungary" and the "Strategic development of the Tisza region" are worth mentioning.

# AGRICULTURAL INDUSTRIAL PARK

As a result of the establishment of the Industrial Park, there is a unique chance to unify the investment needs of the private sector and the opportunities provided by the University. The only knowledge-intensive university "center" of Hungary was established (after the western model) in order to implement a complex as a model of cooperation between higher education and the business sector where education, research and consultancy can be demonstrated in practice. In addition to exploiting the strengths and development potentials of the city and the University, the Industrial Park provides a successful investment opportunity for the innovative ideas of enterprises that move into the Park.

Debrecen can be reached from Budapest in 2 hours via the M3 motorway. Debrecen Airport is the only significant passenger travel airport in Eastern Hungary, operating as an international commercial airport since April 2003. Furthermore, the railway system, serving major passenger and cargo traffic, is also within reach. As a result of all these alternatives, the city of Debrecen is linked to Hungarian and international transportation networks.

The University of Debrecen is the strength of the city, as more than 1400 teachers from 15 faculties train around 30 thousand students a wide range of courses from various branches of science (medicine, pharmacy, architecture, agriculture, law, economics, pedagogy, humanities, natural sciences). The research and development activity at the university provides an intellectual resource which is a significant attraction for internationally acknowledged cutting-edge technologies and production investments. Several world-famous companies (IT Services, National Instruments, BT, TEVA, Actavis, Richter, Béres, GEM, Ygomi) and knowledge-based technologies are present in Debrecen, including enterprises active in pharmacy, packing industry and high-level information technology.

The Debrecen Industrial Park is a 26 ha area next to the University. The infrastructure on the site (public lighting, energy center, water utilities, natural gas, optical cable, telephone, bus traffic) has been developed in order to meet the modern demands of operation. The manage-

ment of the University also plans to launch supplementary services (management, training organization, consultancy, project planning, R&D service, market research, uniform image) for the companies which plan to move to the Industrial Park. Currently, the Industrial Park hosts IT Services Hungary which employs 1200 people and is active in the field of information technology.

## The aim of the Science Park is to

- support the research and development programs (mainly in the field of food and pharmaceutical industries and in information technology) performed by the University of Debrecen in cooperation with industrial partners, thereby supporting the growth of new enterprises and the development of economy,
- accelerate the establishment and growth of innovation-based enterprises by means of their incubation and investments,
- stimulate and manage the flow of knowledge and technology between universities, research and development institutions, companies and the market,
- create circumstances where knowledge-based enterprises can develop and the freshly launched companies can enjoy the advantages of cooperation with the University of Debrecen.





# NORTH GREAT PLAIN REGIONAL CONSULTANCY CENTER ■ ■ ■



The Ministry of Land Use and Rural Development commissioned the agricultural higher education institutes (including the Agricultural University of Debrecen) to organize free group consultancy programs in 1999.

the global operation of consultancy, while it synchronizes and supervises the regional consultancy centers as well.

The aim of our professional consultancy center is to utilize the scientific and innovation findings in the agricultural practice to the greatest possible extent by means of using the agricultural consultancy system.

The next step of developing the consultancy system was the assignment of "Regional Consultancy Center" function to the AGTC. In Hungary, the Farm Advisory System based on a previous university system has been operating since 2007. In accordance with EU regulations, the use of such system is the prerequisite of using agricultural subsidization provided by the European Union. The Center and the consultancy center had a major role in implementing this task. The North Great Plain Regional Consultancy Center performs





# CENTER OF ADULT AND DISTANCE EDUCATION ■ ■ ■

The Center of Adult and Distance Education of AGTC provides high level education and an opportunity to students to attain special qualifications listed in the National Qualification Registry (OKJ), during which they can also utilize the knowledge they acquired during their university studies.

In addition to university students, the Center also organizes trainings outside the school system for other players of the labor market, such as active workers and registered job seekers. The professional qualifications there people can obtain in this system enable them to successfully apply for new jobs and to keep their existing jobs.

In accordance with European Union expectations, the competence-based and modular course systems became more preferred in the area of adult education. In order to widen the range of life-long learning to the whole society, the center built up a wide system of relations, cooperation and information channels with the enterprises and institutions of the region. Furthermore, the Center also organizes further education programs that are laid down in the respective regulations as compulsory training for agricultural and economist professionals hired by these companies. The Center for Adult and Distance Education is also active as an examination center, providing an examination alternative for those who wish to prepare for the qualifica-

tion exam and to acquire the certificate on their own or those coming from other institutions, in addition to the Center's own students and the people who participate in their courses.

The primary objective of the Center is to increase the students' competitiveness on the labor market, as well as to meet the region's human resource needs. We constantly develop our quality-related aims and objectives based on the experience we obtain during the implementation of the programs and the feedback of those who participate in our courses.





# UNIVERSITY KNOWLEDGE CENTER OF REGIONAL DEVELOPMENT ■ ■ ■



The University Knowledge Center of Regional Development of the Center for Agricultural and Applied Economics of the University of Debrecen carries out research and development, as well as innovation and educational activities based on the strategic cooperation of the Hungarian and international scientific and economic sector.

The mission of the knowledge center is to attain achievements during its research and development, as well as innovation and educational activities based on the strategic cooperation of the Hungarian and international scientific and economic sector which can be directly or indirectly used by the Center.

#### Tasks:

- Developing knowledge transfer networks, sharing best practice

- Cooperation between educational institutions, common curriculum development, courses, training programs
- Working out special programs related to highly demanded professions
- Working out programs which extend employment, create jobs and help those who have higher education degrees to find jobs
- Developing life-long learning programs aiming at reducing unemployment
- Strengthening cross-border cooperation tasks, primarily focusing on working out interregional regional development programs in cooperation with Romania, development of the quality of life of those living in the cross-border regions
- Generating and implementing Hungarian international research and energetic (KEOP) projects

The Center for Agricultural and Applied Economic Sciences of the University of Debrecen implemented numerous successful activities which strengthen the cooperation between higher education and the economy.

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**UNIVERSITY OF DEBRECEN,  
CENTER FOR AGRICULTURAL AND APPLIED  
ECONOMIC SCIENCES**

H-4032 Debrecen, Böszörményi út. 138.  
Postal address: H-4015 Debrecen, P.O. Box 36  
Phone: +36 52 508-444, Fax: +36 52 413-385

