Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

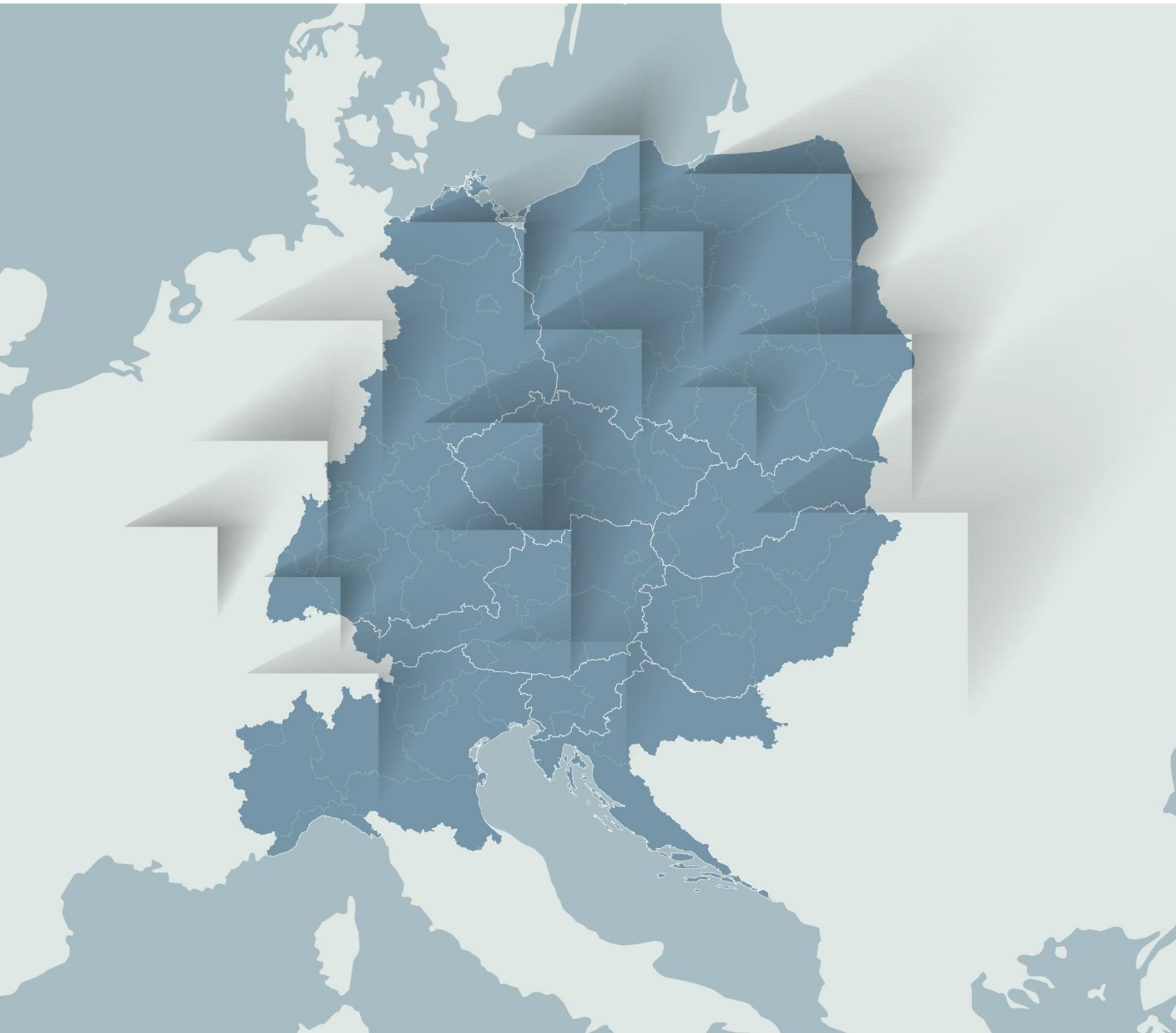
Transfarm4.0

TRANSNATIONAL CATALOGUE OF INDUSTRIAL POOLS OF EXCELLENCE IN PF

Version 2

J. Sienkiewicz, A. Chrystowska O'Shea

05 | 2021



WHAT IS PRECISION FARMING?

Precision agriculture is the practice of implementing technology to achieve greater accuracy and control in agriculture production, and involves the use of various modern technologies to support agricultural processes. Especially new production technologies supported by information technology solutions

The concept is simple in its bases and helps to increase the precision of one's farming operations by using advanced technologies. By using a combination of different sensors and monitoring systems, it is possible to increase yields and improve farm productivity and efficiency of farming. Such action translates into increased profitability in an industry that faces many challenges.

Precision farming was first mentioned in the early 1990s with the introduction of GPS navigation systems for tractors. This made it possible to increase the efficiency of fertiliser, seed and fuel use, saving time and labour.

Along with GPS assisted steering, precision farming has added other technologies. Some of the key elements of this practice include: soil sampling, use of GPS, variable rate technology (VRT), computer analysis and the use of remote sensors.

Soil sampling provides the opportunity to obtain detailed information on available nutrients in the soil. Checking pH and nutrient levels provides information to help develop a plan to optimise seed, fertiliser and pesticide application.

Variable Rate Technology includes a variety of devices that adjust fertiliser application doze based on external factors, including weather. VRT systems often use software and a controller to adjust the use of fertilisers, pesticides and various equipment at specific locations.

Computer analysis includes various applications to assist in obtaining input data for different crop growing, field maps and other precise data. Such analysis done for the farm is used to reduce expenses, increase yields and reduce environmental impact.

The use of sensors is one of the oldest examples of precision agriculture. Farmers first started using remote sensors in the 1960s to monitor land, water and other resources such as soil moisture content to adjust crop irrigation systems.

Whatever the technology, the goal is the same: to make decisions with greater precision.

THE ADVANTAGES OF PRECISION FARMING

Precision farming takes advantage of the many technologies that smart devices offer to consumers. Many home appliances are now connected via Wi-Fi or Bluetooth. Smart homes allow homeowners to simplify common tasks, such as turning off lights and lowering the temperature at night jus as an expamples.

The latest technologies for precision agriculture also help simplify common tasks. However, there are many additional reasons to implement new agricultural technologies, including:

Higher yields - with more accurate observation of soil conditions, crop growth and weather, resource efficiency is improved and yields are increased. Traditionally, decisions related to planting, irrigating, fertilising and harvesting crops have been made based on historical data and regional conditions. The use of sensors, mapping tools and analytical software makes it easier to make changes to production standards related to changes in external factors such as weather or soil condition. Modern technology makes it possible to remotely monitor entire fields and adjust irrigation, pesticide or fertiliser application dozes without leaving home. Data is updated in real time, providing greater accuracy and the ability to make informed decisions.

Reduced waste is one of the key benefits of precision farming. With accurate data on soil and crop conditions, farmers can adjust their use of resources to match fertiliser or pesticide application dozes to actual crop needs and conditions. Using less pesticides and fertilisers can lead to improved soil conditions, as these products often contain harmful chemicals that can seep into the soil. This requires farmers to rotate fields and crops. Maintaining high soil quality can reduce

these practices, providing an additional boost to overall productivity.

Less manual labour is caused by the automation of farm tasks. Although farms will always need people to do certain jobs, more and more tasks are being performed by automated equipment. Mechanisation led to a significant reduction in farm labour from the 1950s onwards. This decline continues to this day. It is clear that the decrease amount of human labour needed in agriculture will continue. With less interest in agriculture as a career, farms may have to rely on automated equipment to replace manual labour.

Increased productivity - the combination of the discussed advantages offered by modern technology leads to increased productivity. With less expenditure, loss of inputs and damage to crops or livestock, farms become more profitable.

This catalogue provides information about the technologies available in the countries of the project partners, equipment manufacturers, development centres, projects on new technologies, etc., which relate specifically to precision agriculture in the respective countries.

1. HIGH-PERFORMING OEMS (HW & EQUIPMENT) BY TECHNOLOGY

1.1. Steering Systems

AUSTRIA (Upper Austria)

Steyr Traktoren
www.steyr-traktoren.com/de-at/landwirtschaft

The S-Tech System of Steyr Traktoren provides high precision steering with an accuracy of up to 2,5 cm (RTK+). Functions: Automatic turn-around at the end of the track, Vehicle settings logging, Power monitoring, Intuitive Touchscreen Monitor and ISOBUS interface.

Agris
www.agris.at/de/muellerelektronik/lenksysteme.html

The onboard electronics products of agris include automatic steering systems with a precision of 15 cm. Their portfolio also includes measuring equipment (humidity, temperature and soil diagnosis) and weighing machines.

HUNGARY

KITE
www.kite.hu
Steering systems are provided

Axiál Ltd.
www.axial.hu
Steering systems are provided

Agrárin Ltd.
www.agrarin.hu
Steering systems are provided

ITALY

Topcon Corporation
www.topconpositioning.com

Topcon Corporation is a Japanese multinational operating in different industries (mainly medical equipment and engineering). The engineering branch, Topcon Positioning Systems Inc., created in 2016 Topcon Agriculture Group with main seat in Turin (Piedmont), focused on Geopositioning, BIM and Precision Agriculture. Topcon provides a wide range of auto-steering systems like the AGI-4, a modular GNSS receiver and steering controller and X14, X25 or X35 consoles, to be used in combination.

Trimble Inc.
agriculture.trimble.com

Trimble Inc. is a California-based software as a service (SaaS) technology company. Trimble operates in Geospatial, Building & Construction, Agriculture and others. The Italian headquarters are in Vimercate, near Milan (Lombardy). It produces the Trimble® Autopilot™ automated steering system.

ITALY (Emilia-Romagna)

AMA
www.ama.it

AMA is a leading company in the supply of components and equipment for outfitting and maintaining Off-Highway Vehicles, agricultural and gardening machines. Its 6 product areas are: solutions for cabins, seats and steering wheels, solutions for hydraulic, point linkage and PTO shafts, soil working, solutions for garden. They produce several steering components (steering units, steering colomns, steering wheels, etc.)

ARAG
www.aragnet.com

ARAG is a main reference point in the spraying accessories field and in the precision farming area at a national and international level. For what concerns precision farming technologies, the company produces multifunction joysticks, TTC BLC, GPS Navigators and Rate Controllers, accessories for navigators and computers, monitors, computers for auxiliary circuits, electronic control units, GPS receivers. For what concerns automatic steering systems in particular, it produces Polaris, ECU-S1 Control Unit and Automatic steering system MDU-4.

COMER
www.comerindustries.com

COMER operates both in Agriculture (Engineering system for agricultural machinery) and Industry (Integrated solutions for construction equipment, marine industry and airport equipment, components and systems for the renewable energy sector). Main agricultural applications are: land preparation machines, soil tillage machines, crop treatment machines, forage and hay machines, biogas systems, corn and grain headers, combine and forage harvesters, forage mixing and distribution machines, tractors.

ITALY (Lombardy)

Bondioli e Pavesi
www.bondioli-pavesi.com

Bondioli & Pavesi is an industry leader in the power transmission sector thanks to a Group of eleven manufacturing companies in Italy and around the world. They created the HUB system, a range of intelligent components integrated into a power transmission system to provide unique control and data capabilities. In such system, the integration of electronics makes the component fully compatible with remote links: data can be sent and received for application of IoT techniques and control via mobile devices. Bondioli & Pavesi produces power transmissions and control tools (drive shafts, gearboxes, servocontrols, electronic control units).

COBO Group
www.cobogroup.net

COBO is composed by several companies, mainly located around Brescia and Reggio Emilia. The group produces electrical and electronic components, seats, steering wheels and completely assembled column kits for manufacturer of industrial vehicles, agricultural machines, earth moving machines and lift trucks, as well as custom-built cars and motorcycles.

SAME (Società Accomandita Motori Endotermici)
www.same-tractors.com

SAME is a historical firm funded in Treviglio in 1942. Now it's part of the multinational SAME Deutz-Fahr (SDF). It produces mainly tractors and relative components, among which SDF Guidance, monitors and Isobus systems.

POLAND

Bitkomp company

Bitkomp company offer „Bitfarma application" - for farmers and agricultural advisors - recording economic events on farms - supporting the planning process and making decisions in the field of current plant production management - GIS functionality and a module cooperating with maps

Agropower company
www.agropower.pl

Agropower company offer:
„AgroAsystent" - for farmers conducting any sown crops, regardless of their area - supports farm management in crop production - GIS functionality; Map module
„AgroPomiarGPS application" - agriculture, forestry, land management - designed for portable Pocket PCs (PDAs) with GPS receiver - GIS functionality, measurement using GPS, graphic presentation of measurements in the form of a map, adding SHP sleepers with record plots
The „RolnikON company" - has developed an online farm management system - effective management of crops, stored materials, breeding - GIS functionality • presentation of fields on a Google map

Agroboss company

eLMID-AgrarGIS, introduces GIS functionality, loading and editing various types of maps, description and vector development of cadastral maps of the entire farm and single arable fields, development of aerial photographs, topographic maps and other soil maps. The program databases contain data of surface registers and usage methods, taking into account cadastral data and the possibility of making manual divisions on the farm schedule and aerial photography base, as well as creating application maps of fertilization taking into account soil tests

Agrar-Office

Agrar-Office produces agriculture applications for full farm management - works with machines from many manufacturers - 4 modules, Field Journal - field card is a tool for accounting - saving field work on the farm, GIS - for area management, Field Book - for management plots for registration and for creating maps of precise fertilization, spraying and sowing - GIS functionality, GIS Smart Rural module.

Agro Innovations Center
agroinnovations.pl

Introduced the application „Virtual Virtual Zootechnik" - WirtualZootechnik.pl. It is a web application that works in a web browser. Basic program for detailed herd management - WirtualZootechnik Farm Manager. The application works on Android phones and is used for daily work directly in the barn. Thanks to the proximity technology, it allows identification of the animal after placing the phone close to the animal's earring.

SLOVENIA

AGROMEHANIKA D.D.
Hrastje 52a, 4000 Kranj
https://agromehanika.si

Agromehanika is the leading producer of agricultural machinery in Central and South-Eastern Europe. For over 50 years, Agromehanika has been synonymous with quality, reliability and development - features recognized by many farmers and business partners. It produces AGS sprayers, AGP mist blowers and compact AGT tractors.
Agromehanika incorporates into their systems equipment from other manufacturers such as GPS navigation G7 Farmnavigator from AvMap, which is an innovative agricultural navigator, designed to precisely farm agricultural land. It enables satellite guidance over the field and more precise crop processing. It is used for sowing, spraying and fertilization.

1.2. Tillage/Soil Cultivation and Seeding Equipment

AUSTRIA (Upper Austria)

Pöttinger Landtechnik GmbH
https://www.poettinger.at/en_us

Pöttinger Landtechnik GmbH is a major Upper Austrian agricultural technology company that includes grasland care, tillage, seeding equipment and digital farming technology (e.g. driving assistance and precision drill technology)

Einböck
https://www.einboeck.at

The portfolio of Einböck includes machines for crop-care, tillage, grassland care and seeding & fertilizing.

Regent
https://www.regent.at/en/

Regent produces equipment for tilling such as ploughs, power harrows, seed drill gear and cultivators.

AUSTRIA (Lower Austria)

Agri Farm Maschinenbau GmbH
www.agrifarm-maschinen.com

They build conventional machines for tillage and soil cultivation

APV Technische Produkte GmbH
www.apv.at

The company started with disc spreaders for grassland and seeding but continuously enlarged the product portfolio with rotary hoes, tine weeders for mechanical weed control, grassland harrows and grassland rollers, pneumatic seeders. The machines are partly equipped with ISOBUS technology. The competence therefore is established within the company.

Geoprospectors GmbH
http://www.geoprospectors.com/

Their product Topsoil Mapper supports the farmer in optimising soil cultivation by measuring the heterogeneity of fields (soil type, water saturation, and compaction using electromagnetic induction). The products are sold via the CNHi distribution channel “agXtend”.

HUNGARY

KITE
www.kite.hu

KITE is one of the main agricultural companies in Hungary. Among others the main sectors are seed production, machine and equipment trade together with irrigation, plant protection, fertilization. In viticulture several machines are provided to the sector such as tractors and equipment: sprayers, defoliators, electric pruners, mulching devices, and machines for undervine care.

Bartifarm
www.bartifarm.hu

Bartifarm among others provides machinery for harvest, transport, pruning, frost protection, and soil cultivation.

Sióagrár Ltd.
www.sioagrar.hu

Sióagrár Ltd. is an agricultural machine and equipment company providing shoot trimmers, soil cultivators, trunk cleaners.

Axiál Ltd.
www.axial.hu

Axiál Ltd. is one of the main companies among the agricultural machinery.

Agrárin Ltd.
www.agrarin.hu

Agrárin Ltd. is one of the earliest companies, main products are among others agrometeorology, nutrient supply documentation.

ITALY (Piedmont)

ROJ
www.roj.com

ROJ: develops and produces mechatronic solutions for customer-unique industrial and vehicle applications, in medium-sized volumes. In the field of seeding equipment, PCS 200 is the ROJ pneumatic precision planter control system, allowing to replace the mechanical transmission of seeding discs with an electric motor to achieve greater machine flexibility and provide new functions which are not possible with the mechanical transmission. ROJ also produces the PCS FS, a new pneumatic and mechanical seed drill control system based on the rugged Agri-Motion DMD 0 motor, controlled by the PCS 100 ECU.

ITALY (Veneto)

Sfoggia
https://sfoggia.com/

Sfoggia is a historical firm founded in 1956. It produces a range of precision seeding drills, strip trillers and cultivators. For what concerns Precision Farming, it produces Elektra Drive and Isobus, a completely automatic electronic system for seeding drills.

MC Elettronica
https://www.mcelettronica.it

MC Elettronica: settled in Rovigo, offers a wide range of electronic equipment for sowing spraying and harvesting machinery. They offer customized agricultural technologies for OEM customers and standard products for retailers and private customers. They produce innovative soil tillage monitors and Isobus planter monitors compatible with third party electronic devices including then main GPS navigators on the market.

Maschio Gaspardo
https://www.maschio.com/

Maschio Gaspardo is an international Group leader in the production of agricultural equipment for tillage, seeding, planting and fertilization, crop care and haymaking. The Group produces a wide range of rotary tillers, power harrows, mulchers, precision planters, cereal seed drills, combination cultivator-drills, flail-mowers, ploughs, minimum tillage, spraying and hay making equipment. For what concerns in particular PA technologies, they produce seeding monitors, sprayers and mistblower control groups, Isotronics and Isobus terminals.
To be noticed, that Maschio Gaspardo's tractor Crono was prized during the event Machine of the Year (a contest for the most innovative agricultural machines) at 2019 Sima event in Paris as best precision seeding drill of the year.

POLAND

Przedsiębiorstwo Usługowo-Produkcyjne AGROMIX Sp. z o.o.
https://agromix.agro.pl/

Przedsiębiorstwo Usługowo-Produkcyjne AGROMIX Sp. z o.o., manufacturer Manitou Group - Manitou MLT 420 telescopic loader

USARYA POLSKA Sp. z o.o.
https://usarya.com/

USARYA POLSKA Sp. z o.o. offers Husarya SCS-100 stone collection machine

UNIA Sp. z o.o.
https://www.uniamachines.com/

UNIA Sp. z o.o. offers UNIA HERON 50 27 - Trailed sprayer

MZURI-AGRO Sp. z o.o. Sp.k.
https://mzuri-agro.eu/

MZURI-AGRO Sp. z o.o. Sp.k. offers Mzuri Pro-Til - belt cultivation technolog
PPHU A-LIMA-BIS Sp. z o.o.
https://alimabis.com.pl/

Przedsiębiorstwo Produkcyjno-Handlowo-Usługowe A-LIMA-BIS Sp. z o.o. offers ALIMAMIX EVOLUTION PRO forage wagon

NAMYSLO Damian Namysło
http://namyslo.pl/

NAMYSLO Damian Namysło offers Seedbed combination with pneumatic seed drill Namyslo FLYY

Agroma S.A.
https://www.agroma-poznan.pl/

The company provides advanced agricultural tools, blocking monitors, cameras, customer relationship management, data management software, flow meters, GPS receivers, planter clamping force, precision application systems, precision planting unit row, speed controllers, RTK signal providers, UAVs.

SLOVENIA

INO BREŽICE d.o.o.
Krška vas 34b, 8262 Krška vas
https://www.inobrezice.com

Produces solutions such as flail mowers, fertiliser spreaders, seed drills, vibrational subsoilers and smart solutions such as smart align (patented safety device for aligning the PTO shafts flail mowers), smart assist (that controles the speed of the tractor, PTO RPM, linkage position and other), smart flow (spreader control), smart hopper (indication system for hopper machines that inform the operator when the loading box is full), vibration control (IoT device used to control of the level of vibrations on INO flail mowers and on other devices) and secure tronic (folding protective system for flail mower).

SIP Strojna Industrija
d.d. Juhartova ulica 2, 3311 Šempeter v Savinjski dolini
http://www.sip.si/company

SIP is the biggest producer of agricultural machinery in Slovenia. The core product range consists of: mowers, tedders and rakes. They incorporate the use of sensors and end switches to make smart turrets and rakes.

1.3. Plant Breeding & Research

AUSTRIA (Upper Austria)

WINTERSTEIGER
https://www.wintersteiger.com/de/Home

WINTERSTEIGER is the world's number one in field research equipment and has established itself at the top of a niche market which will continue to gain significance in future. The big challenge faced by agronomists and plant breeders is introducing new developments that make a decisive contribution towards sustainable food and energy supplies for the world.
WINTERSTEIGER supplies the technology needed to do this, and its products in this area cover the entire cycle of field research from the sowing to the harvesting. The product range includes: plot combines, plot increase combines, stationary threshers, plot forage harvesters, plot seeders, software solutions for data collection and evaluation, fertilization and crop protection equipment, laboratory equipment.

AUSTRIA (Lower Austria)

Farmdok
https://www.farmdok.com/en/

Farmdok is a startup and Farmmanagement- and Informationsystem that provides digital tools for planning and record keeping in agriculture.

ITALY (Emilia Romagna)

KWS
https://www.kws.com/

KWS is a German seeds producer founded in 1856 in Klein Wanzleben. The main Italian branch is in Forlì and works on corn, soy, beets, rapeseed. They also make research in plant breeding, particularly on corn, and offer consulting services to farmers.

ITALY (Friuli Venezia Giulia)

Udine University
https://www.uniud.it

Genomics and Genetics Department is currently focusing on genome analysis in plants, including genome sequencing and resequencing, epigenomic analysis, genome evolution studies, and on sequence diversity analysis and association mapping. Here scholars contribute to sequence grapevine, peach, citrus, barley genomes and are currently sequencing the olive tree. A major research activity is related to resequencing using NGS technologies (Illumina) in order to detect sequence, structural and epigenetic variants and in developing the genomics and bioinformatics technologies needed for this.

Vivai Cooperativi Rauscedo
http://www.vivairauscedo.com/

A grapevine nursery business with a yearly production of more than 60 million grafted vine plants. Beside production, Vivai Cooperativi Rauscedo perform high-quality research ranging from micro-propagation to green-grafting, health checks through Elisa test and PCR, from cloning with weak selective pressure to the characterization of the clones through the evaluation of fine parameters.

ITALY (Lombardy)

Insubria University
https://www.uninsubria.it/

University of Insubria (Varese, Lombardy) operates in the field of Plant Breeding and research through its Applied Botanics Laboratory, the Padiglione Spallanzani. Some research areas comprehend for example the identification of molecular factors controlling root system development and morphological analysis of root systems in agronomics plant grown under compost and biochar applications.

ITALY (Trentino Alto-Adige)

Edmund Mach Fundation
https://www.fmach.it/

A high-tech research institute located in S. Michele all'Adige (Trento) carrying out interdisciplinary research and innovations in the fields of modern and sustainable agriculture, food and nutrition, environment and health. They operate in genomics, computational biology and and biology of fruit crops, with the aim of spreading further genetic improvement of crops and/or to develop new varieties of commercial interest.

ITALY (Veneto)

Padua Univeristy
https://www.unipd.it/

Within the Department of Agronomy, in DAFNAE Laboratory, the main research fields are agronomy and field crops, fruit tree crops, vegetable and flower crops, agriculture genetics, agriculture and microbiology.

POLAND

IUNG company
http://www.iung.pl

IUNG company - which has introduced several solutions:
· NawSald - for agricultural producers and agricultural advisors - preparation of fertilization plans on farms for arable land in accordance with the principles of sustainable mineral management
· MacroBil - balancing nutrients on the farm on the surface of the field
· Plano RSN - creating fertilizer plans with component balance control
· InfoPlant - a comprehensive assessment of the current nutritional status of a crop based on the results of chemical analysis of a plant sample taken during the growing season

Agroboss company

· Poultry application - supports management of laying poultry and meat poultry - the possibility of operating a farm consisting of many buildings (poultry houses) and many warehouses (packaging, feed, eggs and chicks) - the possibility of operating an egg sorting plant

1.4. UAV and Drone technology and remote sensing

HUNGARY

ABZ Drone
www.abzdrone.com

ABZ Drone is a merchant company dealing with drones and related technologies including cameras, sprayers with different services: evaluation of agricultural sites, plant protection. Eurosmart Ltd. (www.eurosmart.hu) is providing drone technologies to the agricultural, architecture, railways, roads and solar panel sector.

Agron Ltd.
www.agron.hu

Agron Ltd. is providing equipments and education in drone technologies, and evaluation of multispectral imagery.

1.5. Forestry equipment

SLOVENIA

PIŠEK-VITLI KRPAN
Jazbina 9 a, 3240 Šmarje pri Jelšah, Slovenia
http://www.vitlikrpan.com/en/contact

Vitli KRPAN is the producer of agricultural and forestry machinery. It is the company with the longest tradition in production of forestry winches in Slovenia which started in 1977. Several decades of experience in this field clearly serve as the company's major competitive advantage, as well as a guarantee for quality, durability and the robustness of its products.
The forestry winch still remains the most important product of the company, for Vitli KRPAN presents itself as the world's leading winch manufacturer. These include smart sensors that prevent excessive inclination of the machinery.

UNIFOREST D.O.O.
Latkova vas 81 d, 3312 Prebold, Slovenia
https://uniforest.si

An environmentally friendly company with high-quality, innovative machines. They include on their products the so-called smart end switches that can turn off the machine in the event of improper operation of the machine and potentially dangerous tilts.

ROBUST d.o.o.
Arja vas 105, 3310 Petrovče, Slovenija
https://www.robust.si/

Under the registered trademark ROBUST, they produce and market hydraulic log splitters with a nominal strength of 13 to 25 tons of their own design. Products are innovated, patented and modelled, manufactured according to EU standards and meet all safety and health requirements. Like the two predecessors they incorporate electronic devices that stop the machines if tilting is detected.

TAJFUN d.o.o.
Planina 41 a, SI-3225 Planina pri Sevnici
http://www.tajfun.com/

The company focuses on the production of winches, firewood processors, mobile tower yarders, forestry trailers, tractor cranes, hydraulic cranes and forestry information systems. Besides the smart antitilt winches the TajGO is the closest solution related to precision agriculture. It uses digital camplers and mobile application for reading, recording, editing, and printing of acquired data from measuring the forest wood assortments (trees, logs and boards). It is designed for individual forest owners, owners of small sawmills and professional users – foresters and wood-handling professionals.

1.6. Spraying equipment

SLOVENIA

AGROMEHANIKA D.D.
Hrastje 52a, 4000 Kranj
https://agromehanika.si/

Agromehanika is the leading producer of agricultural machinery in Central and South-Eastern Europe. For over 50 years, Agromehanika has been synonymous with quality, reliability and development - features recognized by many farmers and business partners. It produces AGS sprayers, AGP mist blowers and compact AGT tractors.
Their novelty in the field of sprayers is the AG tronik M1. It is an advanced sprayer computer for sprayers designed for more demanding users. Its features are: smaller and more efficient use of the spray, better and more precise spraying, control of the sprayer from the tractor cabin, and therefore less exposure to chemicals.

ZUPAN d.o.o.
Celestrina 3, 2229 Malečnik
http://www.zupan.si/

The company is for the production of high quality machinery and plant protection and care products with a focus on of custom-made machines and wishes for the demanding customers. They focus on different kinds of spraying equipment, cleaners and also movers.
In the area of precision farming they use ultrasonic equipment and electrostatics to control the deposition of the plant protection products on the plants. The integrate spraying computers from Inovel (Germany), ARAG (Italy) and Gotrack (Poland).

1.7. Plant inspection and environmental control

SLOVENIA

C-Astral d.o.o.
Tovarniska cesta 26, SI-5270 Ajdovscina
https://www.c-astral.com/

CAstral is an aerospace solutions provider based in Ajdovscina, Slovenia, the “hub” of advanced aerospace development and integration in this part of Central Europe. The company is a global market leader with established reputation in the specialized, fixed wing small Unmanned Aircraft Systems (UAS) manufacturing and services field, with a specific focus on high productivity, endurance, surveying and remote sensing. C-Astral’s customer base is diversified between the commercial UAS operators, larger institutional networks, scientific users as well as government entities. In the area of precision agriculture the aerial vessels are used in mapping services (orthophoto, termography, poit cloud, multispectral, laser).

LOTRIČ Meroslovje d.o.o.
Selca 163, SI - 4227 Selca
https://www.exactum.com/

LOTRIČ Metrology is a family company with 83 employees that have been developing and offering metrology solutions for 25 years. They are developing state of the art, highly perfected, but easy to use metrology products and services. One such interesting solution that also covers the field of precision agriculture is exactum.
Exactum is smart automatic control system - is an innovative measurement systems solution that enhances the workflows in industry, healthcare, labs, warehouses, greenhouses, galleries, transportation, or wherever conditions are demanding. It is an investment in quality that makes your work easier and safe and comfortable. In the case of greenhouses, the system collects and analyses climate and soil data in order to optimize greenhouse cultivation and reduce the use of resources - water, fertilizers, electricity.

TRAPVIEW HQ - EFOS d.o.o.
Razdrto 47B, 6225 Hruševje
https://www.trapview.com

EFOS d.o.o. is a company that produces TRAPVIEW, which is an automated pest monitoring system that monitors all kinds of insects, which can be lured into insect traps. The system consists of three fully integrated, automated and easy to use tools. With significantly raising accuracy and decreasing costs of pest control TRAPVIEW provides an innovative solution for farmers, advisers and researchers.

1.8. Animal Monitoring

AUSTRIA (Upper Austria)

Smartbow
http://www.smartbow.com/en/home.aspx

Smartbow developed a comprehensive system for dairy cow monitoring including Industry-leading rumination monitoring, unparalleled heat detection, truly real-time localization and Animal Pattern Recognition IntelLigence (APRIL).
Benefits: Efficient labor management & Time savings, better insights on dairy cow heat and health, and thus better decision. Results: Potentially achieve more milk, better reproduction, lower disease incidence and better milk quality.

HUNGARY

The OkosFarm (SmartFarm)
https://okosfarm.com/en/

The OkosFarm (SmartFarm) is a unified installation monitoring, automated system, operating with modern tools and working properly on agricultural farms, as well as promoting energy efficiency as management, a powerful resource, controlled alert when the vehicle is inadequate, and alerting needs during data monitoring. OkosFarm is able to create a customized system for each industry and type of farm and is made up of several other subunits.

ITALY (Liguria)

Cynomis
http://www.cynomys.it/en/startup-en/

Cynomis srl is an innovative start-up settled in Genua and operating in the IoT sector. They develop solutions aimed at increasing farm animals' welfare. Their main solution is Plinio, a stable kit making it is possible to accurately monitor environmental parameters in the housings and take prompt action before situations dangerous for the animals and the workers could occur.

ITALY (Veneto)

Technos

Technos offers high-quality monitoring and control in the aquaculture. Among its products: oxymeters, oxywifi2, oxygen probes. They also produce breeding facilities for shellfishes.

POLAND

Zeto software
https://zetosoftware.pl/en/

OBORA application - for dairy farmers - supports the management of a breeding farm covered by the performance assessment - fully integrated with the national system for the assessment of the utility and breeding value of cows and bulls (SYMLEK) – · GIS functionality · animal selection · event forecasting (calving, drying, covering, testing) · analyzes (performance, reproduction, somatosis and observation)

Agroboss company

The „Ferma" application - a computer system for handling a herd of cattle - supports management of a herd of cows - handling databases on cows, bulls and calves
The „Trzoda chlewna" application is a system for managing pig farms - for breeding (breeding) and commercial farms - fast and efficient data processing in the field of animal utilization and the level of production of a given farm - developed by specialists in the field of pig breeding, therefore all operations are adapted to the requirements and habits of pig producers
„Hatchery" - gathering and processing information on the hatching process - tracking numerical movement of eggs from the egg warehouse (acceptance) to sale from the chick warehouse - the possibility of creating a database of egg suppliers and chick recipients
„Veterinary clinic application"- supports the practice of a veterinarian in conducting substantive and financial documentation related to the performed activity - the possibility of performing various analyzes of own professional and financial activity

Mroczko company
http://sklep.mroczko.com.pl/mr-a-winpro-genetica/

MR-A WinPro-Genetica - sow insemination station service

Alima BIS company
https://alimabis.com.pl/

Afimilk - dairy cow herd management – modules: AfiMilk - control of milk production and udder

health, AfiLab - milk composition control, AfiAct - heat detection, AfiWeigh - automatic animal weighing, AfiSort - automatic separation of cows, AfiFeed - individual nutrition with concentrated feeds, AfiFarm - software connecting all modules.

Meteoryt company
https://meteoryt.pl/

Assistant Register of Pigs - for farmers to support pig farming - a register of basic data about animals, e.g. earring number, origin, breed, age, type - gathering data on nutrition and animal weight
Assistant Cattle Registry - for farmers to support cattle breeding - detailed records of animal data, e.g. earring number, origin, breed, age, type - gathering data on nutrition and animal weight
Goat Registry Assistant - for breeders to support goat breeding - record of basic data about animals, e.g. earring number, origin, breed, age, type - gathering data on nutrition and animal weight
Assistant Register of Sheep - for farmers to support sheep farming - record of basic data about animals, e.g. earring number, origin, breed, age, type - collection of data on nutrition and animal weight
Live Inventory Assistant - for farmers - cattle records on a farm, including, for example, cattle photos, recording milk and weight performance, collecting nutritional data.

e-stado sp.z o.o. company
https://e-stado.net/

The company's goal is to provide necessary information about the health of cows and their reproductive cycle. It includes features such as animal health monitoring, heat, insemination and calving. It is non-invasive and safe to use, based on maintenance-free biosensors. Based on data from biosensors, the system monitors herd and barn environment for 24 hours. Data on the animal condition and conditions in the barn are then sent to a central server. The user receives access to the www application and SMS notifications about emergencies, where he has access to all data on an ongoing basis. The company's main systems and devices are: Ear biosensors, Environmental sensors, Tail biosensors, Radio transmitters in the barn and on the pasture

SLOVENIA

IRNAS – institute for development of advanced applied systems,
Valvasorjeva ulica 42, 2000 Maribor
www.irnas.eu

The company focuses to apply the vast scientific knowledge to everyday reality by creating effective and affordable systems. They offer end-to-end IoT solutions for specialized use-cases, ranging from LoraWAN IoT node development, drone mapping sensor network coverage and edge computing off-grid devices for advanced sensor and image processing in limited bandwidth scenarios. A few practical examples of these solutions are: Sea Turtle Tracking, Air Quality and Radiation and Penguin Monitoring.

SENSEDGE d.o.o.
Podbreznik 15, 8000 Novo mesto
http://sensedge.co

Sensedge has developed a sensor platform for agriculture of the future. AgriSense MicroUnits allows you to monitor many parameters in fields, greenhouses and plant canopies. The platform also allows monitoring of the movement of animals and the condition of grazing equipment. MicroUnits are based on LoRaWAN technology, where the data is sent to a cloud platform to analyse the measured parameters that can be monitored and performed. If the pre-set thresholds are exceeded the sistem triggers and alarm, notifying the farmer that it needs to react.

TELOS d.o.o.
Ljubljanska cesta 24G, 4000 Kranj
http://www.telos.si/

Establish advanced smart management and control systems. The LoRa system enables tracking and monitoring of livestock by identifying diseased animals while detecting toxic gases in stables and cages.

1.9. IoT - Internet of Things

AUSTRIA (Lower Austria)

Microtronics Engineering GmbH
https://www.microtronics.com/index_en.html

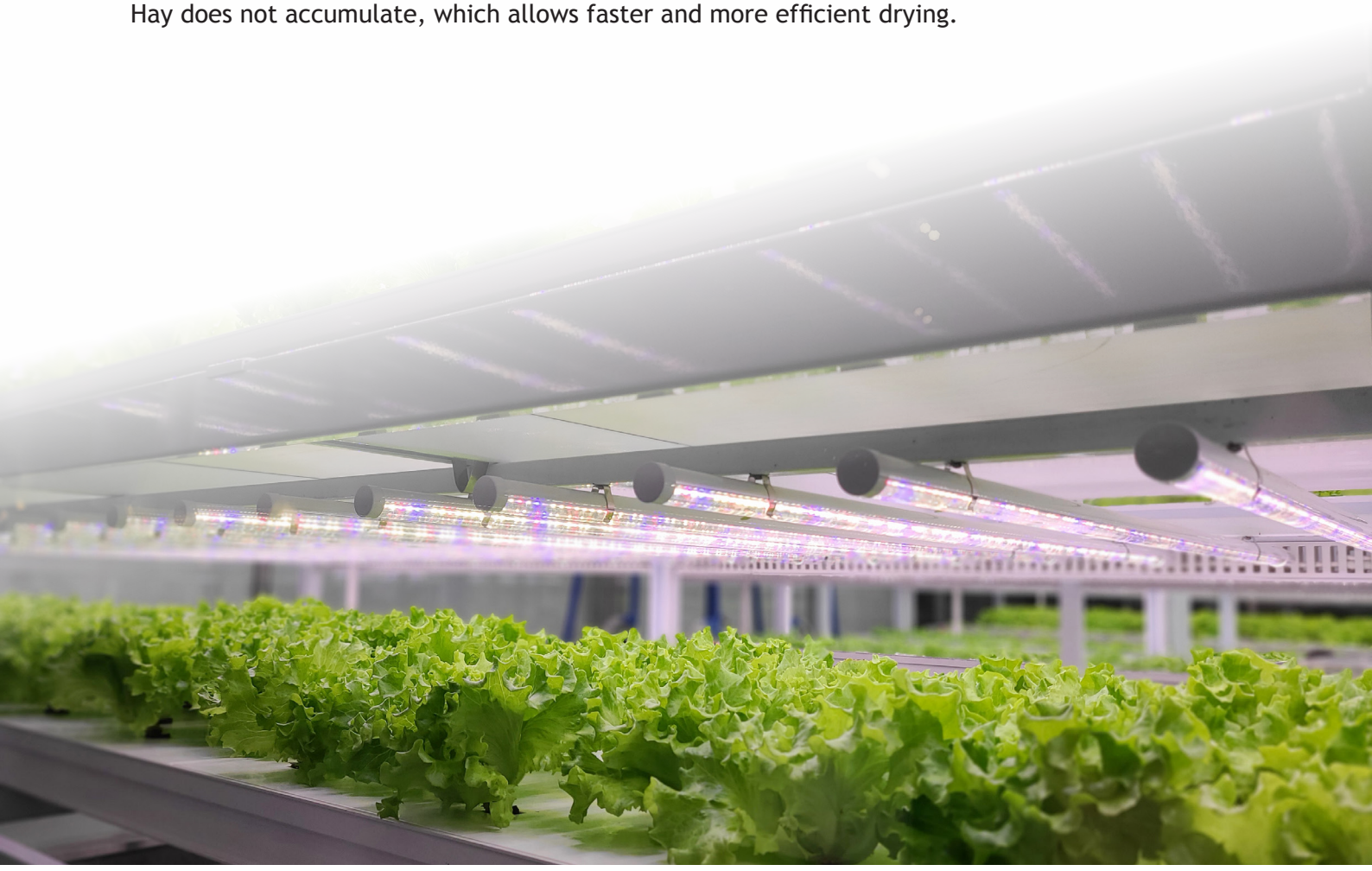
Microtronics Engineering GmbH stands for very high quality state-of-the-art products and services in the field of GSM-based M2M data transmission. The product range covers wireless GSM data transmission technology enabling data interchange between devices and machines, mobile data acquisition devices for data collection and data monitoring in the field as well as visual representation and storage of data on a central server.

1.10. Bale dryers

SLOVENIA

GROS d.o.o.
Ljubljanska cesta 4, SI-4000 Kranj
https://www.gros.si/

GROS focuses on the production of hay blowers, drying systems, spreaders and other. Their interesting solutions in the area of precision farming include bale dryers and spreaders.
Automated bale dryer works according to the reading of the probe that is located inside the bale and the other on the external site to measure the air, which makes possible to precisely control the fans. This saves electricity and time.
Automatic hay spreaders are computer guided which makes it extremely adaptable to the shape of a senile. The telescopic spreader spills up, down, left, right but only when hay is present in the hose. The built-in photocell allows extremely uniform spread of hay across the available surface. Hay does not accumulate, which allows faster and more efficient drying.



2. HIGH-PERFORMING SERVICE PROVIDERS BY SERVICE

AUSTRIA (Upper Austria)

Landwirtschaftskammer OÖ
https://ooe.lko.at/

Landwirtschaftskammer OÖ is the legal representation of farmers and lumberjacks in Upper Austria. This institution provides farmers with information, consulting and all kinds of events.

Maschinenring
https://www.maschinenring.at/leistungen/agrar/rtk

Maschinenring is an association that includes agricultural entities which jointly use agricultural and forest machines, and that arranges for agricultural manpower when needed.
Maschinenring already operates PF machinery as know how centre.

AUSTRIA (Lower Austria)

Agro-Innovation-Labs
https://www.agroinnovationlab.com/

Agro-Innovation-Labs (RWA and BayWa) provide drone services

LK digital
www.lkdigital.at

The Austrian Chamber of Agriculture supports the web-service “LK digital”. Established in 2017, it is operated by the LFI - Ländliches Fortbildungsinstitut Österreich, which is the continuing education institute. LK digital was set up as an education campaign to prepare information in the field of digitization in agriculture and to create awareness for new ways of crop and livestock production, marketing and management. It comprises a central hub for digitisation in agriculture. Interested persons can access relevant information, independent from time and place by the help of a knowledge platform. There you can find e.g. useful apps for agriculture and forestry, reports

from research projects in digitization, monitoring of pest infestation (European Corn Borer), use of satellite information based application maps, data networking with farm management information systems.

ITALY (Emilia Romagna)

IBF Servizi S.p.A
https://www.ibfservizi.it/

BF (Bonifiche Ferraresi) is a 7.000 Ha farm operating also in the field of Precision Farming consultancy through its consulting branch IBF Servizi S.p.A., the first Italian HUB for agriculture. IBF promotes the development of precision agriculture in Italy, supporting farms to adopt and implement innovative technological solutions: optimization of production processes, reduction of production costs, improvement of environmental sustainability and quality

ITALY (Lombardy)

Vantage Italia (former Spektra Agri)
https://www.vantage-italia.com/

A service company offering technical assistance on a variety of PA practices and tools: collection and analysis of data, mapping and guidance systems, tools maintenance.

Arvatec
https://www.arvatec.it/

Arvatec produces, sells and spreads innovative technologies in agriculture: data managing, production mapping, seeding systems, automatic guidance, levelling.

ITALY (Veneto)

Veneto Agricoltura
https://www.venetoagricoltura.org/

Veneto Agricoltura is an instrumental body of the Region of Veneto which carries out support activities for the Regional Council in the field of agricultural sector policies, agribusiness, forestry and fisheries. It deals with applied research and experimentation aimed at testing and disseminating technological and organizational innovations in order to improve the competitiveness of businesses and supply chains production as well as environmental sustainability in the agricultural, agri-food, forestry and fisheries sectors.

POLAND

The Agency for Restructuring and Modernization of Agriculture
https://www.arimr.gov.pl/

The Agency for Restructuring and Modernization of Agriculture, which in addition to providing extensive consulting services for the agricultural market, has been developing the infrastructure and system monitoring system based on the Splunk software for several years

Agricultural Advisory Centers
https://www.gov.pl/web/rolnictwo/doradztwo-rolnicze

Agricultural Advisory Centers, operating regionally and nationwide, are important institutions supporting the agricultural market.

eAGRONOM Sp. z o.o.
https://eagronom.com/pl/

eAGRONOM Sp. z o.o. - eAgronom - a program that facilitates farm management

KST Konsulting Sp. z o.o.
http://www.kstkonsulting.com.pl/

KST Konsulting Sp. z o.o., producer UNIFORM Agri - UNIFORM Agri - dairy herd management software

KUHN-MASZYNY ROLNICZE Sp. z o.o.
https://www.kuhn.com.pl/

KUHN-MASZYNY ROLNICZE Sp. z o.o, producer NOBILI S.p.A. - Innovative remote monitoring system of field crusher KUHN CONNECTED SHREDDER

SatAgro Sp. z o.o.
https://satagro.pl/

SatAgro Sp. z o.o. - SatAgro service module supporting precise soil research and fertilization based on the abundance and satellite images

CLAAS Polska Sp. o.o.
https://www.claas.pl/

CLAAS Polska Sp. o.o - DATA CONNECT - interface enabling the exchange of data on the location, status, speed and fuel level of many brands of tractors and machines

RHIZA
https://rhiza.pl/

This is a company that provides independent solutions supporting precision farming in Poland. The company's basic services include: mapping field and crop boundaries, planning precise sowing and fertilizing, rates of variability of doses and abundance, crop growth models and models of disease / pest occurrence (predicting pressure exerted by pests and diseases), forecast yields.

SLOVENIA

SLEDAT, Uscom d.o.o.
Polhov Gradec 93, 1355 Polhov Gradec
http://sledat.si

Sledat Agriculture is an information solution for agricultural holdings that works in the cloud an it is designed to support and manage all key data on jobs on farms both in the office and on the ground. The information solution consists of a web application designed for entering and managing various records and a mobile application designed to capture data directly on the ground.
Sledat Agriculture is a solution composed of several modules that form a single and efficient system tailored to the needs and requirements of your farm. Access to data directly in a stable, on a field or in an orchard. This was followed by a follow-up mobile application that allows you to use your smartphone or tablet anywhere, at any time, to enter data or access the data you have entered where you need it. The information entered is automatically saved directly to the server and displayed in the web application. The web application enables the preparation of data for various reports, as well as for strategic decision-making.

Elmitel software development
Orehovci 1a, 9250 Gornja Radgona
development.elmitel.com

Elmitel software development focuses on the development of smart could services tu support vine and orchard growers with two dedicated web platforms eVindeyards and eOrchards. In addition, it also offers EIGIS GIS software and IoT Sensing platforms aimed to support precision farming applications.

GEOSERVIS d.o.o.
Litijska cesta 45, 1000 Ljubljana
http://www.geoservis.si/

Company Geoservis, d.o.o. is an authorized seller of measurement equipment for geodesy, GIS, construction and mechanical engineering and navigation equipment. They are representatives by the world-renowned brands Leica Geosystems and geo-Fennel.
The activity comprises certified service, technical support and consulting, management of the permanent GNSS network, and implementation of projects with specific requirements, such as planning, setting up and operating systems for observing movements and deformations, consulting, installation and implementation of machine management solutions.
The reference station GNSS Geoservis is the first ever operating reference station in Slovenia. It was installed in 1999, and in 2000 it was included in the European network of reference stations of the EPN (Euref Permanent Network).

TERMODRON d.o.o.
Ulica škofa Makismilijana Držečnika 6. 2000 Maribor
http://www.termodron.si/

They offer drone inspections to help the farm optimize its use of fertilizers and plant protection products. They ensure that their service can save up to 20 % of these resources and reduce the environmental impact. After the flight, the data is processed and compiled by Vegetation Indexes (NDVI). After consultation, they prepare target models for importation on mechanization, where variable fertilization is possible with electronically controlled mechanization, with or without GPS support.

SINERGISE d.o.o.
Cvetkova ulica 29. 1000 Ljubljana
https://www.sinergise.com

The company has developed and advanced GIS information system that is an integral part of the IACS (Integrated Administration and Control System) policy. The main part of the system known as GERK is used as a tool for the entire agricultural policy and outside the institution. The company also participates in international projects and their clients are important institutions. They have developed: agricultural Register (web application), GERK (Java based tools), Giselle Farm Management (Information System, Farm Management), Controls (support for inspectors during fieldwork), Visual control (LPIS change control application), Disease control (control of infectious diseases in animals), Land consolidation (application, computer support for the management and process of agricultural land consolidation), Reclamation (management of reclamation infrastructure and agricultural land where reclamation is carried out), Register of Wine Producers. (https://www.sinergise.com/sites/default/ files/attachments/leaflet-agriculture.pdf)

TELOS d.o.o.
Ljubljanska cesta 24G, 4000 Kranj
http://www.telos.si/

Establish advanced smart management and control systems. The LoRa system, with the help of an IoT solution, is intended for agriculture, with the help of which we can optimize watering, fertilization and spraying, thereby significantly improving the hectare yield.

GDi Business Technology Solutions d.o.o.
Šmartinska cesta 106. 1000 Ljubljana
https://gdi.net

They provide smart tools and applications for efficient food production. They use GPS systems, satellite data and drone technology to collect data to provide location-based information. Their ensemble for Smart Agriculture provides: different types of agricultural data, past and current information on crops, yield and fertilization, more optimal decisions for planting, fertilizing and harvesting

DATALAB Agro SI d.o.o.
Hajdrihova 28c, 1000 Ljubljana
https://www.datalab.si/

Datalab combines different types of agricultural activities (agriculture, fruit growing, livestock production, viticulture, etc.) into one system. Pantheon Farming includes applications, various integrations of the Internet of Things, data sharing and an office background. The system is tailor-made for each agricultural activity. For example, in animal husbandry we can enter records for individual animals, family trees of animals, animal registry, milking and veterinary diary, feeding, housekeeping. They can also keep an overview of costs, goods, bookkeeping and FADN reports.

SAOP d.o.o.
Cesta Goriške fronte 46, 5290 Šempeter pri Gorici
http://www.saop.si/

Their miniMAX online accounting program for farm households simplifies administration. Farms can, through the miniMAX program, keep a book of received invoices, invoices, manage current operations, manage payment transactions and report DURS.
The latest innovation in miniMAX is a farm chart of accounts that makes it easier and more transparent to monitor your business. The chart of accounts replaced the manual management of FADN records and accelerated many bureaucratic tasks.

2.1. Meteorological data providers and disease forecast

HUNGARY

The Hungarian Chamber of Agriculture (NAK)
www.nak.hu

The Hungarian Chamber of Agriculture (NAK) is a public body established in 2013. Today it has 360.000 members representing agriculture, food industry and rural development according to the 3 chamber departments. The main goals are to improve farming circumstances of the members, competitiveness of the sector and living conditions of the rural people. The plant protection portal of the site provides meteorological data and disease forecast information.

BASF
https://defenso.hu/szolo/allomas-adatok

BASF is one of the main companies providing products for grapevine plant protection and weed control. Based on the iMETOS system BASF provides meteorological data with risk of diseases (botrytis, downy and powdery mildew and black rot) from more than 60 vine growing regions of Hungary.

Bayer
https://bayer.co.hu/uzletagak/crop-science

Bayer is one of the leading agricultural companies providing information about the most important pest and diseases and meteorological information.

Syngenta
https://www.syngenta.hu/service/idojaras

Syngenta also provides meteorological data information.

Agrontech
www.agrontech.hu

Agrontech systems were developed to provide meteorological data and decision support systems for the growers to help proper plant management according to the on-site sensors.

WineData
www.winedata.hu

WineData is a monitoring system developed to support grapevine growers. It provides different modules. Environmental data (precipitation, wind directions and speed, temperature, etc.) provided by sensors. Plant protection module follows phenological stages and based on the meteorological

data helps the growers to keep the vineyard healthy. Operation monitoring provides on-line real time information on the machines based on GPS data. With the help of the 3 modules, the whole process of vine growing can be monitored, the software assists the administrative tasks of the company, performs economic calculations.

SmartVineyard™
www.smartvineyard.com

SmartVineyard™ systems were developed by the QuantisLabs Ltd. to provide meteorological data and decision support systems for the growers to help proper plant protection according to the on-site sensors.

The Research Institute of Tokaj wine region
www.tarcalkutato.hu

The Research Institute of Tokaj wine region provides weekly meteorological data and information about the presence of pests and diseases.

3. HIGH-PERFORMING RESEARCH BODIES BY TYPOLOGY

AUSTRIA (Upper Austria)

The University of Applied Sciences Upper Austria
https://www.fh-ooe.at/campuswels/studiengaenge/bachelor/agrartechnologie-und-management/alle-infos-zumstudium/schwerpunkte/

The University of Applied Sciences Upper Austria offers a bachelor study in agricultural technology and management
Focal points: · agricultural sciences · agricultural technology · agricultural management
Topics: · technology (amongst others: electrical engineering, sensor technology, digitization) · plants (amongst others: tillage, greenhouses, precision farming) · animals (amongst others: anatomy, breeding, precision livestock farming) · management (amongst others: business administration, agricultural markets, digital marketing)
Certificates: · agricultural skilled worker · crop protection expert · drone pilot

AUSTRIA (Lower Austria)

HBLFA Francisco Josephinum Wieselburg
https://www.josephinum.at/blt.html

Competences in Precision Farming at · Analyzing and optimizing technical and logistic processes in the field of agriculture · Computer Vision: Machine vision (image analysis) in agricultural applications such as plants, soil etc. · Data and Information Sciences in Precision- and Smart Farming · Develop future Product concepts based on agro-mechatronic systems · Experimentation and field metrology
Campus Francisco Josephinum of the University of Applied Sciences Wiener Neustadt (FHWN), Study programme “Agricultural Technology”:
Focus: · crop growing and cultivation · agricultural engineering · geo-informatics · agro-mechatronics · software development · precision and smart farming
Certificates: · agricultural skilled worker · crop protection expert

Austrian Institute of Technology (AIT, Klosterneuburg)
https://www.ait.ac.at/en/about-theait/

The AIT was partner of the project SafeCon - Safe semi-autonomous convoying and the project RelCon - Safe control of autonomous vehicles. The KIRAS project SafeCon is aimed at developing a technology for the Austrian Federal Army to make army supply convoys semiautonomous so as to avoid the loss of human lives in hazardous or dangerous situations. TheRelCon (Reliable Control of Semi-Autonomous Platforms) project team will now refine this core technology for autonomous supply convoys to meet the specific requirements of civil disaster scenarios. The intention is to implement the requirements in a simple and inexpensive way, but without compromising on functionality, reliability or safety.
The RelCon project focuses on the integrated use of autonomous vehicles and remote control by teleoperator so as to be able to respond quickly and flexibly to a variety of operational scenarios or conditions. Specifically, the combination of autonomous vehicles and a teleoperator will make it possible to respond appropriately to unexpected events. A robotic system used in a real disaster scenario is expected to respond flexibly to changing and/or unknown conditions and thus prove highly robust in operation. Hence the focus of the RelCon project is on a combination of autonomy and remote control as a means to achieving the high degree of reliability and robustness necessary for use in civil disaster scenarios.

HUNGARY

Szent Istvan University
http://sziu.hu/

Szent Istvan University (SZIU) is one of the leading higher education and research institutes in the field of agriculture and horticulture. Among other research areas in the SzIU PF is dealing with horticultural plant production. In SZIU Viticulture Department the main research topics are vine physiology, molecular biological background of powdery mildew and black rot infections, vine water status, irrigation, canopy architecture, canopy temperature, ecology of the vineyards, climate change investigations, remote sensing.

National Agricultural Research and Innovation Center
https://www.naik.hu/

National Agricultural Research and Innovation Center (NARIC) Research Institute for Viticulture and Oenology Badacsony and Kecskemet. NARIC provides research and advisory services to the growers and collaborates with higher education organizations. Among the main activities the Institute selects new clones, evaluates newly bred cultivar candidates and maintains genbank for genetic resources. Based on the accredited laboratory soil and plant analysis are provided for the growers for proper plant nutrient management.

Research Institute for Viticulture and Enology of the University of Pecs
https://ajk.pte.hu/en

Research Institute for Viticulture and Enology of the University of Pecs is the most important grapevine breeding institution in Hungary. Main activities are consultancy (vine nutrition), research and grapevine breeding. Grape collection of the Institute contains more than 1800 accessions. Main research topics are: disease resistance, plant physiology, molecular genetic investigations, clonal selection and evaluation of cultivars.

Research Institute of Tokaj wine region

Main research topics of the Institute are linked to: investigation of yeasts, effect of erosion, soil science, cover crops, and grapevine trunk diseases, climate change investigations.

Eszterhazy Karoly University
https://uni-eszterhazy.hu/en

Eszterhazy Karoly University is located in the Eger wine region. Main research topics are linked to the region such as evaluation of cultivars, plant protection, clone selection, biology of the botrytis infection, downy mildew and black rot.

ITALY (Emilia Romagna)

Modena and Reggio Emilia University
https://www.unimore.it/

Within this University, the laboratory BIOGEST-SITEIA is a research institute for the optimization and valorisation of biological and agri-food. It offers technical consulting for the agri-food production chain mainly in the sector of vegetable production.

Bologna University
https://www.unibo.it/en/homepage

The DEI (Ingegneria dell'energia elettrica e dell'informazione Guglielmo Marconi) within the university of Bologna operates in precision agriculture with a remarkable specialization in drone technology, both flying and on the ground. They work moreover on Intelligent Sensor Systems, Field Control Systems, Radio Frequency energy harvesting radiating systems.

Parma University
https://en.unipr.it/

The Department of Life Science and Environmental Sustainability has been selected by the Italian Ministry of Education, University and Research as a "Department of Excellence" (they are 180

across Italy) and has been awarded with a special ministerial fund (9 million euros) for the five-year period 2018-2022. Parma University also participates a Precision Agriculture project funded by AGER with the collaboration of Padua, Florence and Teramo Universities. The focus of the project is on the optimization of wheat manuring.

ITALY (Lombardy)

Milan University
https://www.unimi.it/en

The public university of Milan recently launched its first course in Precision Agriculture for the academic year 2019/2020. The main subjects are agricultural machinery and mechanization and plant pathology. Students will learn how to apply methods and sensors to monitor the phytosanitary status of crops and to apply plant pathology and crop protection basic principles to process site-specific data for prescribing maps of agrochemical distribution. They will moreover acquire the ability to manage, interface and program the precision farming systems on operating machines for crop management.

Polytechnic of Milan
https://www.polimi.it/en/

The DEIB Department (Dipartimento di Elettronica, Informazione e Bioingegneria) is a scientific institution committed to forefront research, education, and technology transfer in computer science and engineering, electronics, systems and control, telecommunications, and bioengineering. They operate in Precision Agriculture also and recently participated GRAPE (Ground Robot for vineyArd monitoring and ProtEction) project, whose focus is developing the tools required to execute (semi) autonomous vineyard monitoring and farming tasks with Unmanned Ground Vehicles (UGVs) and, therefore, reducing the environmental impact with respect to traditional chemical control.

ITALY (Piedmont)

Polytechnic of Turin
https://www.polito.it/index.php?lang=en

Polytechnic of Turin is one of the most renowned scientific universities in Italy and has a department specialized in sensors. iXem Labs are a component of the LACE (Laboratorio di Antenne a Compatibilità Elettromagnetica) of the Electronic and Telecommunications Department of Politecnico di Torino: the field of activity is mainly related to the assembling of wireless transmission systems and the realisation and management of wireless networks. In PA field, iXem Labs developed iXem Wine, a

project consisting in a free platform for the monitoring of vineyards through a network of sensors which collects and analyses data.

ITALY (Veneto)

University of Padua
https://www.unipd.it/en/

University of Padua offers a master in Precision Agriculture in collaboration with the Universities of Florence, Teramo and Viterbo, and a master degree course in Sustainable Agriculture. Moreover, the department of land, environment, agriculture and forestry (TESAF) is an important research centre participating at the moment in several EU projects in agricultural sector: Horizon2020, Life, Interreg, PSR (Programma di Sviluppo Rurale).

ITALY

CREA
https://www.crea.gov.it/en/web/alimenti-e-nutrizione

CREA is the leading Italian research organization dedicated to the agri-food supply chains. It operates as a legal entity under public law, and is supervised by the Ministry of Agricultural, Food, Forestry and Tourism Policies (Mipaaft). Scientific activity covers agricultural crops, livestock, fishery, forestry, agro-industry, food science – and socio-economics. CREA was established in 2015, from the merging of CRA (Council for Agricultural Research) and INEA (National Institute of Agricultural Economics).
Headquarters of CREA are in Rome, but in northern Italy two important seats are in Conegliano (Treviso, Veneto) and Bologna (Emilia-Romagna).

FIAT Research Centre
https://www.crf.it/EN

The research centre of FIAT, with offices in Mirafiori (Piedmont), Trento and Bologna, develops innovative power units, vehicle systems, materials, methods and processes to improve the competitiveness of FCA products. FIAT operates in the agricultural sector through CNH (Case New Holland).

ITALY (Liguria)

Istituto Italiano di Tecnologia (IIT)
https://iit.it/

The Italian Institute of Technology is a scientific research centre based in Genoa. Its main goal is the advancement of science, in Italy and worldwide, through projects and discoveries oriented to applications and technology. It participates SMASH project (Smart Machine for Agricultural Solutions Hughtech) for the development of agricultural robots.

ITALY (Trentino Alto-Adige)

Bruno Kessler Fundation
https://www.fbk.eu/en/

Top Research Institute in Italy (Trento), ranked at the 1st place for scientific excellence within 3 different subject areas (ICT, History and Sociology. Specialized in ICT and AI, It works on PA too: it recently developed a special photocamera able to take multi-spectral images of a field by flying on a drone, in order to evaluate different soil types.

POLAND

Institute of Machine Operation, Ergonomics and Production Processes

Agency for Restructuring and Modernization of Agriculture in Warsaw

Central Center for the Study of Varieties of Crop Plants in Słupia Wielka

Institute of Agricultural and Food Biotechnology prof. Wacław Dąbrowski in Warsaw

Institute of Agricultural and Food Economics - National Research Institute in Warsaw

Institute of Plant Breeding and Acclimatization - National Research Institute in Radzików

Institute of Agricultural and Forest Environment of the Polish Academy of Sciences in Poznań

Institute of Plant Protection - National Research Institute in Poznań

Institute of Horticulture in Skierniewice

Institute of Technology and Life Sciences in Falenty

Institute of Cultivation, Fertilization and Soil Science - National Research Institute in Puławy

Institute of Natural Fibers and Herb Plants in Poznań

Institute of Animal Production - National Research Institute in Krakow

National Center for Agricultural Education in Brwinów

National Agricultural Support Center in Warsaw

National Institute of Rural Culture and Heritage in Warsaw

The Vegetable Research Institute Emil Chroboczek in Skierniewice

The Institute of Pomology and Floriculture. Stephen Pieniazek

Institute of Plant Breeding and Acclimatization in Radzików

Central Center for the Study of Varieties of Crop Plants

Institute of Building, Mechanization and Electrification of Agriculture

Institute of Animal Production - National Research Institute in Krakow

National Veterinary Institute - National Research Institute in Puławy

SLOVENIA

Faculty of Agriculture and Life Sciences, University of Maribor
http://fkbv.um.si/index.php/en/

The Faculty of Agriculture and Life Sciences (Fakulteta za kmetijstvo in biosistemske vede) is one of the 17 faculties of the University of Maribor. It is a scientific and educational institution and is, due to its integrational work and effectiveness, in league with successful universities around the world. As a university member, the faculty represents the progress of science in many fields of agriculture resulting in a good bibliography (high-impact original scientific papers, conference

contributions and patents).
The faculty is located in the centre of the most important agricultural region in Slovenia, facilitates a good combination of theory and practice and enables the application of academic knowledge to practical work. Part of the research and educational activities of the Faculty of Agriculture and Life Sciences are carried out at the university's agricultural centre. It is located at the foot of Pohorje, about 12 km from Maribor and covers: · 55 ha of fruit tree plantation, · 60 ha of fields, Page 13 · 18 ha of vineyards at Meranovo, · 22 ha of grasslands, · 240 ha of forests, · 8 ha of botanical garden area.
These are used for research and for the practical work of about 700 students and 70 members of teaching staff.
The Faculty of Agriculture and Life Sciences has numerous accredited undergraduate and postgraduate study programmes. We offer 8 undergraduate study programmes: Agriculture and Environment, Agronomy-Ornamentals, Vegetables and Field Crops, Biosystems Engineering, Organic Farming, Agricultural Economics and Rural Development, Viticulture, Enology and Fruitgrowing and Animal Science. The first one is more academically oriented while all others are professionally oriented. Currently, there are 3 Postgraduate study programmes (Master's programmes): Agricultural Economics, Agriculture and Food Safety and 2 Postgraduate study programmes (PhD): Agricultural Economics and Agriculture.
Educational and scientific research units at the Faculty of Agriculture and Life Sciences: Animals sciences, Agricultural economics, Biosystems engineering, Botany and plant physiology, Chemistry, agrochemistry, Genetics, Grassland management and forage production, Field crops, Fruit production and fruit processing, Mathematical methods, informatics and statistics in agriculture, Microbiology, molecular biology, biochemistry and biotechnology, Organic farming, Ornamental plants, Phytomedicine, Plant improvement, Rural development, Soil science, Vegetables and Viticulture and enology.
In 2018 FALS employed 61 employees and was involved in the last evaluation period (2014- 2018) the research work was on conducted on 127 research projects. There were 104 national (CRP, basic, applied and postdoctoral) projects, out of which 14 were in 2018, and 23 were international, out of which 4 were conducted in 2018.

Biotechnical Faculty, University of Ljubljana
https://www.bf.uni-lj.si/

The fundamental mission of the Biotechnical Faculty (Biotehniška fakulteta) is to provide university level, advanced professional, and postgraduate education, as well as to carry out scientific research and technical and consulting work concerning the sciences of living nature (biology, microbiology) as well as agriculture, forestry and fisheries (forestry, animal husbandry, agronomy) and the related production technologies (wood technology, food technology, biotechnology).
Focal points: graduate and post graduate education, scientific research and technical work.
Sciences: living nature (biology, microbiology), agriculture, forestry and fisheries (forestry, animal husbandry, agronomy), production technologies (wood technology, food technology, biotechnology).
Departments: · Department of agronomy · Department of biology · Department of forestry · Department of landscape architecture · Department of wood technology · Department of animal science · Department of food science · Biotechnology studies · Microbiology studies · Chair of sports education
The Biotechnical Faculty employs 700 members. At the Biotechnical Faculty in 2018, research work was carried out in the 156 research projects. There were 27 national (basic, applied and postdoctoral) projects, 17 were CRP projects and 112 were international.

The Agricultural Institute of Slovenia (KIS)
https://www.kis.si/en/

Agricultural Institute of Slovenia (Kmetijski inštitut Slovenije) is the leading agricultural research institution in Slovenia. It comprehensively deals with the problems of modern agriculture and expands its activities in the field of environmental protection and ecology. It employs 195 workers, including 89 researchers.
The Agricultural Institute of Slovenia is a public research institute that performs basic, applied and developmental research and professional tasks in agriculture, publishes the results of scientific-research, professional and control work, performs tasks on the basis of authorizations and accreditations, checks the quality of agricultural products and products. used in agriculture. The Institute is also involved in training farmers, educating young people and advising various users in agriculture. Areas of activity: · agriculture and horticulture with seed production, · genetics, breeding, maintenance selection and gene banks in agriculture, · animal husbandry (cattle, pig, beekeeping), · fruit growing, viticulture and winemaking, · protection of plants and the environment, · fertility control and quality of agricultural land, · ecology of agricultural area, · land use and protection, · analysis of soil, mineral and organic fertilizers, animal feed, honey, pesticide residues, plant protection products, wine, · must and spirits, · agricultural technology and energy; and economics of agriculture.
In 2018 KIS employed 191 employees and was involved in research work was on 54 research projects. There were 24 national (CRP, basic, applied and postdoctoral) projects and 28 were international.

4. OVERVIEW OF EXISTING NETWORKS

AUSTRIA (Upper Austria)

The OÖ Bauernbund
http://ooe.bauernbund.at/netzwerkagrar/

The OÖ Bauernbund offers agricultural networks (Netzwerk Agrar), where all persons can become members. Aim of the networks is to provide amongst others the following services: · exchange of experience and information · interface to politics, business and stakeholders · lectures, excursions, and events

The Bauernnetzwerk
https://www.bauernnetzwerk.at/startseite/

The Bauernnetzwerk is a service platform for farmers and consumers. Aim of the network is to provide amongst others the following services: · networking · provide services to farmers and consumers

AUSTRIA (Lower Austria)

Ecoplus
https://www.ecoplus.at/about-us/facts-figures/)

Ecoplus (the Lower Austrian business agency) operates so called Technopoles. One is located in Wieselburg, focusing on Agricultural Technology: · Support stakeholders and companies (Funding and Project Partners, …) · Stimulate the cooperation between R&D, economy and education · Organization of meetings and events for knowledge exchange and project development · Dissemination of project outputs and results
The common goal is to make the production of food, feed and raw materials environmentally friendly, sustainable and cost-effective. A part of Ecoplus is the Mechatronic Cluster. It incorporates Precision Farming technologies provided by the industrial sector.

Platform "Digitisation in Agriculture"
https://www.bmnt.gv.at/english/agriculture/Digitization/Digitisation-in-agriculture.html

To explore and seize new opportunities the platform "Digitisation in agriculture" of the Federal Ministry for Sustainability and Tourism was established in spring 2017. The platform aims to accompany the trend towards digital technologies in agriculture in the large number of areas

concerned with an eye to the future. Short-, medium- and long-term measures are to be taken in a way that this trend can be followed and supported and that domestic agriculture which, in international comparison, is rather small-structured, can make good use of it and utilise it adequately. Specific fields of action have been identified and analysed in a report. They comprise legal framework conditions just as much as economic or environmental aspects and regional development.

Nine areas of activity have been identified [BMNT: Bericht "Digitalisierung in der Landwirtschaft – Entwicklung, Herausforderungen und Nutzen der neuen Technologien für die Landwirtschaft"]:

1. Technology in arable farming: The high rate of development offers a huge potential for an improved, precise and optimized production method. Digitalisation is a challenge for small-scaled Austrian farms. They often can´t afford modern technology (ISOBUS, GNSS, section control, telematics, FMIS) for their own farm. The risk of highly rated transparency or the dependency on reliable technology are rated as risks from farmer´s perspective.
2. Technology in livestock farming: The number of semi- or fully-automatic working processes increases, especially in livestock farming. The systems are digitally controlled and acquire or handle external data. The collected data are used for herd management and for optimized feeding. It has to be mentioned that digitalization in livestock farming must not only be a tool for management control, but has to support animal welfare by the help of existing information.
3. Material management: The information along the value chain shall be improved and standardized. One example is the structured digital data exchange for planning and controlling the processes in the Austrian forestry sector. Meanwhile, about 90 % of the Austrian round timber is managed with the standardized FHP file format to enable automatic cross-company data exchange.
4. Business administration and management: The chance of small scaled farms is to take decisions on the basis of relevant data. Therefore the cost accounting has to be linked with farm-management systems. Farmers need the skills to acquire information out of data. An advantage of digitisation is the simplified proof of origin.
5. Ecology: Digital information from soil and fields supports the decision making process in terms of arable farming (e.g. plant treatment, irrigation, demand-driven fertilization) to minimize environmental impacts (e.g. nitrate concentration in ground water, resistance formation among pathogens).
6. Legal framework: The operation of drones in agriculture to acquire field information requires to fulfil several legal requirements. Uniform standards need to be developed. The permanent storage of data enables Big Data-analysis. From the legal point of view it is relevant that access to data without personal connection enables benchmarks in wide areas. The combination of various data can lead to new KPIs. But farmers might be supervised by third parties (e.g. service providers) when they collect data from the farmer´s fields. They could draw conclusions e.g. from the site-specific yield value.
7. Administration and agricultural statistics: The ownership of data has to be clarified (open-data).
8. Regional development: Austria is still lacking in technical and social infrastructure. The telecommunication systems need to be established and has to cover the agricultural territory.
9. Education and training, consulting: The digital learning objectives have to be integrated in curricula of courses for future farmers. They learn about the utilization of Smart and Precision Farming. Several training opportunities are offered in Austria by the Francisco Josephinum, University of Applied Science Wiener Neustadt and the University of Natural Resources and Life Sciences.

House of digitalization
https://www.virtuelleshaus.at/

The aim of the House of Digitalization is to increase understanding of the significance of digitalization for our (working) lives and our prosperity. It will provide a new creative space where projects can be initiated and implemented. The aim is to provide support for innovative firms, helping them get their ideas onto a commercially viable footing.
The targets are: • Accelerated digital transformation for businesses in Lower Austria • Easy access to research institutions for business enterprises • Strengthening multi-disciplinary and international research • Key and demonstration projects • Raising awareness • Transforming people's fears into interest through better understanding
The (virtual) House of Digitalization comprises several floor levels:
1. digiPEDIA: This floor is some kind of compendium for items, terms and definitions regarding digitization. This reference work explains abstract terms and definitions of digitization by means of concrete examples or projects.
2. digiGALERIE: Examples of digital innovation can be presented on this floor, as well as the corresponding companies.
3. digiEVENTS: This event calendar provides an up-to-date overview about digitization events in Lower Austria.
4. digiSKILLS: Companies and institutes can describe their skills, abilities, resources and references. If someone is seeking for a project-partner you can access this floor.
5. digiFIT: Search function for courses and training opportunities related to digitalization. Organizations that offer these types of opportunities are welcome to add them here.
6. digiLAB: New project ideas can be presented here - expecting to find an appropriate project partner.
7. digiCROWD: Service to support the development of new products, services and business models.
8. digiINNOVATION: Service to support the development of new products, services and business models – within a closed format.
9. digiCHECK: online-check of your digital skills (fit4internet)
10. digiFörderung: Compilation of various funding measures from the state of Lower Austria and the federal government that are relevant to the topic of digitization.
11. digiNEWS: Social media news related to the House of Digitalisation.
12. DIHOST: The Digital Innovation Hub East supports small and medium-sized companies in their digital transformation.

ITALY

Federunacoma
https://www.federunacoma.it/en/index.php

The Italian Agricultural Machinery Manufacturers Federation, formed in 2012 to replace Unacoma (the Italian Farm Machinery Manufacturers Association set up in 1945), brings together, and represents in Italy and abroad, the associations of Italian manufacturers of implements (Assomao),

self-propelled machines (Assomase), tractors (Assotrattori), components (Comacomp) and gardening machinery (Comagarden).

Assotrattori
https://www.assotrattori.it/en/index.php

The main activities of Assotrattori are: · reporting data for compiling statistics and information · the organization of specific events such as seminars in the framework of trade fairs · providing incentives for research projects which foster cooperation between member companies and research institutes; providing assistance and consultations in technical and regulatory fields.

Comacomp
https://www.comacomp.it/en/index.php

An association of components manufacturers in Federunacoma. The production of components represented by the association for machinery for agriculture, earthmoving and gardening, OEM and spare parts, can be divided into macro areas: · mechanical components (drive shafts for power trains, speed reducers and increasers, gearboxes, free wheels, clutches, axles, etc.) · hydraulic components (cylinders, pumps, motors, valves, etc.) · electric-electronic components (electric plant, cable harnesses, electronic regulation and control devices, GPS systems, onboard computers and instruments, etc.) · various components (belts, cabs, seats, brake systems, frames, three-point hitches, etc.) · irrigation components (hoses, couplings, filters, pumps, sprayers, accessories, etc.) · sprayer components (bars, pumps, fans, filters, ECDs, nozzles, etc.)

IDEAgri
https://ideagri.com.br/

IDEAgri is a company network set up to develop common activities within the frame of ISOBUS standard and more generally of Digital Electronics for agricultural machinery. All the 8 founder companies are under the leadership of Reggio Emilia Innovazione (REI) and have joined their specific skills. The 8 companies are AMA, Arag, COBO, COMER, Agro Tractors, Salvarani, Walvoil and ReLab.

CL.A.N.
https://www.clusteragrifood.it/en/

The National Technology Agrifood Cluster is a multi-stakeholder network of the key Italian players of the entire agrifood chain - a partnership of companies, research centres and institutions set up to promote sustainable economic growth, based on research and innovation in the industry and acting as partner for Italian and European Institutions.

POLAND

The National Center for Agricultural Support
https://www.kowr.gov.pl/

In Poland, the leading networks that distribute solutions, information, and manage communication and funding are Agricultural Advisory Centers, oriented in every region in Poland (ODR). The National Center for Agricultural Support takes care of the regional institutions of the ODR.

The National Rural Development Network
http://ksow.pl/

Network for innovation in agriculture and in rural areas - SIR, operates within the National Rural Development Network (NRN subnet) and is of an open nature. Network participants can be all entities involved in the development of agriculture and rural areas. The tasks of the Network for innovation in agriculture and rural areas, including the tasks of an innovation broker, are carried out by WODRs located in all 16 voivodships

The European Innovation Partnership for efficient and sustainable agriculture (EIP-AGRI)
https://ec.europa.eu/eip/agriculture/en

The European Innovation Partnership for efficient and sustainable agriculture (EIP-AGRI) is a new tool to support the agricultural and forestry sector. Its primary goal is to increase efficiency, sustainable economy and create opportunities to solve current problems such as strong competition, unstable market prices, climate change or tougher environmental regulations.
The EIP-AGRI network focuses on establishing partnerships and contacting people from various specialties within the EIP-AGRI network to carry out work focused on various fields within the EIP-AGRI operational and focus groups.

SLOVENIA

ITC, Innovation Technology Cluster
Lendavska ulica 5a, 9000 Murska Sobota
https://itccluster.com/sl/

Digital Innovation Hub for Agriculture and Food Production (DIH AGRIFOOD). They combine Slovenian and European research and development expertise on digitalisation in agriculture (smart agriculture). Their goal is to provide a ‚One Stop Shop' that will provide organizations with services in the region to provide safe, sustainable and quality food.

AE-ROBO-NET
Liminjanska 96, 6320 Portorož-Portorose
http://www.ae-robo.net

AE-ROBO-NET cluster was funded to provide agricultural and environmental robotics systems and services appropriate to the needs of farmers, road operators, eco remediation providers and underwater construction operators thereby increasing their efficiency, innovative potential and ecologically friendly operations.
The network organization provides an ever-expanding knowledge base, which is be based on user-friendly research and development activity, which stimulates innovation. The network association contributes to the development of competitive agricultural and environmental robotic systems needed by domestic and international agricultural and environmental providers, thereby increasing the efficiency of both sectors, and profit-making ability.

Slovenian Agricultural Engineering Society
Hacquetova 17, 1000 Ljubljana
www.dkts.si

The basic task of the Association is to encourage scientific and professional work in the field of production, use and sale of agricultural technology, its rational and safe use, automation and precision agriculture, organizing various forms of information, training and education of members (congresses, symposia, consultations, workshops, professional courses, lectures, consultations, discussions, excursions, competitions, etc.).
Much attention is paid to informing members and the general public about the work of the Society, taking care of raising the technical culture and publishing professional books, publications and information.

5. OTHER FEDERAL PROVINCES

AUSTRIA

AAC – Austrian Agricultural Cluster (Headquarter in Vienna)
https://www.aac.or.at/

The Austrian Agricultural Cluster (AAC) is the export-oriented Association of the most innovative Austrian producers of agricultural, food processing and renewable energy technologies.
The company cluster was founded in 1999, within the Export Promotion Program of the Austrian Ministry of Agriculture, Forestry, Environment and Water Management and of the Austrian Federal Chamber of Commerce.
The Austrian Agricultural Cluster currently represents 19 leading companies and organisations covering all segments of the agrifood chain: · Agricultural Equipment: Bauer GmbH, Cimbra, CNH Industrial Austria GmbH, Pessl Instruments · Animal Housing: Schauer, Smartbow, Wolf System · Animal Nutrition: Biomin, DonauSoja · Breeding Livestock: pig.at – Austrian Pig Breeders Association, IK Pyra – International Competence Center for Cattle Breeding and Dairy Cattle, ZAR - Federal Association of Austrian Cattle Breeders, ÖBSZ - The Austrian Federal Association for Sheep and Goats · Consulting Services: BOKU Vienna, Wieser Consult · Food Processing: Berglandmilch, Bertschfoodtec,Bertschlaska, Biomedica · Know-How: BOKU, IK Pyra, Wieser Consult · Smart Farming: Bauer GmbH, CNH Industrial Austria GmbH, Pessl Instruments, Smartbow
Through the network of qualified companies in various sectors of agriculture, food-processing and renewable energy, the AAC is a partner for integrated agricultural projects including corporate finance combined with European Union subsidy programs. The core competence lies in the provision of scientific know-how, consulting and latest technologies of leading Austrian companies and organisations.

Lindner
(Headquarter located in A-6250 Kundl/Tirol)
https://www.lindner-traktoren.at/en/

Lindner has been developing and producing tractors and transporters for the alpine and pasture farming industry, cultivated agriculture as well as for municipalities and cities throughout Europe. Various technical innovations allow a very wide range of applications of agricultural machinery. From agricultural use such as farming, mowing, plowing, etc. to special forestry use in the mountains.

Bauer GmbH
(Voitsberg, Styria)
https://www.bauer-at.com/en

Bauer GmbH (OEM) operates in three main product fields: Irrigation, Slurry Technology and Pipes & Fittings. The company has accumulated expertise for over 80 years based on experience, research and development to become a world market leader in irrigation technology. A mobile irrigation

management system “SmartRain”, a BAUER GPS-supported application, can calculate and plan the optimal irrigation amount based on the measured soil moisture, the existing soil type and on the weather conditions. The app can be used from any mobile device and offers an overview of the irrigation machines on the field.

Audili
(Styria)
https://www.audili.io/

Audili is a start-up company which develops a self-learning software which determines soil characteristics on a satellite basis and thus replaces complex soil analyses. Audili utilise proprietary remote soil sensing algorithms in combination with certified third party soil probes to support, verify and monitor the longterm storage of CO2. Based on these results voluntary CO2 certificates are issued and farmers compensated for taking action.