



ITFARM

IT for Interconnection of Social, Economic and Environmental Aspects in Agribusiness

WP2 – Survey on the ICT Technologies supplied in precision agriculture

(Please provide together with English questionnaire responded, your findings from the Survey by 1st June 2022 by summarising the feedback from the questionnaires in the following structure using the following formatting: Font Calibri, Font size: 12).

Part 1. Introduction and profile of the participants (Questions in the part: “Enterprise information”)

The three largest companies that provide a comprehensive service of technical and SW equipment on the market of precision agriculture in the Czech Republic were contacted and asked to participate in the questionnaire survey. They very willingly participated in it and thus provided sufficient information for the situation on the Czech market in this area.

- 1) AGRI PRECISION - offers comprehensive services – Dealer and Service Provider – from the analysis of the company's production capabilities to the complete installation of equipment, operator training, service. Operates in all regions.
- 2) STORM specializes in the sale of technical equipment, operates branches in all regions.
- 3) Leading Farmers CZ – dealer, which specializes in the installation of equipment from various companies, provides consulting and service.

The selection of companies represents a representative sample of the "turnkey" offer of precision agriculture technologies. They are all successful in the market, they have good and sophisticated advertising, they have been on the market for more than 20 years.

Each of the companies cooperates with its partner suppliers of machinery and corresponding equipment. These are mainly foreign manufacturers with a strong market position. They maintain their position in the market by the fact that the components of their machines cannot be applied to the machines of competing companies. This is the reason why farmers are forced to use the service of only certain groups of companies, why technologies cannot be combined with each other.

Most of the machines are manufactured by renowned companies: John Deere, Kioti, Multione, Tierre, Marolin, S&C, Kioti, Morgnieux, P&L, Hilltip, Sampo Rosenlew, Faresin, etc., some small parts of the machinery are of the Czech production. The machines are available in several model lines, different outputs, and equipment. The machines can be tailored to the customer's needs.



Thanks to a wide range of accessories, they have a high utility value. The disadvantage for farmers is the fact that they are forced to always focus on one manufacturer, because the equipment purchased usually cannot combine accessories from other manufacturers.

Part 2. Results

Result 1. Current situation of ICT agro-Techno input suppliers (Questions in the part "Enterprise current situation" Q1-Q10)

The companies are interested mainly in

- System installing
- Machine installing
- Technical assistance

The services are followed by various tailor-made training programmes.

Distribution of clients:

- Large agricultural enterprises (70%)
- Small family farms around 20%
- In non-agricultural sectors, demand is around 10%.

The majority of 80% orders are realized in the Czech Republic, outside the territory of the Czech Republic around 20%.

All companies report a very positive impact on their business results.

Currently, farmers are most interested in the following technologies:

Weather connected stations

Soil management:

- Soil electrical conductivity sensor
- Electrodes for frequency domain (FDR) or time domain reflectometry (TDR)
- Ion-selective electrodes (ISE) and ion-selective field effect transistor sensors (ISFET)
- Ground penetrating radar (GPR) and gamma ray spectrometry (GRS)

Seeding management:

- Seed drill depth control system
- Electric seeder for small-size vegetable seeds, optical fiber detection technology
- Wheel mobile robot for the wheat precision seeding
- Control system for seed-metering device using a single chip microcomputer
- Air-assisted high speed precision seed metering device

Smart fertilisation management:

- Variable-rate fertilizer control system based on ZigBee technology
- Low-cost agricultural robot (prototype)
- IoT-based fertigation system

Grass yield monitoring

Feed management



Field mapping with GIS

Yield monitor and data analysis

Companies can handle any order, including very specific requirements, from all areas of implementation of advanced technologies in crop, animal production and other areas such as horticulture, parks, orchards, etc. To do this, they use cooperation with boughs internal and foreign business partners.

The main factors that affect the sale of new IT technologies to farmers:

	Factor	1 - most 5 – least important	Reasons
1	High capital investment	2	New technologies are generally more expensive.
2	Return on investment	1	The most important factor when making a purchase decision.
3	Short lifespan of new technologies	5	This is a factor that everyone must take into account in general.
4	Complicated use	3	Qualified personnel are able to operate modern machines with advanced equipment.
5	The need for qualified staff	3	It is difficult to find a skilled workforce.
6	Legal issues	5	There are more and more administrations involved in business in general, but this is not one of the main reasons for acquiring new technologies.

Result 2. Identify and understand current and future suitable technologies for EU precision agricultural farms (Questions in the part “current and future suitable technologies for EU precision agricultural farms”, Q11-Q16)

Practice training.

Product training after purchase.

Training in the promotion of new products.

Regular technical training.

Introducing how technologies work directly on farms.

Participants only pay for the required trainings - these are regular technical trainings.

Trainings usually take place once a month.

Trainings on request are organized as well.

Result 3. Technology training programmes on ICT for precision agriculture employees. This part includes two sections 1) Training for clients (farmers), Q17-Q29 and 2) Training for enterprise' employees, Q30-Q43.

The training period usually lasts 1 day, if needed 2 days.

Training is organized by companies, or sometimes their suppliers or subcontractors.

The trainings take place directly at the customers, or also in the training centres of the companies.

The training only concerns installed technologies, training in basic IT skills (such as computer work, data processing, programming) is not include.

Financial support programs (e.g. deferred payment, lower interest rates, etc.) are not implemented by companies.

They also do not draw any state subsidies for the development of new technologies, there is no legislative support directly designed for this type of business activities.

Result 4. Financial support programmes for ICT development at suppliers' level Questions from Q44 to Q49.

There is no support programme directly assigned for development of new technologies.

The companies received subsidies at the time of COVID. But these smaller subsidies supported the business during the critical period only.

Subsidies would allow companies to focus more on developing new technologies and improving services for their customers.

Result 5. National and international legal/regulations/policy on new ICT technologies applied in agro sector. Questions from Q50-Q51.

Business must adapt to the requirements of the Green Deal and meet other criteria related to energy savings, waste management and other environmental requirements. This should lead to an increase in prices and thus to a reduction in interest of farmers in installing new technologies of the 4th Industrial Revolution.

Significant changes in legislation are expected for both farmers and companies, which will support the development of precision agriculture, which is becoming an important strategic player in meeting the goals of the Green Deal.

Conclusions:

The companies offer all the necessary services for the development of precision agriculture at a high professional level. They provide the necessary training, have good, targeted advertising, well-functioning websites.

They operate within the framework of normal supplier-customer relationships, they have a chance to develop further. They expect that the legislative environment will change.

If the state supports farmers with subsidies for the development of precision agriculture, these will be reflected in an increased interest in the services of technology suppliers. This

will then help both parties - both farmers and technology providers - both sectors could grow and develop.

Recommendations:

It is recommended to establish cooperation with selected companies and use their training and training materials in a) creation of educational materials, b) directly in courses where they can directly participate in teaching.

