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D.T1.1.2 PRECISION FARMING POLICY ECONOMIC REVIEW ANALYSIS

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Poland

Version 1

Contents

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1. Role of PF industrial sector - Overview about industry/companies

There are a number of technologies supporting precision farming. These technologies are used for the identification of objects, the extraction of geographic information about the farm and the measurement of specific parameters, Global Navigation Satellite System (GNSS), communication, data storage and analysis, guidance systems, robotics and autonomous navigation. There are already first examples of implementation of precision farming practices in field crops, vegetables and dairy, but precision farming technologies can also be applied to other sectors. Good progress is currently being made in the development of precision agriculture, and the precision agriculture market is fully supported by the sector and investors, but its full potential has yet to be realised.

The concept of precision agriculture in Polish conditions is well known, and is gaining increasing interest. There is a noticeable trend towards smaller farms becoming smaller and larger farms becoming larger. Because of these trends, the technologies of precision farming, as those requiring more resources, are being applied precisely on the larger farms.

Fragmentation of farms and low value of agricultural production makes the adoption of PA difficult in Poland. However, under such conditions, more simple forms of PA can be adopted.

Polish agriculture is still not able to sufficiently use PA when it comes to its practical implementation. The main reason for this lies in the nature of the fragmented Polish agricultural sector composed of many small farms that lack the potential to adopt PA practices.

Labour and skills aspects are crucial for the further development of the agricultural sector. Agriculture in Poland is facing many challenges: financial crises, global competition, climate change and rising costs are putting pressure on the farming community. Upgrading skills is one of the major problems.

2. Impact of precision farming technology, developments and applications

At the moment, precision farming in Poland is still a relatively unpopular concept. However, there is no denying that the emerging solutions on the market that offer farmers optimal crop management are based on precision farming technologies. There is a growing awareness among farmers of precision crop management, as well as the possibility of implementing appropriate technologies on their own farms with the financial support of EU subsidies. Implementation of

various technologies is ongoing across the country, but this is a slow process. Technologies used are:

Intelligent irrigation

The use and management of water on farms is an important aspect of agriculture today. Around 70% of the total water abstracted worldwide is used for agricultural activities. As much as 60% of the water used for irrigation is lost due to leakage into the atmosphere, in ground runoff or through inefficient use. Smart solutions make it possible to closely monitor and adjust water use on the farm

Intelligent fertiliser dosing

Variable Rate Control allows you to adjust the application rate of seed or fertiliser.

Weather and climate monitoring

Greenhouse gas emissions from agricultural sources have doubled in the last 50 years, unfortunately these statistics are expected to continue to rise. Climate change, excessive rainfall, floods, droughts and other extreme weather conditions are causing huge losses in agriculture. Technologies for monitoring weather forecasts make it possible to adequately prepare crops for the arrival of a storm or drought and thus minimise possible damage.

Pest control

Most farms monitor pests using visual detection, often using an external specialist. This is an expensive and labour-intensive method that lacks systematicity, making it many times impossible to respond to outbreaks in real time.

In smart farming, Agriculture 4.0, pest monitoring is done remotely by collecting and understanding data on pest activity, location and occurrence patterns. An example would be combining traps to detect specific levels of pests and then automating the monitoring and data collection to take more accurate and timely countermeasures.

Mapping and drones

Satellite navigation, smart drones and UAVs can help farmers with image mapping. Mapping can detect changes in soil and vegetation and determine irrigation levels, while drones can assist with crop spraying.

SAT AGRO dedicated platform for precision and smart agriculture - Allows access to satellite observations from NASA, the European Space Agency and private operators. Allows data to be processed separately for each field. The SatAgro application allows you to monitor crop development, observe the impact of weather and agronomic treatments, and analyse historical data. Application maps enable precise sowing, fertilising and spraying, and automatic alerts inform you of sudden changes in crop condition and weather.

The integrated mapping of multiple sections of a field and various factor allows for identifications of the problems, eliminate them in time and thus increase crop yields. It can also be used as a tool to track livestock, and drones can be used to deliver inputs such as fertiliser.

The use of drones for chemical and biological crop protection is still in a very small range due to the cost of use. Used very occasionally and only in cases of

Farm management software

The information gathered by sensors and smart devices is fed into the software. Machines and sensors that monitor soil quality, crop condition, weather and pesticides, combined with the right software to store and process this data, provide the opportunity for better management and more efficient production.

3. Support PF at Policy level in Poland, including support for Smart Agriculture

Smart agriculture is based on the intensive use of modern ICT technologies, eventually leading to the so-called third green revolution (after the introduction of artificial vehicles and the genetic revolution). This revolution is transforming the world of agriculture through the integration of diverse ICT solutions such as the Internet of Things, big data processing, precision equipment, geolocation systems, unmanned aerial vehicles (drones) and robo-tech. From the farmer's point of view, smart agriculture should result in value-added in the form of more efficient decision-making and more effective operation and management activities. In this context, smart agriculture includes three interconnected technological areas:

Management information systems: systems for collecting, processing, storing and disseminating data in the form needed to perform operations and functions within the farm.

Precision farming: managing spatial and temporal variability to improve economic returns and reduce environmental impacts. Includes decision support systems for whole-farm management to optimise returns while maximising resource conservation, through widespread use of satellite navigation systems, aerial imagery (including drone), latest generation hyperspectral imagery provided by satellites, enabling spatial mapping of crop yields, topography, organic matter content, moisture levels, nitrogen levels, etc.

Agricultural automation and robotics: the process of applying robotics, auto-control and artificial intelligence techniques to all levels of agricultural production.

The 5G network is an indispensable implementation platform for intelligent agriculture which, on the one hand, provides the computing infrastructure for application systems and, on the other hand, communicates the individual components of the system with the corresponding quality parameters.

Strategy for sustainable development of rural areas, agriculture and fisheries 2030

Further digitalization is also an opportunity for agriculture, including, among others, optimal use of large data sets (all the more so as the demand for greater personalization of food products is growing). Implementation of many solutions in the field of digitisation and Industry 4.0 in the agri-food sector (e.g. monitoring of crops and their condition - freezing, drought, precise and resource-efficient farming) will be favoured by its active inclusion in the benefits that come from the developing space sector, although in general in Polish agriculture and fishery the transition from basic digitisation to the Internet of Things is much slower than in agri-food processing.

4. Direction of intervention: I.3 Development of innovation, digitalization and Industry 4.0. in the agri-food sector

The entities of the agri-food sector should participate in the next industrial revolution, which is determined by innovations (product, process, organisational, marketing), digitisation, satellite technologies, the Internet of things50) and industry 4.0, which is a condition for maintaining and strengthening the international competitiveness of this sector. The development of innovative data processing technologies has to take into account resilience to cyber threats and increased protection of information, in particular in the context of processing of huge data sets (Big Data) and collection of data from a large number of geographically dispersed sensors (Internet of Things), while at the same time increasing the need for high mobility of data collection, analysis and visualisation systems. ICT has the potential to transform agriculture in many aspects, including: the use of data from intelligent sensors, e.g. on weather conditions, soil quality, crop progress or cattle health, in order to, inter alia, track the general condition of the farm, the productivity of employees or equipment (agricultural machinery) and solutions used, better control of internal processes through the ability to predict production results, cost management and waste reduction - thanks to increased control over production, increased business efficiency - thanks to process automation, control over the production process and maintenance of higher crop quality standards and growth capacity - thanks to automation.

Dissemination of precision farming and other technologies allowing to increase productivity with lower (economical) use of crop inputs, both pesticides and mineral fertilizers

The Network for Innovation in Agriculture and Rural Areas (SIR) - operates within the National Rural Development Network and has an open character.

The structure of SIR is based on public agricultural advisory services: The functioning of SIR is ensured by public agricultural advisory units:

- Agricultural Advisory Centre in Brwinów (CDR) as a coordinator of the Network,

- 16 Voivodship Agricultural Advisory Centres (WODR) as units

The network will be carried out in each voivodship.

Detailed SIR objectives:

Facilitate the creation and operation of contact networks between farmers, advisory bodies, research institutions entrepreneurs of the agri-food sector and other entities supporting

Facilitate the creation and operation of contact networks between farmers, advisory bodies, scientific entities, entrepreneurs from the food sector and other entities supporting the implementation of innovations in agriculture and rural areas.

Facilitate exchange of expertise and good practice in the field of innovation in agriculture and rural areas.

Assist in the establishment of EIP Operational Groups and assist in the development of projects by operational groups and innovation partnerships.

Subsidies schemes supporting PF in Poland

PROW 2014-2020 - Programme specification

Program Rozwoju Obszarów Wiejskich (Development Programme for the Rural Areas 2014-2020)

Improving the competitiveness of agriculture, balanced territorial development of rural areas, climate protection activation and sustainable management of natural resources are the main objectives of the Programme, which is part of the overall system of national development policy based on the Partnership Agreement. The European Union has prepared the strategic growth plan "Europe 2020 - A strategy for smart, sustainable and inclusive growth", thus taking into account the personalized development needs of individual Member States.

NRDC (The National Centre for Research and Development)

Reallocates funds from European Funds within the POIR Operational Plan Innovative Developemnt on the national level to support new technologies in the agricultural sector (Agriculture 4.0).

The Fast Track "Agrotech" competition has been launched. The initiative aims at increasing the competitiveness of Polish companies working on projects in the field of robotization and automation, digitisation or environmentally-friendly agri-food production.

The research agenda of the new NRDC competition defines 6 main thematic areas in which the financed projects are to be included:

1. automation and robotization in agriculture;

2. mechanisation in agriculture

3. applications and advanced digital services for optimisation, prediction and simulation of processes, and effective digitalisation of production, processing and management in agriculture

4. precision agriculture (smart fields)

5. sustainable agriculture and agri-food processing, innovative food, agricultural biotechnology

6. bioenergy and biomaterials.

EIP-AGRI Projects in Poland (selected)

Title	Polish Fruit Vinegar - Production of fruit vinegar as a product, process and technological innovation
Geographical location	Poland
Objectives	Production of fruit vinegar in the Łódź, Masovian and Silesian voivodships in cooperation with the W. Dąbrowski Institute of Agriculture and Food Industry as an innovative product, process and technology aims to develop and implement an new product - fruit vinegar and an innovative technology for the production of fruit vinegar using selected local strains of microorganisms. Vinegar composition and quality will be the result of many different variables at production steps. It will be essential to control the microorganisms that conduct fermentation and acetification in the production of fruit vinegar to obtain biodifferent products with health benefits without chemical preservatives.
Main funding source	Rural development 2014-2020 for Operational Groups (in the sense of Art 56 of Reg.1305/2013)
Starting date	2019
End date	2020
Project status	ongoing

Title	**Researching and developing technologies for pork meat processing in order to extend shelf life, preserve nutritional values, health-enhancing benefits**
Geographical location	**Poland**
Keywords	**Food quality / processing and nutrition**
Main funding source	**Rural development 2014-2020 for Operational Groups (in the sense of Art 56 of Reg.1305/2013)**
Project type	**Operational group**

Starting date	2020
End date	2021
Project status	ongoing

Title	Developing strategies to prevent the development of seed potatoes phytopathogens based on ecological biotechnological solutions and a new storage meth
Geographical location	Poland
Keywords	Agricultural production system
Main funding source	Rural development 2014-2020 for Operational Groups (in the sense of Art 56 of Reg.1305/2013)
Project type	Operational group
Starting date	2019
End date	2021
Project status	ongoing

Title	Development of a mobile technology for testing pesticides in agricultural products and identifying the source of origin of agricultural products.
Geographical location	Poland
Keywords	Food quality / processing and nutrition
Main funding source	Rural development 2014-2020 for Operational Groups (in the sense of Art 56 of Reg.1305/2013)
Project type	Operational group
Starting date	2019
End date	2021

Project status	ongoing
Website	Development of a mobile technology for testing pesticides in agricultural products and identifying the source of origin of agricultural products.

Title	Improving the quality and health of apples by reducing residues of plant protection products using ozone technology
Geographical location	Poland
Keywords	Food quality / processing and nutrition
Main funding source	Rural development 2014-2020 for Operational Groups (in the sense of Art 56 of Reg.1305/2013)
Project type	Operational group
Starting date	2019
End date	2021
Project status	ongoing