



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

THE EXTERNAL EFFECTS IN AGRICULTURE AND METHODS FOR REGULATING

Tomasz Pajewski✉

Szkoła Główna Gospodarstwa Wiejskiego w Warszawie

Abstract. The paper presents the problem of the presence of externalities in agriculture, and their impact on the provision of public goods by agriculture. The work is theoretical so for its realization mainly Polish and foreign literature was used. It also presents action to regulate the level of external effects (positive and negative) on the formation of agri-environmental public goods – agri-environmental program under RDP 2007–2013. The views presented were used to ask the questions which can be the basis for further considerations related to a more in-depth analysis of the problems of the complex socio-environmental and economic problems.

Key words: externalities, environmental protection, public goods, agri-environmental program

INTRODUCTION

Human activity is related to using the natural environment. Its utilisation can bring both positive and negative results. While a positive result is preferred both from the point of view of the human and environment, the negative results bring many controversies. As Manteuffel Szoegé notices each economic activity (and in particular production) contaminates the environment. He differentiates two reasons for occurrence of such type of phenomena. Firstly, each material product finally becomes waste, after finishing the period of its utilization. Moreover, production waste and emissions of pollutions accompanying a product lifecycle almost always

occur, namely by-products, undesired material products, whose generation is unavoidable while producing and distributing a given good (Manteuffel-Szoegé, 2011). Environmental pollution can also be observed in the agricultural sector. This is a field of national economy, which is precisely based on using natural resources, in particular – soil. However, we should remember about the basic (social) purpose of the agricultural activity – supplying people with food.

As Gołębiewska notices production of food products (materials) is a basic function, which agriculture is required to fulfil. The author also presents other food products offered by agriculture. According to her farms provide a wide range of market goods, which include production of food, raw materials for food production, industrial raw materials, manufacturing of products for self-supply and internal trade (including production of own fodder) or renewable sources of energy (Gołębiewska, 2011). There is no doubt that food production is the basis of human existence in the world. However, we should note that the demand for food will keep increasing due to the fact that the population keeps growing. As Kagan indicates, there are two basic possibilities of increasing the quantity of produced food. One of them is the process of extending the areas of plant cultivation for human consumption and fodder for animals. The second possibility is based on increasing outlays and modifying technologies of conducting plant production while using current area of cultivated land (Kagan, 2011). It can be stated that on

✉mgr Tomasz Pajewski, Katedra Ekonomiki i Organizacji Przedsiębiorstw, Szkoła Główna Gospodarstwa Wiejskiego w Warszawie, ul. Nowoursynowska 166, 02-782 Warszawa, Poland, e-mail: tomasz_pajewski@sggw.pl

the aforementioned grounds intensification of agricultural production is inseparably linked to increasing of the quantity of produced food, which has a significant influence on occurring of the so called externalities on rural areas.

OBJECTIVE AND RESEARCH METHODS

The aim of the study is to draw attention to the problem of formation of externalities in agriculture and to provide environmental programs for regulating externalities arising as a result of agricultural activities.

The pursued objective was carried out using the literature and information contained in the report on the implementation of the RDP 2007–2013. The work is a theoretical consideration and its meaningful part is based on a review of the literature indicating the importance of concepts such as externalities, public goods implemented in the context of pro-environmental solutions Common Agricultural Policy. The results are presented in a descriptive and graphic form.

EXTERNALITIES IN AGRICULTURE

The notion of the externality was defined in 1890 for the first time in Alfred Marshall's work entitled *Principles of Economics* (Marshall, 1820). He differentiated two groups of phenomena that have impact on an enterprise activity. The first ones included these, which took place inside (internal economies), whereas the other ones contained external stimuli that have impact on organization's activity (external economies). These events, which occurred inside an enterprise did not cause any great problem to classify, estimate to measure their impact and significance on its activity, as they were successively recorded as exogenous factors. However, external factors, despite their visible and frequently obvious impact on the situation of the enterprise, were hard to estimate, as they did not take any form, which could be taken as assets or liabilities of the enterprise. Blaug commented on such factors, both positive and negative, which were difficult to estimate and had impact on the activity of one entity, resulting from the activity of another one. He described these externalities in the following manner: "Benefits, i.e. positive external economies or losses, i.e. negative external economies, occur always when a function of a given enterprise includes a variable, which is not an outlay of a factor in a physical sense,

but rather a result of activity of the other enterprises" (Blaug, 1996). It can be noted that the authors highlight the role of not only external factors, but also those coming from the outside of the enterprise, frequently having a great significance in functioning of a unit.

An important problem related to the occurrence of externalities is their financing. Stiglitz indicates the matter of reimbursements related to an impact of the considered effects. He recognizes that an externality occurs when a given person or a company undertakes actions, which have an impact on a situation of other persons or companies and they are not compensated with an adequate payment in one or the other direction (Stiglitz, 2004). While assuming the occurrence of positive and negative externalities, we can consider two situations. Firstly, a situation when the enterprise A has an impact on the enterprise B in an adverse effect, namely in a manner, which has a negative impact on its activity and has no reflection in market transactions¹. The relation of a poultry farm with agri-tourism company can constitute an example here. Farm (A) has a negative impact on tourists resting in a neighbouring agri-tourism company (B) by emitting unpleasant odour, which is the effect of poultry production. The result of such an activity can be a decrease of interest of tourists in the offer of the entity B, which in fact means reduction of economic effectiveness of the enterprise. Therefore, a question arises, if entity A should in any way compensate entity B for any adverse effects caused by its activity.

We can also consider a reverse situation, namely the one, in which enterprises act to their benefit and make no transactions between each other. Enterprises concentrated on a small area, mentioned by Marshall, can constitute an example here. We can also ask a question, if an enterprise acting to the benefit of the others should receive compensations for this.

Externalities occur in each sector of the economy, also in agriculture. However, it should be noted that the role of non-market products offered by agriculture keeps growing, in particular the ones, which are called public goods in the theory of economics. Daniłowska describes the fact that agriculture provides such type of goods defining that "agriculture, by its close relations

¹ According to Samuelson and Nordhaus: "...an externality occurs when the activity of one unit has impact on the welfare level of the other and it has no reflection in money transactions on the market". Samuelson and Nordhaus, 1995, p. 91.

with nature, is perceived as a potential source of numerous public goods” (Daniłowska, 2014). Daniłowska also highlights that supplying public goods is not a responsibility of the state, but various entities stating that “it should be highlighted that public goods should not be associated with goods supplied by the state or a certain community. They can be delivered by entities of different character, also completely private ones, provided that the condition of no rivalry in consumption is fulfilled” (Daniłowska, 2014). Agriculture can be included in this definition, as it has an impact on numerous public goods such as landscape features, soil and inland water quality, abundance of natural flora and fauna, level of noise or air pollution (odours) on rural areas and many others.

The fact should also be noted that public goods generated or affected by agriculture often occur next to its basic function (food production), about which Hagedorn and Adamowicz convince. According to them “manufacturing of given products in agricultural enterprises by farmers generates a number of externalities, which find no expression in market transactions. Therefore, agriculture manufactures products of non-commodity character, apart from products on the market, which have no market value and price, as they have the character of public goods. These externalities of agricultural management can have an undesired character for the environment, which has a place in the case of environmental contamination caused by farming due to intensive use of fertilizers or irrational waste (slurry) management. The feature of multi-functionality of agriculture on all levels, which is commonly present, is considered as tightening of production expressed in mutual existence (manufacturing) of goods and non-commodity products in the character of private goods and public goods” (Adamowicz, 2005; Hagedorn, 2003).

On the aforementioned grounds it can be stated that farmers often have a significant impact on public (environmental) goods by their activity, whose consumer is the society. Provided at the same time that these goods constitute significant elements of activities of other entities (e.g. fresh air, landscape – for agri-tourism companies, or quality of groundwater for entities using them), then agriculture with impact on natural environment and the level of public goods offered for the society affects activity of these entities in the form of externalities. We can mention the occurrence of environmental

externalities in relation to agriculture – society, as there are no direct market transactions between entities.

Moreover, it should be highlighted that in this case the carrier of externality is a definite element of the ecosystem, which in this case is mainly soil. As Baum, Przezbórska-Skobiej, Brelik note: “despite the fact that the earth is a nationwide heritage, in the case of agriculture, we deal with public goods produced on private land. A part of benefits resulting from activity of a farmer is transferred to third persons without any compensation. These are the so-called effects of management” (Baum and Śleszyński, 2009; Brelik, 2010; Przezbórska-Skobiej, 2014). Are farmers entitled to a compensation for externalities of their activity, which take a form of public goods?

Maciejczak presents a specific character of public goods in the context of the phenomenon of externalities. He claims that public goods is an extreme case of an externality from the point of view of the institutional economics. He explains that they invoke – according to a standard definition of an externality – discrepancy between costs and benefits generated by private persons and a society. He claims that all their benefits are of external character in the context of public goods, namely these goods are not used by customers, but all consumers. In the case of externalities they can be liquidated or strengthened by adequate indication of taxes and subsidies. It can be made on the basis of the topic of Coase (positive externalities) or the Pigou tax (negative externalities). Maciejczak also highlights that it is related to the fact that both positive and negative externalities cause ineffectiveness of resource allocations in the sense of Pareto and they are used as the argument for intervention of the state as the cause of market mechanism failure (Fiedor, 2002; Maciejczak, 2009).

Nowadays environmental externalities that occur in the form of public goods offered by agriculture are covered in some sense by state intervention. It takes a form of various types of programmes, whose objective is to encourage farmers to undertake pro-ecological activities in their enterprises, which should lead to an increase of positive and eliminate negative externalities. These are the main activities resulting from the politics conducted within the framework of the Common Agricultural Policy. The basic type of activity within the second pillar of the CAP are the agri-environmental programmes.

AGRI-ENVIRONMENTAL PROGRAMME VERSUS EXTERNALITIES IN AGRICULTURE

The increase in intensification of agricultural production lies at the basis of environmental risk on rural areas, as it has been mentioned earlier. According to Niewęgłowska, increasing the area of cropland related to liquidation of grassland, as well as changing of natural and half-natural meadows and pastures to intensive ones, has an impact on reducing the number of places being a sanctuary for rare species of flora and fauna – which undoubtedly constitute common goods and they are positively received by the society (Niewęgłowska, 2005). However, there are activities within the framework of the Mutual Agricultural Policy, whose main task is to prevent negative impact of agriculture on natural environment. The Polish Agri-Environmental Programme is one of such activities. Gonda-Sorczyńska persuades about the necessity of implementing pro-environmental activities. According to her it is necessary to undertake activities aiming at effective elimination or weakening of unfavourable aspects of human activities in the environment. The Polish Agri-Environmental Programme has been indicated by her as an example of such activities (Gonda-Sorczyńska, 2007).

As Kucharska highlights, the main assumption for realization of the agri-environmental activity has been to limit intensification of agricultural production to the benefit of extensive management. The author claims that promotion of such changes was related to preservation of natural values of rural areas, reduction of negative impact of agriculture on environment and maximising its positive impact on biological diversity and landscape of rural areas (Kucharska, 2010). Jaskulski talks about supporting natural environment and the necessity of modifying management in the direction of sustainable management. According to him the agri-environmental programme has become the basic instrument to support agricultural production according to the requirements of environmental protection. Its objective is to stimulate sustainable development and to preserve biological diversity. He also claims that agri-environmental activities promote actions aiming at maintaining natural values of rural landscape, biological diversity of habitats and systems of environmentally-friendly agriculture (Jaskulski, 2009; Liro, 2003). Environmental values, whose preservation or improvement should be invoked by activities within the framework of the agri-environmental

programmes, often create elements of public goods such as natural flora and fauna of rural areas, landscape, and biodiversity.

Pawlewicz and Bórawski also describe definite objectives of the agri-environmental programme activity. According to them a considered form of national interventionism is focused on financial support for farmers, who by changing a manner of functioning of a farm, reduce negative impact on the natural environment of rural areas. The authors see a special role of AE packages in restoring values or maintaining a condition of valuable habitats used for agriculture and preserving biological diversity on rural areas, promoting sustainable management system, appropriate soil utilisation and water protection, protecting endangered local species of farm animals and local species of cultivated plants (Pawlewicz and Bórawski, 2013).

As Gotkiewicz, Mickiewicz, Koszykowska claim agricultural producers can invoke improvement of environmental quality and preservation of natural values of rural areas thanks to agri-environmental programmes. They also stress the fact that improvement of environmental values is a result of the obligation of farmers to apply agricultural practices, which are a bit more than ordinary good agricultural practices used on a farm. The authors also drew attention to an important issue from the point of view of public goods generated by agriculture. They claim that the programme concerns mutual and timeless values, enables environmental protection and therefore, it is worth participating in (Gotkiewicz et al., 2009).

The agri-environmental programme for 2007–2013 consisted of nine basic packages, divided into 49 different variants. The basic agri-environmental packages included (Report on realising..., 2014):

- sustainable agriculture (1 variant)
- organic farming (12 variants)
- extensive permanent grassland (1 variant)
- protection of endangered bird species and natural habitats outside Natura 2000 areas (10 variants)
- protection of endangered bird species and natural habitats in Natura 2000 areas (10 variants)
- preservation of endangered genetic plant resources in agriculture (4 variants)
- preservation of endangered genetic animal resources in agriculture (4 variants)
- water and soil protection (3 variants)
- buffer zones (4 variants).

Table 1 presents the level of realization of individual agri-environmental packages, including payments granted to farmers and the area covered by the programme activity.

It follows from the information contained in table 1 and in the report from the realization RDP 2007–2013 that the total amount of payments made within the framework of the agri-environmental programme, for obligations undertaken within the RDP 2004–2006 and RDP 2007–2013, until the end of 2014 amounted to about 8732.6 mln PLN, including about 6 097.00 mln PLN for RDP 2007–2013 and about 2 635.6 mln for RDP 2004–2006 (The report..., 2014). Payments made within the framework of described programme within the regional system were presented in the Figure 1. But we cannot directly indicate the implementation of each

of the packages resulted in a level of agri-environmental public goods due to lack of data.

We can state on the basis of Figure 1 that the greatest amount of financial funds related to realization of the AE packages for Zachodniopomorskie, Wielkopolskie and Warmińsko-Mazurskie or Lubelskie voivodeships (the total of 3668.09 mln PLN). The AE programmes were the most popular in Łódzkie, Opolskie, Śląskie, Małopolskie and Świętokrzyskie voivodeships (the total of 1037.32 mln PLN). We can see significant differences in the absorption of funds in regional terms. In an extreme case, ie. between the West Pomeranian voivodeship, where most payments were implemented (1,174.14 million PLN) and the Silesian where completed their minimum (118.45 million PLN), the difference amounted to more than a billion PLN. This was due to,

Table 1. Realization of agri-environmental (AE) packages within the framework of RDP 2007–2014

Tabela 1. Realizacja pakietów programu rolno-środowiskowego w środowisku RDP 2007–2014

AE package Pakiet programu rolno-środowiskowego	Level/characteristics of realizing the AE package Poziom/charakterystyka realizacji pakietu programu rolno-środowiskowego
1	2
Package 1. Sustainable farming Pakiet 1. Rolnictwo nie-naruszające równowagi ekologicznej	Agri-environmental payments made for the amount of about 1318.8 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 1 100 948.32 ha. Płatności rolno-środowiskowe o wartości 1318,8 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto obszar 1 100 948,32 ha.
Package 2. Organic farming Pakiet 2. Rolnictwo ekologiczne	Agri-environmental payments made for the amount of about 1664.3 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 681 160.74 ha, for 29 457 farms. Variant 2.1. Agricultural crops (for which the conversion period has been finished) have been the most popular within the package – about 40% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 1664,3 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 29 457 gospodarstw na obszarze 681 160,74 ha. Wariant 2.1. Uprawy rolnicze (dla których okres konwersji się zakończył) był najbardziej popularny w tym pakiecie i objął około 40% płatności w tym pakiecie.
Package 3. Extensive permanent grassland Pakiet 3. Rozległe obszary trawiaste	Agri-environmental payments made for the amount of about 552.7 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 279 104.08 ha of permanent grasslands. Płatności rolno-środowiskowe o wartości 552,7 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 279 104,08 ha trwałych użytków rolnych.
Package 4. Protection of endangered bird species and natural habitats outside Natura 2000 areas Pakiet 4. Ochrona zagrożonych gatunków ptaków i siedlisk naturalnych	Agri-environmental payments made for the amount of about 513.5 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 162 183.77 ha of permanent grasslands. Variant 4.1. Protection of birds' nesting places has been the most popular within the package – about 92% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 513,5 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 162 183,77 ha trwałych użytków rolnych. Wariant 4.1. Ochrona strefowa gniazd był najbardziej popularny w tym pakiecie i przypadło na niego około 92% kwot płatności dostępnych w tym pakiecie.

Table 1 cont. – Tabela 1 cd.

1	2
Package 5. Protection of endangered bird species and natural habitats in Natura 2000 areas Pakiet 5. Ochrona zagrożonych gatunków ptaków i siedlisk objętych programem Natura 2000	Agri-environmental payments made for the amount of about 731.3 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 189 631.65 ha of permanent grasslands. Variant 5.1. Protection of birds' nesting places has been the most popular within the package – about 92% of the amount of payments made within the package. With reference of realisation of “new challenges”, resulting from the art. 16a of the resolution of the Council (EC) 1698/2005, within the framework of the package 5 agri-environmental payments made for the amount of about 165.7 mln PLN, which constitutes about 23% of the amount of payments made within package 5. Within the framework of “new challenges” the aid was passed to the benefit of 9 380 farms and the support within the framework of the package was covered by the area of 142 613.03 ha. Płatności rolno-środowiskowe o wartości 731,3 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 189 631,65 ha trwałych użytków rolnych. Wariant 5.1. Ochrona strefowa gniazad był najbardziej popularny i przypadło na niego około 92% kwot płatności dostępnych w tym pakiecie. W związku z realizacją „nowych wyzwań”, określonych w art. 16a rezolucji Rady (KE) 1698/2005, kwota płatności rolno-środowiskowych w tym pakiecie wyniosła 165,7 mln zł, co stanowi 23% kwot płatności przekazanych w ramach pakietu 5. W związku z realizacją „nowych wyzwań” pomoc otrzymało 9380 gospodarstw, a wsparcie w ramach tego pakietu objęło obszar 142 613,03 ha.
Package 6. Preservation of endangered genetic plant resources in agriculture Pakiet 6. Zachowanie zasobów genetycznych zagrożonych gatunków roślin w rolnictwie	Agri-environmental payments made for the amount of about 87.7 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 55 932.99 ha. Variant 6.1. has been the most popular within the package. Commercial production of local species of cultivated plants – about 73% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 87,7 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 55 932,99 ha. Wariant 6.1 Produkcja na skalę przemysłową lokalnego gatunku rośliny uprawnej był najbardziej popularny i przypadło na niego około 73% kwot płatności dostępnych w tym pakiecie.
Package 7. Maintenance of genetic resources of endangered animal species in agriculture Pakiet 7. Zachowanie zasobów genetycznych zagrożonych gatunków zwierząt w rolnictwie	Agri-environmental payments made for the amount of about 142.9 mln PLN. The number of supported area, resulting from the decisions issued to grant agri-environmental payment, amounted to 3476 ha. The number of farm animals covered with support within the framework of the package 7 amounts to 63 579 stock units (on an annual average). Variant 7.3. Preserving local breeds of sheep has been the most popular within the package – about 42% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 142,9 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 3476 ha. Liczba zwierząt gospodarskich objętych wsparciem w ramach tego pakietu to 63 579 sztuk (średnia roczna). Wariant 7.3. Zachowanie lokalnych ras owiec był najbardziej popularny i przypadło na niego około 42% kwot płatności dostępnych w tym pakiecie.
Package 8. Water and soil protection Pakiet 8. Ochrona wód i gleb	Agri-environmental payments made for the amount of about 1084.0 mln PLN. Supported area, resulting from the decisions issued to grant agri-environmental payment amounted to 841 505.97 ha. Variant 8.3. has been the most popular within the package. Stubble intercrops – about 61% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 1084,0 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 841 505,97 ha. Wariant 8.3. Międzyplon ścierniskowy był najbardziej popularny i przypadło na niego około 61% kwot płatności dostępnych w tym pakiecie.
Package 9. Buffer zones Pakiet 9. Strefy buforowe	Agri-environmental payments made for the amount of about 1.7 mln PLN. The number of supported area, resulting from the decisions issued to grant agri-environmental payment, amounted to 174. The length of buffer zones amounted of 579 444 mb (linear meters) and therefore, the length ratio of buffer zones covered with support within the framework of the package 9 was realised in about 89%. Variant 9.2. Maintaining 5-meters of buffer zones has been the most popular within the package – about 53% of the amount of payments made within the package. Płatności rolno-środowiskowe o wartości 1,7 mln zł. Płatnościami rolno-środowiskowymi, jak wynika z wydanych decyzji, objęto 174 ha. Długość strefy buforowej określono na 579 444 mb (metry bieżące) a zatem stosunek długości stref buforowych objętych wsparciem w ramach pakietu 9 został zrealizowany w około 89%. Wariant 9.2. Utrzymanie pięciometrowych międz śródpolnych był najbardziej popularny i przypadło na niego około 53% kwot płatności dostępnych w tym pakiecie.

Source: own elaboration prepared on the basis of: The report..., 2014, p. 64–65.

Źródło: opracowanie własne na podstawie The report..., 2014, s. 64–65.

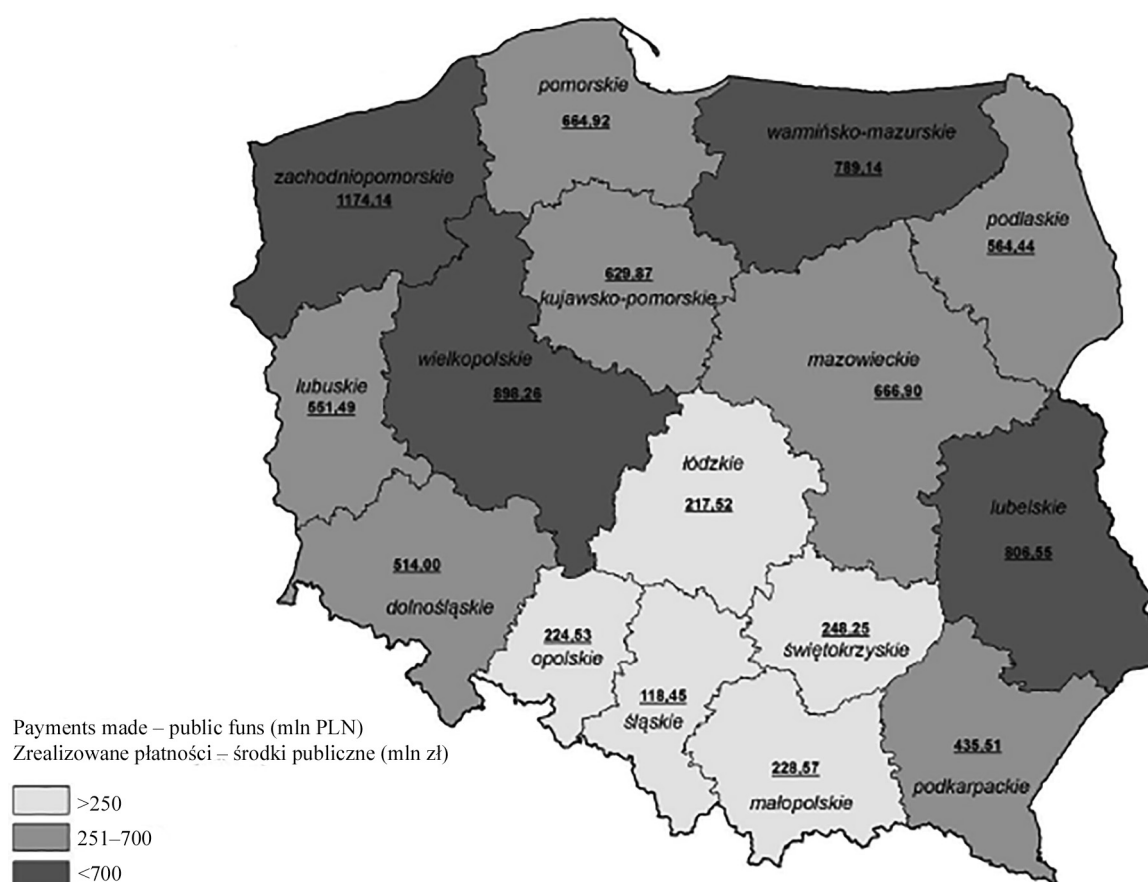


Fig. 1. Payments made within the agri-environmental package between 2004–2014 in the regional system

Source: The report..., 2014, p. 66.

Rys. 1. Płatności zrealizowane w ramach pakietu rolno-środowiskowego w latach 2004–2014 w systemie regionalnym

Źródło: The report..., 2014, s. 66.

among others, to a considerable difference in surface regions, different number of farms in the voivodeships, but it seems that the main reason was the activity of farmers in obtaining these funds. As Gotkiewicz, Mic-kiewicz, Koszykowska indicate, the agri-environmental programme initiates a new approach to the way of realizing nature protection in our country. According to them these activities not only enable the wildlife protection services, but also farmers to undertake tasks aiming at preservation of places with high natural values. These active forms of nature protection have a chance to penetrate the whole country, without limitation to protected areas - national parks or sanctuaries (Gotkiewicz et al., 2009).

CONCLUSION

Occurring of (positive and negative) externalities in agriculture still remains a very difficult topic. This difficulty means not only discovering externalities themselves, but also measuring their impact on the society. Searching for cause-and-effect relationships, as well as their impacts, in the situation when these element are included in accounts, is a difficult ask. The elements are difficult to measure and sometimes uncountable, which is a frequent phenomenon for calculations related to environmental elements.

However, it should be noted that agriculture is the “producer” of such effects thanks to its direct impact

on the natural environment. As regards positive effects, they are socially desirable and all activities related to them are positively received by the society. External costs, namely negative effects of impact on the society require, however, corrective actions, often in the form of interventionism of the state.

One of the elements levelling these negative environmental effects is the agri-environmental programme. In its assumptions, it is not a programme, whose aim is only to mitigate negative and strengthen positive externalities in agriculture, but it has an indirect influence on them. When farmers decide to realize this programme, they actually make a choice between reducing intensity of management in exchange for it, they receive adequate compensation or continue intensive production and have no reimbursement. When farmers join this programme (this is a voluntary programme), they declare to manage in the manner specified in the guidelines for implementing a specific AE package. These are actions aiming at improvement of natural environment, which has a direct impact on the level of public goods, on which agriculture has its influence.

Farmers who own land have a direct impact on the environment (eg soil, landscape, air, groundwater and surface), e.g. through fertilization, chemical protection of plants and other agricultural practices. Excessive intensification of these activities can lead to environmental degradation at various levels. Damage caused in this way also applies to a range of environmental public goods. In this issue many questions are raised. Should farmers who use in their operations (production), environmental resources (as a factor of production) be required to take care to preserve its quality, if they manage a private land? As considered in this context, property rights? If so, who and to what extent should be responsible for the environment? Is only the manufacturer who has to reconcile ecological and economic goals? Should society participate in the costs to maintain the desired quality of the environment and the farmers should be assisted in “providing” public goods?

The amounts dedicated to implement agri-environmental activities – about 8,700 mln PLN in the years 2004–2014 can constitute the evidence that protection of nature and also environmental public goods on the rural areas has been gaining greater and greater significance.

The agricultural sector is a very interesting area in the context of the discussed phenomena, ie. public goods, externalities, implemented CAP instruments.

Relationships that occur in the relationship farmer (farm) – Environment (level of environmental public goods consumed by the public) and located somewhere in the middle of state intervention, create a lot of topics for discussion. At this point, a highly interdisciplinary issue arises since what we are dealing with concerns both social, and environmental and economic areas.

REFERENCES

- Adamowicz, M. (2005). Zrównoważony i wielofunkcyjny rozwój rolnictwa a agronomia (Sustainable and multi-functional development of agriculture versus agronomy). *Ann. UMCS Sec. E, LX*, 71–91.
- Baum, R., Śleszyński, J. (2009). Nowe funkcje rolnictwa – dostarczanie dóbr publicznych. (New functions of agriculture – supply of public goods). *Rocz. Nauk. SERiA, XI*, 2.
- Blaug, M. (1996). *Economic theory in retrospect*. Cambridge: Cambridge University Press.
- Brelik, A. (2010). Wielofunkcyjny rozwój rolnictwa a dostarczanie dóbr publicznych. (Multi-functional development of agriculture versus supply of public goods). *Zesz. Nauk. Ostroł. Tow. Nauk.*, 24, 307–313.
- Daniłowska, A. (2014). Koncepcja dóbr publicznych a rolnictwo (Concept of public goods versus agriculture). *Pr. Nauk. UE Wroc. Agrobiz. 2014. Probl. Ekon. Społ.*, 360, 244–252.
- Fiedor, B. (Ed.) (2002). *Podstawy ekonomii środowiska i zasobów naturalnych*. Warszawa: C.H. Beck.
- Gołębiewska, B. (2011). Efekty zewnętrzne produkcji rolniczej i ich wpływ na dochody gospodarstw (Externalities of agricultural production and their impact on farm incomes). *Rocz. Nauk. SERiA, XIII*, 13, 4.
- Gonda-Soroczyńska, E. (2007). Planowanie przestrzenne jednym z najważniejszych instrumentów ochrony środowiska w Unii Europejskiej (Spatial planning as one of the most important instruments of environmental protection in the European Union). *Zesz. Nauk. AR Krak. Ser. Gozdz.*, 23, 273–282.
- Gotkiewicz, W., Mickiewicz, B., Koszykowska, J. (2009). Realizacja programu rolnośrodowiskowego w województwie podlaskim w latach 2004–2006 i 2007–2008 (Implementation of the agri-environmental programme in Podlaskie voivodeship between 2004–2006 and 2007–2008). *Ochr. Środ. Zas. Nat.*, 41, 544–554.
- Hagedorn, K. (2003). Rethinking the theory of agricultural change in an institution of sustainability perspective. In: *Importance of Policies and Institutions for Agriculture*. Laurent Martens. Academic Press Liber Amicorum.

- Jaskulski, D. (2009). Przyrodnicze i organizacyjno-ekonomiczne uwarunkowania realizacji programu rolnośrodowiskowego w Polsce (Natural and organisational-economic conditions to realise the agri-environmental programme in Poland). *Fragm. Agron.*, 26(4), 46–54.
- Kagan, A. (2011). Oddziaływanie rolnictwa na środowisko naturalne (Influence of agriculture on natural environment). *Zag. Ekon. Roln. Iss. Agric. Econ.*, 3, 328, 99–115.
- Kucharska, A. (2010). Przewodnik po programie rolnośrodowiskowym (The guide for agri-environmental programme). Warszawa: MRiRW.
- Liro, A. (2003). Program rolnośrodowiskowy jako instrument wielofunkcyjnego rozwoju wsi i ekologizacji polskiego rolnictwa (Agri-environmental programme as an instrument of multi-functional development of villages and greening of Polish agriculture). *Wiś Roln.*, 2, 96–116.
- Maciejczak, M. (2009). Rolnictwo i obszary wiejskie źródłem dóbr publicznych – przegląd literatury (Agriculture and rural areas as the source of public goods – review of literature). *Zesz. Nauk. SGGW Ekon. Org. Gosp. Żywn.*, 75, 121–134.
- Manteuffell-Szoegge, H. (2011). Optymalny poziom zanieczyszczenia środowiska w zależności od trwałości zanieczyszczenia (Optimum level of environmental pollution depending of durability of contamination). *Ekon. Środ.*, 1(39), 34–44.
- Marshall, A. (1820). *Principles of Economics*. London: Macmillan.
- Niewęgłowska, G. (2005) Zdolność rodzinnych gospodarstw rolnych do realizacji programu rolnośrodowiskowego. Warszawa: IERiGŻ.
- Pawlewicz, A, Bórawski, P. (2013). Realizacja programu rolnośrodowiskowego w Polsce. (Relisation of agri-environmental programme in Poland). *Rocz. Nauk. SERiA*, XV, 2, 271–276.
- Przezbórska-Skobieł, L. (2014). Obszary wiejskie i rolnictwo jako źródło dóbr publicznych w agroturystyce. (Rural areas and agriculture as a source of public goods in agrotourism), *Probl. Roln. Świat*, XIV (XXIX), 2, 194–202.
- Samuelson, P. A., Nordhaus, W. D. (1995). *Ekonomia 2*. Warszawa: Wyd. Nauk. PWN.
- The report on realising the Rural Development Program for the years 2007–2013 (2014). Report number 8/2014.

EFEKTY ZEWNĘTRZNE W ROLNICTWIE ORAZ SPOSOBY ICH REGULOWANIA

Streszczenie. W pracy przedstawiono problem występowania efektów zewnętrznych w rolnictwie, oraz ich wpływ na dostarczanie dóbr publicznych przez rolnictwo. Praca ma charakter teoretyczny, dlatego dla omówienia tematu posłużono się głównie studiami literatury polskiej i zagranicznej. Przedstawiono również działania mające na celu regulowanie poziomu efektów zewnętrznych (pozytywnych i negatywnych) pod kątem powstawania rolno-środowiskowych dóbr publicznych – program rolnośrodowiskowy w ramach PROW 2007–2013. Zaprezentowane poglądy posłużyły do postawienia pytań, które mogą być podstawą kolejnych rozważań w ramach bardziej dogłębnej analizy problemów o złożonym charakterze społeczno-środowiskowo-ekonomicznym.

Słowa kluczowe: efekty zewnętrzne, ochrona środowiska, dobra publiczne, program rolno-środowiskowy

Accepted for print – Zaakceptowano do druku: 11.04.2016