

## SUPPORT INSTRUMENTS FOR THE KNOWLEDGE-BASED ECONOMY IN POLISH AGRICULTURE

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**Abstract:** The paper shows direct and indirect forms of supporting the process of introducing scientific solutions into Polish agriculture. These instruments are contained in the Rural Development Programme – RDP (2nd pillar of the Common Agricultural Policy). The measures related to the development of knowledge within the RDP were presented, so were financial resources allocated for their implementation as well as R&D inputs regarding agricultural sciences. The EU system of introducing scientific solutions by so-called operational groups has been demonstrated.

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**Keywords:** Agriculture, Science, Forms of support, R&D inputs

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### INTRODUCTION

In the literature of the subject, there is no single, commonly accepted definition of the „knowledge-based economy” concept. Individual interpretations highlight different and also interdependent aspects of the issue concerned. For example, B. A. Lundvall and D. Foray (1997) define the knowledge-based economy as the one where knowledge is the most important resource and learning is the most important process. P. Drucker treats this economy „as the economic order, in which knowledge, not labour, raw materials or capital, is the key resource.” In the OECD report, entitled „The Knowledge Based Economy” of 1996, the knowledge-based economy is defined as one which is based on production, distribution and practical use of knowledge and information (The Knowledge-Based Economy, 1996). According to the report, developed by the OECD and the World Bank in 2000, it is the economy, in which „knowledge is created, absorbed and used more effectively by enterprises, organisations, individuals and communities, fostering the faster economic development.”

The implementation of the objectives of the knowledge-based economy (KBE) has been adopted as the primary objective of the development strategy of EU countries. The development plan for the entire EU based on the KBE for the first time was defined at the European Council Summit in Lisbon in March 2000. The development strategy adopted in Lisbon was to make the Community the most competitive knowledge-based economy in the world, capable of the permanent and sustainable development. In accordance with the Strategy, the basis for the development of the EU economy were to be innovation, development of the information society and improved education system, based mainly on extensive scientific studies. Currently, the EU implements the Strategy 2020 in which it has been assumed that the Community development, to the extent greater than before, is to be based on three

mutually complementary priorities (pillars). They are: smart growth – knowledge- and innovation-based, sustainable growth – aimed at increasing the importance of the low-carbon economy which is resource-efficient and competitive as well as inclusive growth - supporting the employment growth with the economic, social and territorial cohesion.

The implementation of the EU Europe 2020 Strategy, and especially of its 1st pillar (smart growth – knowledge- and innovation-based) is particularly difficult in the agricultural sector. This results mainly from: very diversified structure of the sector (small-scale holdings and large-scale „industrial” farms), many types of production, extended distribution chain, necessity to comply with certain standards for the functioning of entities (food safety or animal welfare), and relatively poor, when compared to other market entities, economic situation of agricultural holdings.

All these factors determine not only the fact that putting knowledge achievements, including innovation, into economic practice is slower in agriculture than in other sectors of the economy, but also the need to develop a separate strategy of „interactive” development for this sector so as to improve the efficiency of its functioning. Support for the process of introducing and dissemination of knowledge must be greater than in relation to other sectors.

### DETAILS EXPERIMENTAL

#### 2.1. Materials and Procedures

The paper used the data and studies of the European Commission, information of the Polish Ministry of Agriculture and Rural Development regarding the Rural Development Programme (RDP) and data of the Central Statistical Office (CSO) in Poland. The study method consisted in carrying out comparative analyses and expert assessments.

## 1. *Forms of support*

### 3.1 *Common Agricultural Policy and Strategy 2020*

The implementation of the Strategy 2020 in Polish agriculture and more broadly in the agri-food sector is carried out mainly using the funds of the Rural Development Programme (RDP). In the years 2014-2020, the achievement of the RDP objectives and assumptions applies to six priorities. They are:

1. Fostering knowledge transfer and innovation in agriculture.
2. Enhancing the viability and promoting innovative farm technologies.
3. Promoting food chain organisation, animal welfare and risk management in agriculture.
4. Restoring, preserving and enhancing ecosystems related to agriculture and forestry.
5. Promoting resource efficiency and supporting the shift toward a low-carbon and climate-resilient economy.
6. Promoting social inclusion, poverty reduction and economic development in rural areas.

The implementation of these priorities shall be carried out by a series of measures and submeasures. The measures directly related to the 1st pillar of the Strategy 2020 (Smart Growth) are: Transfer of knowledge and information activity. Advisory services and Cooperation. The implementation of the first two measures, addressed to training centres (scientific units, agricultural advisory centres, chambers of agriculture, private advisory entities) is aimed, first of all, at developing knowledge and professional skills of farmers, disseminating innovation and good practice in the field of agricultural production and in processing of agricultural products. The measure Cooperation applies only to innovative projects.

Very strongly related to the implementation of the 1st pillar of the Strategy is support provided as part of Modernisation of agricultural holdings under the measure Investment in fixed assets. Modernisation is defined as introducing innovation, but also as improving the product quality. Modernisation is not feasible without proper knowledge possessed by agricultural holding managers. Improving the quality of labour force in agriculture by changing the age structure of agricultural holding managers, as well as a possibility of enhancing education, is fostered by support in a form of bonuses for young farmers. Young farmers managing agricultural holdings are usually more creative in applying modern production and organisational solutions than older farmers.

Enlarging the area of holdings and improving their economic strength are fostered by support for farmers handing over small holdings to another farmer, and by restructuring of small holdings, while improving the scale of supply – by support to the establishment and functioning of producer groups and organisations. Support for these measures has no direct reference to the development of the knowledge-based economy, but

it is obvious that an improvement in the agrarian structure is closely associated with holding managers' pursuit of improving knowledge and enhancing the level of education. In groups, and especially in producer organisations, it is „easier”, in economic and organisational terms, to introduce modern achievements of science and practice into members' holdings and into joint actions. The knowledge-based economy is closely related to the level of and improvement in the quality of manufactured products. The improvement in the quality of agricultural is directly referred to by the measure „Quality schemes for agricultural products and foodstuffs”, although the improvement in the quality of offered products is the objective of support in a number of other measures, particularly Modernisation of agricultural holdings, Bonuses for young farmers and Support for processing. In the years 2014-2020, about EUR 13.5 billion, i.e. about PLN 55 billion, are allocated for implementing all the RDP measures (in the years 2007-2013, the ARMA paid about PLN 43 billion from the RDP funds). The financial plan for the years 2014-2020 for the measures which may be directly applied to the knowledge-based economy (knowledge transfer, advisory services, cooperation) provides for a budget of about EUR 191 million. In the years 2014-2020, the share of overall support for the measures related directly and indirectly to implementing the 1st pillar of the Strategy 2020 with respect to the agri-food sector is to account for about 40% of the RDP budget. Just like in the previous period of the RDP implementation, the largest funds (EUR 2.4 billion) will be allocated for Modernisation of agricultural holdings. In the years 2014-2020, Poland is the largest EU beneficiary of the EU funds allocated for implementing the 2nd pillar of the CAP.

In Poland, the implementation of the RDP measures (2nd pillar of the CAP) will be co-financed by EUR 4.5 billion from the Cohesion Policy. Within the framework of the Cohesion Policy, the EU funds will be allocated, *inter alia*, for increasing inputs for scientific studies and their continuation as well as for disseminating the use of information and communication technologies. The following will also be co-financed: development of non-agricultural enterprise and investments related to production and distribution of renewable energy sources. Also in relation to the Cohesion Policy, in the years 2014-2020 Poland, with the amount of EUR 82.5 billion, is the largest EU beneficiary of support from the EU funds.

The funds from the 1st pillar of the CAP, i.e. direct payments and market regulation measures, which in Poland in the years 2014-2020 account for about 66% of total support from the EU budget for the CAP implementation (in the EU – 71%) are allocated for support and stabilisation of agricultural income. The funds from area payments in Poland are largely allocated for the development objectives, including education of children and adolescents from farming families, and consequently improving the quality of the

labour factor in agriculture and increasing the possibility of using innovative solutions and information technologies.

### 3.2 European Innovation Partnership „Agricultural Productivity and Sustainability” (EIP-AGRI)

Taking into account the specific nature of agriculture in the EU, European Innovation Partnership „Agricultural Productivity and Sustainability” EIP-AGRI has been developed (taking into account the priorities of the Europe 2020 Strategy). The objective of implementing this Programme is to accelerate the process of effective putting the innovative solutions developed by scientists into economic practice (from laboratory to practice). The acceleration of the knowledge assimilation process is to be supported by the introduction of an interactive innovative model consisting in the joint activity (and obtaining EU support measures) of agricultural producers, scientific units, advisors, food industry operators, but also consumer organisations and representatives of supporting units (units involved in providing agriculture with the means of production). This joint activity is to take place through the creation of so-called operational groups.

The objective of the activity of the groups is to implement a specific project which aims at putting the technological or organisational solutions into economic practice of participants in knowledge-based groups. The initiator of creating the groups may be any of their potential members. A prerequisite for obtaining support is the dissemination of research results.

The range of topics, under which the operational groups function, is very extensive, but the major objective of implementing the tasks adopted in the project must be to apply scientific research solutions into practice and encourage participants in agricultural markets and the agricultural sector environment to cooperate for a specific objective and break the conservative attitudes of the agricultural environment (including representatives of science), and mostly agricultural producers in the field of interactive contacts aimed at introducing the widely understood knowledge achievements into the agricultural sector.

In accordance with the AKIS document, a fundamental role in creating and functioning of the operational groups should be played by scientific research units and advisory centres. The role of representatives of science should be reduced primarily to carrying out and disseminating application research, but also to assessing the results of the implemented solutions.

In most EU countries, the scale of the development and dissemination of knowledge by creating and functioning of the operational groups is not considerable yet. This is mainly due to conservative attitudes of the agri-food sector entities as well as units operating in the environment of the sector to carrying out interactive activities. However, in many countries of the Community (mainly in France, Finland, Spain, the Netherlands and Italy) there are formal and informal groups whose objective are joint activities towards solving specific solutions, which is compatible with a

need for the „thematic” presentation of problems in the operational groups.

The authors of the AKIS documents did not find in Poland either examples of undertakings with regard to putting scientific solutions into practice of the operation of agricultural holdings or forms of interaction between market participants and agricultural environment entities, which could be turned into operational groups. However, it should be stressed that in Poland there is a constant flow of scientific and research achievements among scientific research institutions and agricultural producers and processing plants (numerous industry conferences, links to producer groups and processing plants). These links are promoted by the „thematic” nature of scientific research institutions, i.e. institutions involved in individual issues related to agriculture and food economy.

### 3.3 R&D inputs related to agriculture in Poland

The development of the knowledge-based economy in Polish agriculture is fostered by increased inputs for the research and development activity in this sector. In 2015, the inputs amounting to PLN 0.8 billion were higher by PLN 0.4 billion than in 2000. At the same time, however, since 2005, the share of inputs for the research and development activity in Polish agriculture in R&D inputs has been decreasing. In 2000, this share amounted to 8.3%, in 2010 – 7.7% and in 2015, only 4.4%.

In Poland, the employment level in scientific research institutions and other entities involved in agricultural issues does not increase. In 2000, it amounted to 8.2 thousand persons, in 2005 – 6.5 thousand persons and in 2015 – 5.9 thousand persons. In the total number of the employed in the R&D industry, the share of the employed involved in agricultural issues decreased from 10.4% in 2000 to 4.8% in 2015.

Table 1. Employment in R&D and R&D inputs in Poland

| Specification               | Employment in the R&D industry (in thousand persons) |             |             |              | R&D inputs (in billion PLN) |            |             |             |
|-----------------------------|--|-------------|-------------|--------------|-----------------------------|------------|-------------|-------------|
|                             | 2000   | 2005        | 2010        | 2015         | 2000                        | 2005       | 2010        | 2015        |
| <b>Total</b>                | <b>78.9</b>  | <b>76.8</b> | <b>81.8</b> | <b>123.3</b> | <b>4.8</b>                  | <b>5.6</b> | <b>10.4</b> | <b>18.1</b> |
| In the agricultural sector  | 8.2  | 6.5         | 5.4         | 5.9          | 0.4                         | 0.5        | 0.8         | 0.8         |
| Share of agriculture (in %) | 10.4   | 8.5         | 6.6         | 4.8          | 8.3                         | 8.9        | 7.7         | 4.4         |

Source: CSO Statistical Yearbooks (2007 and 2016).

In Poland, the science and research inputs are regularly growing in processing plants and the number of employees involved in the research and development activity in these units is increasing. The share of the economic producers’ funds in the overall R&D inputs in Poland increased from 24.5% in 2000 to 39.0% in 2015. The share of support from international funds increased from 1.8 to 16.7%, and the share of support from the state budget decreased from 63.4 to 41.9%.

In terms of the share of the R&D inputs in GDP, Poland occupies one of the lowest positions in the EU. This indicator is lower only in Slovakia, Greece and Romania. The share of the R&D inputs (3%) in GDP is the highest in Sweden, Finland and Denmark. Poland also occupies one of the lowest positions in the EU in terms of the development of the academic staff (ratings by the European Innovation Scoreboard (EIS)). This applies to, *inter alia*, the number of doctorates per 1 thousand persons aged 25-34, the share of persons aged 30-34 who graduated from universities and the number of publications in international journals per 1 million inhabitants. The position of Poland in the EU is low in most areas of science, including agricultural sciences. However, it must be stressed, that the criteria and indicators to assess knowledge and quality of the academic staff do not apply to „application” knowledge, thus, it is difficult to conclude, on their basis, on the preparedness of representatives of science, including agricultural sciences, to apply implementation solutions.

## CONCLUSIONS

Poland uses the largest EU support in the field of the 2nd pillar of the Common Agricultural Policy covering also direct and indirect support for introducing scientific solutions and innovation into agriculture and into the more extensive food economy. Inconsiderable is the use of EU support measures relating to creating and functioning of operational groups. The lowering share of the inputs for R&D related to agricultural sciences in the

overall inputs for this sphere in Poland is not favourable to the development of scientific research. What is necessary is an increase in expenses for research and development, not only in relation to agriculture but also to other sectors of the economy, an increase in the scope of cooperation between agricultural entities with units operating in their environment and the creation by the Government administration of favourable conditions to make it easier for market entities to access innovation activities and improve the scope of knowledge (more flexible access to EU and national means of support).

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