THE ACTIVITY OF LOCAL GOVERNMENTS IN THE ABSORPTION OF EU FUNDS AS A FACTOR IN THE DEVELOPMENT OF RURAL COMMUNES

Agnieszka Cyburt

Pope John Paul II State School of Higher Education in Biala Podlaska

Abstract. Development relates to such research areas as local development and activity of local governments in obtaining external sources of financing for development in rural communes. The article includes theoretical considerations and the results of empirical studies conducted in the general area of all rural communes of the province of Lublin (171 units). The choice of the region was intentional, as it was classified as problem areas where accumulation of development barriers is observed. The scope of research covered the years 2004–2010 including programming periods related to financial assistance as part of the EU Structural Funds in the periods 2004–2006 and 2007–2013.

Key words: local government, the absorption of EU funds, local development, rural communes, Lublin Voivodship

INTRODUCTION

The occurrence of the problem of inequality in both the global, regional as well as local systems becomes increasingly important to identify factors that determine the development. Poland joining the European Union in 2004 received the opportunity to transfer funds representing a substantial contribution to socio-economic development and the opportunity to increase investment opportunities [Sawicka 2009]. Sum of financial transfers from the EU to Polish on the support provided under the cohesion policy exceeded EUR 55 billion, of which the structural funds accounted for almost 70% of this amount. EU membership is a good chance inflow of structural funds to poorer regions through which it is possible to intensify the processes of many areas. Local governments were granted the chance to actively participate in the allocation of aid. In the programming period 2004–2006, the structure of the beneficiaries of the programs financed by the Structural Funds accounted for the largest percentage of local government units (48%) [Słomińska 2007]. The situation was similar in 2007–2013 (until the end of January 2012 governments accounted for 43.9% of the beneficiaries) [Experts debate 2012].

Corresponding author – Adres do korespondencji: Agnieszka Cyburt, Pope John Paul II State School of Higher Education in Biala Podlaska, Sidorska 95/97, 21-500 Biała Podlaska, Poland, e-mail:a.cyburt@wp.pl

METHODOLOGY AND RESULTS OF A RESEARCH

Objectives of a research

The main purpose of this study was to determine the level of activity and rural municipalities in the province of Lublin absorption of EU funds and to determine its relation with the level of local development. For the key objective achievement four specific objectives were adopted. Firstly the focus of understanding and defining the level of socioeconomic development of rural Lublin Voivodship is presented. Secondly diagnosis of maturity of the basic units of local government to absorb EU aid was done. Thirdly, the focus was on understanding and determining the level of activity of local governments in the acquisition and use of aid funds. Finally, efforts were made to identify factors differentiating self-governments in the absorption of aid funds. The aim was to develop synthetic methodology of measurement used to measure the level of local development and measurement of activity in absorbing EU funds by local government units.

The research process was adopted to verify the main hypothesis: there is a both sides relationship between the activity of rural communes in the absorption of EU funds, and the level of their development. The higher absorption activity is manifested by communes, the higher the level of their development is, and the higher the level of this development is, they are more active in the absorption of EU funds.

There was also provided the following specific hypotheses:

- Location of the communes with respect to the main urban center in the subregion is a factor differentiating activity of absorption and level of development of rural communities
- 2. Activity in the absorption of EU funds is determined by institutional [Gralak 2008] and organizational factors.
- 3. Having strong leadership with clear vision of the direction of development increases the level of activity in the absorption of EU funds.

Material and methods

The study used primary and secondary sources of research material. For primary sources, results of research conducted among two groups of multipliers were included. These two groups are: mayors of rural municipalities and employees involved in the handling of investments co-financed from European funds. Secondary sources of research material include: literature in the field: economics, finance, management, statistical material developed and published in the database CSO Regional Data Bank (RDB CSO) for the 2004–2010 period, and reports on the implementation of the budgets of local governments of Lublin Voivodship for the years 2004 to 2010 published by the Regional Audit Office (RIO) in Lublin, as well as data Marshal's Office in Lublin (as at 31 December 2010), which analyzed implementing institution support programs.

Among the methods of collecting the material following issues were used: Polish and foreign literature, information and data from studies published in the database BDR CSO RIO in Lublin, the Marshal's Office in Lublin and the method of diagnostic survey using the survey technique. Among the methods of analysis of the research material following methods were used: methods of qualitative analysis (questionnaire) and quantitative,

which included statistical analysis, i.e. Hellwig's taxonomic method – basis used in the assessment of the level of development of municipalities and the activity level of absorption, cluster analysis – basis used in the making of two-stage grouping the communes with regard to diagnostic variables used to assess the level of local development and activity level of absorption and gauge the relationships between variables (Pearson's correlation coefficient r). All analyzes were performed within the framework of the doctoral thesis. Calculated absorption synthetic indicators of activity and level of development of municipalities and compiled them together in search of the relationship. The results helped establish the existence of a moderate positive relationship between these measures.

In reality it can be noted that the community in different degrees cope with the emerging new challenges. On the map of Poland the communes as growth centers, or commune of success, as well as the peripheral regions, which are much less developed easily can be found [Wróblewska 2010]. Lublin region is classified for these areas because of the level of development of this area and such difficulties as economic, social and spatial: lowest GDP per capita among voivodships of Eastern Poland, i.e. 67.1% of the total for Poland and only 40.9% of this value for the EU. Recalled data show that the studied area are divided by a large development distance in relation to other regions of our country. This region is characterized by economic backwardness, unfavorable structure of the economy, deficiencies in infrastructure and lower than the national average macroeconomic indicators [Leszczewska 2010]. A particularly difficult situation applies to rural areas, the development of which depends on many factors, among others: location factors, socio-economic, technical and organizational [Bański, Czapiewski 2008].

Activity in the absorption of EU funds refers to funds for investment and a completely new factor in the competitiveness of regions. These investments can significantly affect the level of environmental infrastructural and institutional companies quality of life, but will also condition the level of economic development of the areas in the future [Barczyk 2010]. Where governments fight for funding its development, in the future there may occur multiplier effect of investment: an increase in expenditures on individual elements of the system of local ties (people – institutions – infrastructure) will result as an an increase in the effects of rapid economic development of the whole region [Chmieliński 2008].

Diagnostic variables used in the synthetic measure of local development

The construction of synthetic measure of local development [Wojewódzka 2007] was carried out using 25 variables divided into 5 groups, i.e. the potential of economic, labor market and human capital, quality of life, infrastructure management, education, and education (Table 1).

Components of the synthetic measure of the activity of absorption

In the case of the construction of the absorption of synthetic activity measurement there was used a comprehensive approach taking into account the absorption activity of three dimensions (Fig. 1).

The above dimensions of activity are included in the set of determinants [Wojtach 2012] chosen for the design of diagnostic synthetic measure of absorption activity (Table 2).

Table 1. Diagnostic variables used to assess the level of local development

	1					
Symbol	Variables					
	Economic potential					
y1	total revenue per 1 inhabitant (PLN)					
y2	share of own revenues in total income (%)					
y3	value of community investment expenditures per 1 inhabitant (PLN)					
y4	share of capital expenditure in total expenditure (%)					
y5	share of income for the tasks financed by foreign funds in total income (%)					
y6	share of spending on investment projects co-financed by foreign investment expenditure (%)					
y7	ratio of public debt to total income (%)					
	Labour market and human capital					
y8	employment rate (%)					
y9	share of the unemployed registered in the population of working age (%)					
y10	number of units registered in the company registration number, per 1000 inhabitants. age (entities)					
y18	expenditure on public administration in 1000 inhabitants (thousand PLN)					
	Quality of resident's life					
y11	number of people using the gas network in population (thousand persons)					
y15	share of homes equipped with sanitary installations – bathroom in the total number of homes (%)					
y16	average usable floor space for one person in m ²					
y20	expenditure on health care per 1000 inhabitants (thousand PLN)					
y21	expenditure for physical culture and sport per 1000 inhabitants (thousand PLN)					
y22	expenditure housing per 1000 inhabitants (thousand PLN)					
y24	expenditure for libraries, cultural centers, community centers and clubs for 1000 inhabitants (thousand PLN)					
y25	number of buildings newly completed to use (pcs.)					
	Infrastructure development					
y12	active length of the sewerage network (km)					
y13	population using sewage system per 1000 population (person)					
y14	number of people using the water mains per 1000 population (person)					
y23	expenditure for municipal public roads per 1000 inhabitants (thousand PLN)					
	Education					
y17	percentage of people with higher education among councilors (%)					
y19	expenditure on education per 1000 inhabitants (thousand PLN)					
ource:	Own study					

Source: Own study.

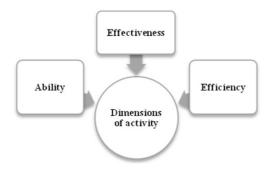


Fig. 1. Dimensions of the absorption activity

Source: Own study.

Table 2. Diagnostic variables included in the construction of the synthetic activity of the absorption measure

Symbol	Variables						
	Capacity absorbed funds						
x1	amount of debt per 1 inhabitant (PLN)						
x2	share of expenditure on salaries in public administration in the total amount of expenditure (%)						
x3	number of applications (pcs.)						
x4	number of activities under the various programs in which the municipality dished out by means of (pcs.)						
x7	share of projects that received a positive formal evaluation in all complex applications (%)						
Efficiency absorbed funds							
x6	share of the number of contracts signed in the number of all applications – the success rate (%)						
x5	average percentage of points obtained in the technical assessment with respect to the maximum possible score $(\%)$						
x9	part of the amount of co-financing in all community investment expenditure (%)						
	Efficiency of absorbed funds						
x8	grant amount per 1 inhabitant (PLN)						
x10	part of the amount of co-financing in the general level of salaries in the public administration (%)						

Source: Own study.

Substantive considerations, and above all limitation of the catalog of potential beneficiaries determined the choice of actions in the operational programs enabling to support the development of local importance, and therefore targeted at rural communities. The choice of the programs has decided about support programs with the highest percentage of rural communities among the beneficiaries. The proposals submitted in the operational programs from the perspective of 2004–2006 and 2007–2013 (Fig. 2) were analyzed.



Fig. 2. Selected for the analysis of the absorption activity of operational programs from programming periods 2004–2006 and 2007–2013

Source: Own study.

Comprehensive approach based on the three dimensions of activity included the absorption path analysis of each of the 2,321 projects for which the path from the moment of receipt of the application by an assessment of the formal as well as substantive, and ultimately decision to award the grant was traced. Analysis of a total of 56 competition procedures within the analyzed four support programs was done.

The basis of the synthetic indicator was used to organize local development and the creation of linear ranking rural districts of the Lublin voivodship because of the level of local development in 2004, 2008 and 2010. The obtained values of taxonomic indicate significant differences in rural districts of Lublin voivodship in terms of their level of development. In the years 2004, 2008 and 2010, the highest values obtained the Puchaczów commune – value ratio respectively 0.3578, 0.3598, 0.3183 (subregion of Lublin). The lowest value in 2004 and 2008 reached the Chrzanów commune – value ratio respectively 0.0149, 0.0094 (Puławski subregion). In 2010 the last position was the Miączyn commune with the value of index equal to 0.0091 (Chełmsko-Zamojski subregion).

There have also been made grouping of rural communes in the province of Lublin four homogeneous groups of objects including the values of the synthetic indicator of growth coming in at certain intervals taking into account the standard deviation of the meter around its average value. In 2004 to the group of the communes with a very good level of development 22 communes were bracketed, of which the top 10 were 4 communes from Bialski subregion, 3 communes from Chełmsko-Zamojski subregion, 2 communes from Puławski subregion and only 1 from subregion of Lublin. In the group of the communes with a good level of development there were 58 units, while the sufficient level of development reached 70 communes that represent 40.9% of the total. An insufficient level of development showed 21 the communes, of which from the last 10 communes, 6 of them were from Chełmsko-Zamojski subregion, 3 from Puławy subregion and 1 from Lublin subregion.

In 2010 the number of communes with a very good level of development increased by 5 units and was 25 communes. In the 10 highest values of aggregate measure of development there were 5 subregion communes of Lublin, 3 communes from Bialski subregion and 2 communes from Puławy subregion. Number of communes with a good level of development was 51 units, which increased by 5 units compared to 2008. The largest group

consisted of communes with a sufficient level of development acting 45% of the total. Between 2008 and 2010 the number of the communes with a sufficient level of development was reduced 10 times. Number of communes in the group of under-development levels did not change between 2008 and 2010, and amounted to 18 units.

Taking into account the level of development, changes in the size of individual groups of level of development are observed. Group of the communes with a very good level of development between 2004 and 2010 increased by 3 communes, the number of communes with lower growth decreased by 3 units. It is worth emphasizing the fact that between 2004 and 2010 showed an increase in the communes of good and very good and the decrease in the number the communes with sufficient and insufficient level of development.

In the class of the lower activity in 2008 there were 28 communes, while in 2010 it was 19 communes. Sufficient level of activity reached 65 communes in 2008 and 71 in 2010. Communes with a good level of absorption activity in 2008 was 55 units and 58 in 2010. Number of communes with a very good level of activity in 2008 and 2010 was 23 units. Due to the decreasing number of the communes with lower activity must be concluded that the situation of the communes in this area is still improving.

In own studies the factors determining the level of activity of the absorption of rural communes were analyzed. The results made it possible to extract a few key factors of a group of organizational, financial and institutional (Table 3).

Table 3. Selected factors differentiating the level of activity of the absorption of rural communes of Lublin Voivodship

Specification	The activity level of absorption Share of responses in the group (%)			
	very good	good	sufficient	insufficient
Long-term strategic planning: the period provided for in the current Communes Development Strategy: 6 or more years	92.3	90.6	75.0	37.5
Percentage of employees participating in training in the field of acquisition and use of funds: over 6 training	84.6	78.1	53.6	50.0
Continuity of power: more than 5 term of office of the mayor	38.5	12.5	25.0	25.0
Number of employees involved in service projects co-financed from EU funds: more than 6 employees	15.4	0	0	0
Assessment of the financial resources of commune: sufficient for the implementation of planned activities	15.4	0	3.6	0
The most important factors for the implementation of projects co-financed by EU funds: the competence and				
knowledge of employees	13.6	38.3	33.3	9.9
Education mayor: economic direction	7.7	3.1	7.1	0
Percentage of employees involved in the handling of EU projects with university code: 3–4 employees	7.7	0	3.6	0
Cooperation with the implementing institution (Marshal Office): bad rating	7.7	0	0	0

Source: Own calculation based on data from communes administration.

Carried analyzes allow to conclude that municipalities, which could in the long-term plan for self-development proved to be the most active in the absorption of EU funds. An important factor determining the activity level of absorption was the level of human capital. Communes that have achieved the highest scores in terms of: the number of employees serving EU projects, the number of training received by them in this regard were characterized by the highest level of absorption activity. In this group also reported the highest proportion of staff with professional education related to the management of EU funds. Also factors related to the characteristics of the local leader proved to be important. It was noted that the ability to obtain the support and trust of residents have their expression in the exercise of the office of mayor for many terms most often concerned the communes with the highest level of absorption activity. Communes with the lowest activity level of absorption were mostly managed by mayors exercising his office for the first time. Deserves to be highlighted is the fact that among the mayors of rural municipalities, with the highest percentage of economic education, concerned individuals with the highest level of absorption activity. This allows you to conclude that the direction of education determined mayor absorption activity. Economic education is closely connected with the possession of knowledge, including the management unit and management of its finances. As part of the institutional factors, assessment of the quality of cooperation with the institution implementing the EU support programs was analyzed. It was found that the most active in the absorption of EU funds communes with the most contact with the said institution, evaluate cooperation the worst. The list of factors to apply for EU support is presented in Figure 3.

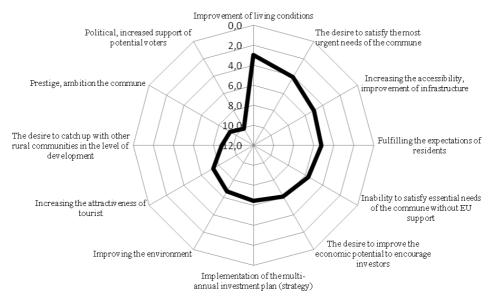


Fig. 3. Factors influencing the choice of applying for aid in the evaluation of governors surveyed municipalities (factors listed from quintessential – 1 to the least important – 12)
Source: Own study.

In conclusion it should be noted that the governors of the communes as the most important factor in deciding to apply for aid acknowledged the improvement of living conditions, which is the main objective of local development.

The main areas of use of EU support for rural communities implementing projects in 2004–2006 and 2007–2013

In the next stage of the analyzed areas of use of EU funds for investments in support offered in the programming periods 2004–2006 and 2007–2013 (Fig. 4).

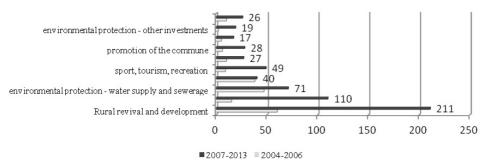


Fig. 4. Number of projects implemented by municipalities rural areas of Lublin Voivodship by utilizing the support of perspectives 2004–2006 and 2007–2013

Source: Own study.

In the group of municipalities with the highest activity absorption included such units, which implemented more than 10 projects in the field of human resources (7.7% of the group). These results confirm that the municipalities with the highest level of activity absorption observe the role of the human factor and the need for investments related to it. Municipalities with a good level of activity of absorption more than 10 projects were carried out in the area of sport, tourism and recreation (7.7% of the group) and village renewal and development (6.3% of the group). In groups of municipalities with sufficient and insufficient activity level of absorption was not on any that would achieve more than 10 projects in the analyzed areas. In both programming periods the commune most often implemented projects in the area of health and rural development, environmental protection (water and sewer) and road infrastructure. Investments in these fields helped in narrowing the gaps in terms of basic infrastructure. In the 2007–2013 perspective is shown a significant increase in investment in human resources, sports, tourism and recreation, information society and promotion of the municipality. The obtained data testify to the fact that rural communities in the first place pursue investments in technical infrastructure, and in the next programming period often reached after measures to support the development of social infrastructure.

CONCLUSIONS

The methods used for classification of municipalities and measuring the relationship between the level of activity and the level of absorption of local development made it possible to combine these two very important categories, as well as to answer the question

whether there is a relationship between them. It is worth emphasizing that the obtained data related to half of the programming period 2007–2013. It must therefore be concluded that the experience of municipalities in terms of absorption of structural funds translate into their greater activity, and hence the observed moderate correlation of two indicators will increase in the coming years.

The research and analysis showed that rural municipalities of the province of Lublin are diverse in terms of absorption activity and level of development. Analysis of activity of the absorption in the two programming periods 2004–2006 and 2007–2013 showed that on the map of the region can be found both municipalities success (which in both periods, reached the highest level of activity absorption, e.g. Firle, Głusk, Ostrówek, Terespol, Ułęż and Zalesie) and municipalities passive (Alexandroff, Rams, Chrzanów, Radecznica, Stanin, Rudnik). Increasing number of municipalities moving from lower to higher classes of the activity level of absorption was accompanied by increase in the number of municipalities achieving a higher level of development. Summary of studies of two financial perspective shows that the situation in the area of active participation in EU structural policy is greatly improved, which clearly indicates an increase in the experience, competence and skills of the staff involved in the handling of EU projects.

All the accepted hypothesis were verified positively. The main hypothesis was confirmed which assumes the existence of bilateral relations between the activity of rural municipalities in the absorption of EU funds, and the level of their socio-economic development. Partly confirmed is also a hypothesis that the position of municipalities with respect to the main urban center in the subregion is a factor differentiating activity of absorption and level of development of rural communities (in 2010 the occurrence of negative dependence was recorded which suggests that the farther from the urban center of the municipality is situated, the lower the level of its development). The hypothesis regarding institutional factors and organizational were confirmed, which define the activity in absorbing EU funds. In addition, positively were verified the hypothesis stating that having strong leadership with clear vision of the direction of development increases the level of activity in the absorption of EU funds.

In conclusion it is worth noting that in the third Cohesion Report of 2004 regional policy was indicated as one of the three main pillars of the European Union. Also it was noted that its evolution will strive to create a dynamic-oriented instruments for precise and purposeful intervention especially in regions where there is still untapped capital accumulation and development barriers, including undoubtedly the Lublin Voivodship.

REFERENCES

Bański J., Czapiewski K. 2008. Identyfikacja i ocena czynników sukcesu społeczno-gospodarczego na obszarach wiejskich, Ekspertyza [Identification and evaluation of the success factors of socio-economic development in rural areas, Expertise]. Zespół Badań Obszarów Wiejskich, IGiPZ PAN, Warszawa, 84.

Barczyk S. 2010. Przedsiębiorczy samorząd lokalny i jego instytucje [Entrepreneurial local government and its institutions]. Wydawnictwo AE, Katowice, 174.

- Chmieliński P. 2008. Polityka spójności, wspólna polityka rolna a rozwój obszarów wiejskich. Razem czy osobno? W: Polityka spójności ocena i wyzwania. Materiały z konferencji [Cohesion policy, the common agricultural policy and rural areas development. Together or separately? In: Cohesion Policy evaluation and challenges. Materials from the conference]. Wydawnitwo. MRR, Warszawa, 116.
- Debata ekspertów [Experts debate] 2012. Fundusze europejskie realistyczne spojrzenie na przyszłość! W: Samorządność i Suwerenność [European Union Funds a realistic view of the future! In: Self-governance and Sovereignty]. Biuletyn Fundacji Akademii Samorzadności 2, 7.
- Gralak K. 2008. Wykorzystanie instrumentów zarządzania publicznego w doskonaleniu potencjału instytucjonalnego administracji samorządowej w Polsce [The use of public management instruments to improve the institutional capacity of local government in Poland]. Acta Scientiarum Polonorum, Oeconomia 4, 53–64.
- Kulesza M. 2000. Transformacja ustroju administracyjnego Polski (1990–2000). Prawo jako instrument przemian ustrojowych w Polsce 1989–1999 [Transformation of Polish administrative system (1990–2000). Law as an instrument of political transformation in Poland, 1989–1999]. Studia IURIDICA 38, 81–83.
- Leszczewska K. 2010. Aktywność ekonomiczna regionów peryferyjnych. Nierówności społeczne a wzrost gospodarczy. Spójność społeczno-ekonomiczna a modernizacja gospodarki [Economic activity of the peripheral regions. Social inequality and economic growth. Consistency and socio-economic modernization of the economy]. Zeszyty Uniwersytetu Rzeszowskiego 17, 215–216.
- Potoczek A., Pyrzyk I. 2011. Administracja i zarządzanie. Perspektywa społeczna i organizacyjna [Administration and management. Social and Organizational Perspective]. Wydawnictwo WSHE we Włocławku, Włocławek, 82.
- Nowe partnerstwo dla spójności konwergencja, konkurencyjność, współpraca. III Raport na temat spójności społecznej i gospodarczej z dnia 18 lutego 2004 r. [A new partnership for cohesion convergence, competitiveness and cooperation. Third report on economic and social cohesion]. Retrieved from http://www.mir.gov.pl (Accessed 05.09.2013).
- Sawicka J. 2009. Rozwój obszarów wiejskich w świetle reform wspólnej polityki rolnej i polityki spójności Unii Europejskiej [Rural development in the light of the reform of the common agricultural policy and cohesion policy of the European Union]. Acta Scientiarum Polonorum, Oeconomia 8 (2), 140.
- Słomińska B. 2007. Przedsiębiorczość na poziomie gmin jako przejaw realizacji europejskiej polityki spójności. W: Zachowania rynkowe w teorii i praktyce [Entrepreneurship at communal level as a sign of the implementation of European cohesion policy. In: Market behavior in theory and practice]. D. Kopycińska (Ed.). Wydawnictwo Uniwersytetu Szczecińskiego, Szczecin, 115–125.
- Wróblewska E. 2010. Działalność inwestycyjna małych gmin Polski Wschodniej na przykładzie gminy Ryki [The investment activities of small communes of Eastern Polish on the example of Ryki]. Acta Scientiarum Polonorum, Oeconomia 9 (1), 123–130.
- Wojtach A. 2012. Uwarunkowania zdolności absorpcyjnej funduszy unijnych w administracji publicznej [Determinants of the absorption capacity of EU funds in the public administration]. Zarządzanie i Finanse 3, 432–445.
- Wojewódzka A. 2007. Klasyfikacja gmin miejsko wiejskich województwa mazowieckiego według poziomu rozwoju. W: Gospodarka lokalna i regionalna w teorii i praktyce [Classification of urban rural Mazovia province by level of development. In: Local and regional economy in theory and practice]. D. Strahl (Ed.). Prace Naukowe AE 1161.

AKTYWNOŚĆ SAMORZĄDÓW LOKALNYCH W ABSORPCJI ŚRODKÓW UNIJNYCH JAKO CZYNNIK ROZWOJU GMIN WIEJSKICH

Streszczenie. Opracowanie dotyczy takich obszarów badawczych jak rozwój lokalny oraz aktywność samorządów w pozyskiwaniu zewnętrznych źródeł finansowania rozwoju gmin wiejskich. W artykule zawarto rozważania teoretyczne oraz przedstawiono wyniki badań empirycznych przeprowadzonych na obszarze ogółu gmin wiejskich z województwa lubelskiego (171 jednostek). Wybór województwa był celowy, jako że jest ono zaliczane do obszarów problemowych, gdzie obserwuje się kumulację barier rozwojowych. Zakres badań obejmował lata 2004–2010 i dotyczył okresów programowania finansowej pomocy w ramach Funduszy Strukturalnych Unii Europejskiej w latach 2004–2006 i 2007–2013.

Słowa kluczowe: samorząd lokalny, absorpcja funduszy unijnych, rozwój regionalny, gminy wiejskie, województwo lubelskie

Accepted for print – Zaakceptowano do druku: 28.11.2014

Acta Sci. Pol.