SOCIO-ECONOMIC AND ENVIRONMENTAL DETERMINANTS OF SUISTAINABLE DEVELOPMENT OF RURAL COMMUNES IN MAŁOPOLSKA PROVINCE

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Abstract. Disproportions of economic, social and environmental in the development of rural areas occur at every level of an administrative division of a country. These disproportions are applicable to the actions which are and should be taken not only to better the economic situation of rural areas, but to increase the standard of living for the villagers as well. The aim of this article is both to identify and to evaluate the influence of factors which characterize the level of socio-economic development of environmental sustainability of rural communes in Małopolska Province. Analyses are based on multiple regression model which represents the approach used by Classical Statistics Analysis (enables the observation of the correlation between multi dimensional structures). Research embraces 125 rural communes, with the exception of urban and urban-rural communes, in Małopolska Province. The conducted researches demonstrate that factors of economic nature, particularly the size of own incomes of a commune and means of EU project financing, exert the most powerful influence on the level of environmental sustainability of the researched rural communes.

Key words: sustainable development, zero unitarization method, multiple regression, own incomes, rural communes, Małopolska Province

INTRODUCTION

In today's publishing world, the necessity to maintain sustainable development is highlighted. The concept of sustainable development is understood as social, economic and environmental capacity of a country to meet material and non-material needs of both current and future generations [Brelik 2012]. It is not without reason that the main

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goal of a particular country is to secure a high standard of living for the community as a whole. This goal is said to be accomplished when the use of natural resources is rational [Dobrzański 2010]. In order to preserve the stability of environment-economy-society macro-system, environmental factors, which have a profound influence on this particular macro-system, should come under close scrutiny [Michałowski 2011]. It should be noted that the area of interest of economy-society-environment-oriented economists has switched from the concept of economic growth to the paradigm of sustainable development which opens up new possibilities for various observations and analyses.

First and foremost, multifarious economic, social and environmental disproportions in the degree of development of rural areas occur at every level of an administrative division of a country [Siekierski and Popławski 2008]. These disproportions are applicable to the actions which are and should be taken not only to better the economic situation of rural areas, but to increase the standard of living for the villagers as well. It is important to mention that the main differences in the degree of development of rural areas, which have arisen from the past economic development, are to be seen at the level of rural communes [Paluch and Sroka 2012].

On the one hand, sustainable development of, and the rate of change of a commune is determined by miscellaneous exogenous and endogenous determinants, which are the source of information about functionality of this particular commune. But on the other hand, the given process is also a result of a number of factors influencing the change in system of values and in an environmental model of consumption. This change is accomplished when the pressure accompanied by economic development never surpasses the ability of this development to self-regenerate [Lewandowski 2007]. Taking into account the situation described above, it seems that the best option is to examine the relation between economy and environment. The main goals of human activity, namely the maximum rise in profits and material production, have been prevalent in literature ever since. The mention of these two goals dates back to the first works of the classical school of economics. Classical economists equated the increase in material prosperity with the improvement of quality of life. This axiom applied to both a planned and market economy. Hence, during the past decades, social policy has been preoccupied mainly with the promotion of benefits which resulted from intensive economic growth [Daly 1996, p. 2]. Not only have these practices threatened environmental and social values, but also natural limits to economic development have emerged. It should be highlighted that economy is responsible for changes in natural environment as well as for an exploitation of natural resources.

Despite there is a strong tendency to level a number of changes against neoclassical economics, such as social inequalities and degradation of environment, its achievements should not be discredited. However, the neoclassical school of economic thought have not contributed to the betterment of environmental policy. These deliberations lead to a question whether there are any tangible interactions between the realization of economic and environmental goals. In today's world, it is assumed that highly developed countries and regions are characterized by their effective realization of environmental policy. The research conducted by Bołtromiuk [2011] indicates that highly developed communes in Poland are more likely to achieve environmental sustainability. Paluch [2012], similarly to Bałtromiuk, notices the correlation between the degree of socio-economic develop-

ment of rural communes and environmental sustainability in Małopolska Province It is believed that the dimension of economic development is linked not only with continuity and sustainability, but also with the rate of social and environmental change [Kokoszka 2011].

In most researches, concerned with the conditions of sustainable development of rural areas, emphasis is put on a local policy. Hence, the local authorities and institutions are faced with multifarious, yet tough decisions. Various objectives, which are aimed to fulfill goals and principles of local government units, are achieved by these units and are said to constitute the basic tool used in the process of economic planning and in the implementation of sustainable development. Thus, the rational development policy is concomitant with the application of specific economic as well as non-economic instruments. These processes can both stimulate and hamper development which in turn is dependent on the condition and level of diversification of resources and on the degree of attractiveness and competitiveness of socio-economic space, including environmental conditions of a particular commune.

MATERIALS AND METHODS

The main aim of this research is to identify and evaluate the factors of environmental sustainable development of rural communes in Małopolska Province. Scientific measures are taken to provide a definite answer to the pivotal question of what kind of socio-economic characteristics, including tools of budgetary policy, contribute to the increase in the level of environmental sustainability in local government units. Thus, the obtained results may have a profound impact on future decisions that are to be made by other local governments. These results may give a hint on how to effectively take advantage of the existing conditions and achieve the high level of environmental development.

This research is based mainly on the data taken from Local Data Bank of Central Statistical Office, Institute of Soil Science and Plant Cultivation in Puławy, Regional Directorate for Environmental Protection in Kraków and the so-called SAS (a system aimed at monitoring local public services). This study is narrow in scope and covers six years from 2004 to 2010.

This scrutiny embraces 125 rural communes, with the exception of urban and urban--rural communes, in Małopolska Province. Urban-rural communes are excluded because of the lack of statistical data concerning the division into urban and rural areas. This investigation is also supplemented by Classical Statistics Analysis aimed at an observation of the correlation between multidimensional structures. Due to their multidimensionality, evaluation and measurement of sustainable development should be constructed around the description of numbers as well as the assessment of mutual disproportions, which exist in either a spatial or temporal dimension. The collection of chosen indexes is a statistical reflection of the descriptive definition of sustainable development [Paluch and Płonka 2011, p. 70].

In the first part of this research, the degree of environmental sustainability of given communes is estimated by the use of multidimensional zero unitarization method. Every rural commune out of 125 is evaluated on the basis of an established unit of diagnostic

variables. The established unit of diagnostic variables is used to give an exhaustive out-line of the described phenomenon. Initial studies are based largely upon a wide array of variables describing the degree of environmental sustainability of rural communes. In order to reduce the number of variables, formal criteria are taken into account. Hence, the formal criteria imply that diagnostic variables should barely correlate with each other so as not to duplicate the information they carry[1]. The values of calculated Pearson prod-uct-moment correlation coefficients are used to determine the degree of correlation be-tween variables. Additionally, it is accepted that these variables should be characterized by a high degree of variability which is expressed by the coefficient of variation and the relative communicative value. It is generally claimed that the value of coefficient of vari-ation, which is calculated for particular variables, should be more than 10% [Sobczyk 1983, Kukuła 2000, Bąk and Sompolska-Rzechuła 2006, Młodak 2006, p. 27]. The level of environmental sustainability is characterized by the use of such diagnostic variables as:

$x_{1(s)}$ – the average value of expenditure on municipal engineering and protection of en-vironment per capita (zł),

$x_{2(s)}$ – the length of water supply network in km per km^2 of an area,

$x_{3(s)}$ – the length of sanitary sewer network in km per km^2 of an area,

$x_{4(s)}$ – the share of legally protected areas in the whole area (%),

$x_{5(s)}$ – the size of collected municipal solid waste per capita (kg),

$x_{6(s)}$ – the population serviced by Industrial Water Treatment in the overall percentage of population (%),

$x_{7(s)}$ – the index of agricultural quality of production areas (points),

$x_{8(s)}$ – the share of forests and forest lands in the overall areas (%),

$x_{9(s)}$ – the share of organic farms in the overall number of agricultural holdings (%).

The normalization (comparability) of diagnostics variables is achieved by the use of following normalization formulas [Kukuła 2000]:

– for the so-called stymulanta (larger the better): $z_{ij} = \dfrac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}}$,

– for the so-called destymulanta (smaller the better): $z_{ij} = \dfrac{\max x_{ij} - x_{ij}}{\max x_{ij} - \min x_{ij}}$.

Analysing the given transformation all standardized variables *(z$_{ij}$)* fall in (0,1) range, it should also be noted that the least favourable condition of every variable results in value 0, whereas the most favourable condition results in value 1. On the basis of the achieved values of standardized variables, calculations have been made to establish a composite indicator ($\bar{z}_j$) for every subject (rural commune):

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[1] However, it is hard to decide upon the level of correlation between variables, it can be done when one divides variables into "high" and "low" category [Kukuła 2000].

$$\bar{z}_j = \frac{\sum\limits_{i=1}^{n} z_{ij}}{n} \quad (i = 1, 2, \ldots, r),$$

where: $\bar{z}_j$ – the average value j of this standardized variable,
   z_{ij} – the value i of this subject (rural commune) for j of this standardized varia-
   ble,
   n – the number of researched subjects (rural communes).

   In the second part of this research importance is attached to an evaluation of the im-
pact of socio-economic characteristic on the level of environmental sustainability of rural
communes. In cause and effect researches, one of the frequently used types of statisti-
cal modeling is the analysis of regression. For the purpose of this analysis, a composite
indicator of environmental sustainability should be treated as a dependent variable (Y_i).
An analysis of regression is based not only on the estimation of parameters of theoretical
equation, which can thoroughly reproduce the existing correlation, but also on the graph
of a function, which will optimally move into the direction of every point on a certain
scale. Not only is the analysis of regression essential to evaluate strength and form of
a relation between the agreed diagnostic characteristics, but it also enables to predicate
the dependent variable, whose base is combined with the observed values of correlation
coefficients and exogenous variables [Stanisz 2007, pp. 59–63]. Multiple regression has
its roots in simple regression, thus multiple regression consists of one dependent variable
(Y_i) and a set (q) of independent variables: (x_{ip}): $Y_i = b_0 + b_1 x_{i1} + b_2 x_{i2} + \ldots + b_p x_{ip} + \varepsilon_i$.
   In a regression equation, the value of Y_i variable is estimated for the i observation, and
similarly x_{ij} ($j = 1, 2, \ldots, p$) are the values of p variables meant to explain the i observation.
Furthermore, where ε_i is a random error of the i observation, b_0 and b_j are unknown param-
eters of this model. The application of this method is possible only when certain conditions
are to be met by both exogenous and endogenous variables. Not only should exogenous
variables correlate with a variable they describe, but they should also be characterized by
a suitable coefficient of their own variability. Under no circumstances can exogenous vari-
ables be interdependent. It should also be noted that the number of estimated parameters
(k) may not surpass the number of observation (n). It is important to mention that the lack
of an observational error in a dependent variable Y_i as well as in exogenous variables (x_{ip})
is the essential premise of a regression. Other assumptions are related to the lack of corre-
lation between random elements, to the distribution of random elements, which should be
similar to a normal distribution, and finally to the variance of random elements and their
expected values. Additionally, when analyzing regression, the parameters b_0 and b_j are
unknown, hence they should be estimated in data fitting as well as chosen in such a way
to minimize the sum of squared residuals. The method of least squares is one of the well-
-known approaches to regression analysis [Stanisz 2007, pp. 59–63].
   The statistical phenomenon of multicollinearity and the effect of catalysis can be pre-
vented by the use of various methods. Despite the methods vary greatly in calculation,
they come down mainly to a selection of the amount of variables and an elimination of
exogenous variables, which are correlated too strongly with other independent variables.
During the reduction of a set of initially distinguished characteristics, which will take

part in the construction of multiple regression model, only these exogenous variables for whom the correlation coefficient is smaller than the value of a coefficient which represents the interdependence between exogenous and endogenous variables, should be marked out. A potential exogenous variable carries the information about an endogenous variable [Paluch 2012].

According to the previously described method of analysis, from among the initially chosen set of characteristics (in total 17 variables) that are meant to construct multiple regression model, independent variables (x_{ip}) are distinguished. These independent variables, assuming that the level of trust is 95%, are characterized by a relatively high value of correlation coefficient with dependent variable (Y_i) and by higher value of correlation coefficient when compared to the correlation between these independent variables:

x_2 – own income of communes (per inhabitant in zł),
x_7 – means of UE project financing (per inhabitant in zł),
x_8 – age dependency ratio,
x_{12} – education index,
x_{13} – the number of non-governmental organizations (per 1,000 inhabitants),
x_{15} – the index of economic servicisation.

Among other things, the variable x_1 (total incomes of communes) is not included in the set described above. The variable x_1 is not taken into consideration because the correlation coefficient together with the variable x_2 (own incomes of communes) has been over twice as great (0.77) than the value of correlation coefficient which describes the dependence of variable x_1 with a composite indicator (Y_i), i.e. 0.33. Similar procedure has been used in the case of remaining variables. Majority of the calculated correlation coefficients between the composite indicator and the analyzed exogenous variables have revealed value added in the 0.16 to 0.36 range.

The procedure of forward stepwise regression[2], based on a partial F-test, has been used to analyze the dependence between socio-economic and environmental dimension of the sustainable development of rural communes in Małopolska Province [Gradziuk 2005]. First and foremost, the aim of forward stepwise regression is to find exogenous variable which not only is the most powerfully correlated with endogenous variable, but it also determines a model of significant parameters. Secondly, next step involves choosing another exogenous variable, whose values are strongly correlated with the remainders from the first step. Since every step entails the inclusion of a new variable x_{ip}, partial F-test[3] is used to revise the evaluation of significance of variables. The procedure is ended either when there is no new exogenous variables to improve the model or when the inclusion of a new variable leads to the loss of significance of the whole model.

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[2] The procedure of stepwise regression can be done in two ways: either in a forward or in a backward way [Gradziuk 2005].
[3] Partial F-test is used to evaluate a relative significance of the part of a model (a certain k among m variables). A relative significance of k refers to a premise that $m – k$ variables remain in a model. Partial F-statistics is regarded as a check on this test. Partial F-test, which is aimed to check the significance of a singular variable, can be treated as t-test when hypothesis of a relative significance of one variable x_{ip} among other variables included in the model is tested [Bitner 2007].

Additionally, so as to check the significance of particular angular coefficients in the equation (b_p), t-test is carried out. The aim of t-test is to reduce the number of irrelevant variables, i.e. those which have a marginal impact on a formation of the value of Y_i variable [Bitner 2007].

The evaluation of a divergence between the values of a dependent variable and the values obtained from the model are considered an important premise of multiple regression analysis. Standard deviation of remainders or more popular coefficient of determination (R^2) is used to measure multiple regression. The best suited model is characterized by the value of a coefficient (R^2) which is close to unity, where value 1 refers to a perfect adjustment while $R^2 = 0$ refers to the lack of correlation between variables. Coefficient of determination is used to measure which part of a total variability of dependent variable is estimated by regression. While assessing quality of the model, the comparison of R^2 with the same value estimated for an alternative model, which is described by a different function, can be made. If the value R^2 of an alternative model is larger, this alternative model can be seen as more suitable to describe data. Adjusted coefficient of determination ($R_S{}^2$) is required to use when the number of exogenous variables increases.

RESULTS AND DISCUSSION

The lineral model, which is based on six exogenous variables, has been constructed as a result of analyses that have made use of forward stepwise regression model. Hence, this lineral model have enabled to determine the force of an impact of particular variables, which characterize the socio-economic dimension, on the level of environmental sustainability (Y_i):

$$Y_i = 0.300\,x_2 + 0.224\,x_{15} - 0.280\,x_8 + 0.181\,x_7 + 0.161\,x_{12} + 0.125\,x_{13}$$

$$t = |3.525| \quad |2.725| \quad |{-3.140}| \quad |2.164| \quad |1.922| \quad |1.422|$$

$$p = |0.001| \quad |0.007| \quad |0.002| \quad |0.033| \quad |0.048| \quad |0.157|$$

$$R = 0.762 \quad R^2 = 0.516 \quad \bar{R}_S = 0.477$$

$$F = 8.097 \quad p < 0.000 \quad S_e = 0.064$$

In this model own incomes of a commune per inhabitant in zł (x_2) are an exogenous variable, which greatly ($b_p = 0.300$) influences the value of a composite indicator (Y_i – composite indicator of environmental sustainability). This equation is supplemented by all remaining variables which have met the established methodological premises, hence the remaining variables include: the index of economic servicisation (x_{15}) per 1,000 inhabitants ($b_p = 0.224$), which refers to the number of people employed in the sector of both market and non-market services, age dependency ratio (x_8) per 1,000 inhabitants ($b_p = -0.280$), which is the number of people at non-working age, means of EU project financing (x_7) per inhabitant in zł ($b_p = 0.181$), education index (x_{12}), which is the weighted mean of particular levels of education ($b_p = 0.161$), combined with the number of non-governmental organizations (x_{13}) per 1,000 inhabitants ($b_p = 0.125$).

Five out of these variables, taken to form the equation x_{ip}, show value added, which means that the increase of one standard deviation in whichever variable leads to the

increase in the value of dependent variable of b_p value of its standard deviation. Limiting oneself only to the interpretation of own incomes of a commune, which are a key independent variable (x_2), it should be pinpointed that the increase of one standard variation in this independent variable will lead to the increase in the value of variable Y_i of 0.300 of its standard deviation. The remaining exogenous variables should be interpreted similarly. The opposite situation happens when the reduction of age dependency ratio (x_8) should contribute to the increase in the value of composite indicator (Y_i).

An assumption that there is a lineral dependency between dependent variable (Y_i) and exogenous variables (x_{ip}) has been positively verified by F-test, (6.118) = 8.097. Hence, the value of R^2, which equates 0.516, explains that the variability of composite indicator amounts to 51.6%. However, the analysis of outliers has demonstrated that the absolute values of remainders for observation 4, 50 and 19 are larger than the value of standard deviation. Hence, not only has the procedure of robust statistics been implemented, but also the equation of multiple regression has been estimated again (Table 1).

Table 1.   The result of resistance estimation of the model Y_i – composite indicator of environmental sustainability

| Step | Divergence | | R^2 | $\bar{R}_S$ | F | | S_e |
	Number	Value of a remainder			Value	p	
1	4 50*	−0.106 0.111	0.516	0.477	8.097	< 0.000	0.064
2	4* 19	−0.103 −0.097	0.518	0.478	8.101	< 0.000	0.045
3	19*	−0.096	0.543	0.504	8.955	< 0.000	0.044
4	Lack	–	0.557	0.519	9.447	< 0.000	0.042

*Observations removed in the next step, where: 50 – Tarnów commune, 4 – Trzciana commune, 19 – Igołomia- -Wawrzeńczyce commune.

Source: Own calculations.

It is a quite common phenomenon that in cross-sectional data models there are one or a few outliers in which the relation between endogenous variable and exogenous variables is disparate from the dominant number of subjects in a research. The results of estimation can be strongly influenced by one or a few observations which are usually disproportionate to their overall significance. One of the main problems of economic statistical analysis is both the detection of outliers and the prevention of their impact on the results [Jajuga and Walesiak 2007, p. 595]. As a result of the elimination of outliers, the final multiple regression model[4], which depicts the correlation between the level of

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[4] During the research other alternative models, based on curvilineral functions, have been constructed. These alternative models include both power and exponential function which have been subjected to the process of lineralization. The obtained R^2 and R_S^2 values have been lower than in the case of the obtained lineral function.

socio-economic development and the level of environmental sustainability of rural communes in Małopolska Province, has taken the form of:

$$Y_i = 0.327\, x_2 + 0.244\, x_{15} - 0.298\, x_8 + 0.202\, x_7 + 0.161\, x_{12} + 0.134\, x_{13}$$

$t = |3.787| \quad |3.029| \quad |{-3.568}| \quad |2.452| \quad |1.626| \quad |1.847|$

$p = |0.001| \quad |0.003| \quad |0.001| \quad |0.016| \quad |0.049| \quad |0.106|$

$R = 0.797 \qquad R^2 = 0.557 \qquad \bar{R}_S = 0.519$

$F = 9.447 \qquad p < 0.000 \qquad S_e = 0.042$

The given model, similarly to the previous one, demonstrates that the variable x_2 (own incomes of a commune per inhabitant in zł, $b_p = 0.327$) has the largest impact on the value of composite indicator (Y_i), which characterizes the level of environmental development of rural communes in Małopolska Province. The remaining exogenous variables, at the level of 0.05 significance, are coincidental and statistically significant. An exception to the principle is the variable x_{13} (the number of non-governmental organizations per 1,000 inhabitants) whose value in t-test has amounted to 1.847 while the value of p statistics has come to 0.106. Moreover, the value of p statistics has been over twice higher than the established level of significance (> 0.05). According to F-test, the high value of F-statistics (9.447) demonstrates that the inclusion of variable x_{13} to the equation of regression has not shattered the significance of the whole model.

In the described model there is a relatively strong as well as statistically significant correlation between the dependent variable (Y_i) and exogenous variables (x_{ip}). Furthermore, the results of regression model demonstrate that the formally selected independent variables, which characterize the level of socio-economic development of rural communes in Małopolska Province, have a varied impact on the value of composite indicator of environmental sustainability. Own incomes of a commune, whose increase of one standard deviation in the value leads to the increase in the value of endogenous variable (Y_i) of 0.327 of its standard deviation, have turned out to be the main determinant. Smaller significance is given to the index of economic servicisation (0.244), age dependency ratio (–0.298), means of UE project financing (0.202), education index (0.161) and the number of non-governmental organizations (0.134). Additionally, the negative value of age dependency ratio informs that its reduction may lead to the increase in the value of composite indicator (Y_i).

Coefficient of determination (R^2) and standard error of estimation (S_e) has been calculated to evaluate fitting of the constructed model. The value of coefficient of determination (R^2), which determines how the model fits the actual data, has amounted to 0.557. Hence, it should be noted that at least 56% of the variability of composite indicator (Y_i) is explained by exogenous variables (x_{ip}) whereas the remaining 44% can be explained by other characteristics, which have not been included in the equation.

CONCLUSIONS

On the basis of presented analyses, it should be highlighted that the main factor of environmental sustainability of rural communes in Małopolska Province is the rate of their

own incomes. Own incomes of communes are extremely significant because they enable effective realization of statutory tasks mainly concerning environment protection. The researched subjects, thanks to own incomes of a commune, can absorb extrabudgetary funds which are indispensable to take investment measures mainly of infrastructural nature. Due to their great expense, the management of these investments has an effect on the increase in the level of development of three basic dimensions of sustainability, namely social, economic and environmental. It is claimed that the intensive development processes will be carried out in units that are financially stable. Assuming that the financially stable units have enough own incomes, they will be able to take multifarious actions. Hence, these actions will be taken as part of strategic and operational plans, which are made in accordance with the premises of sustainable development. Apart from factors of economic nature (own incomes of a commune and the index of economic servicisation), huge impact is also attributed to a special kind of demographic potential represented by age dependency ratio. The conducted researches demonstrate that units of no great age dependency ratio are distinguished by their relatively high level of environmental development.

In addition, an analysis of correlation between the established unit of variables, which characterize the level of socio-economic development of communes, has demonstrated that the level of age dependency ratio does not contribute to the increase in the value of own incomes of a commune. This lack of correlation is revealed in a low value of correlation coefficient (–0.05). From what has been presented, it appears that people at working age are characterized by high ecological awareness in contrast to people at non-working age. This awareness is seen as one of the most important factors influencing the formation of environment by local communities. This awareness enables people to understand the natural phenomena as well as makes them more sensitive to particular problems. Moreover, it also influences the pro-ecology attitudes of inhabitants and the course and type of decision processes made by local governments.

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SPOŁECZNO-GOSPODARCZE I ŚRODOWISKOWE DETERMINANTY ZRÓWNOWAŻONEGO ROZWOJU GMIN WIEJSKICH WOJEWÓDZTWA MAŁOPOLSKIEGO

Streszczenie: Dysproporcje poziomu rozwoju obszarów wiejskich w ujęciu jego trzech wymiarów, tj. gospodarczego, społecznego i środowiskowego występują na każdym szczeblu podziału administracyjnego kraju. Dotyczą one m.in. zakresu działań jakie są i powinny być podejmowane w celu poprawy sytuacji gospodarczej obszarów wiejskich oraz jakości życia mieszkańców wsi, przy zachowaniu racjonalności wykorzystania zasobów środowiska przyrodniczego. Celem opracowania jest więc próba identyfikacji oraz oceny wpływu czynników charakteryzujących poziom rozwoju społeczno-gospodarczego na zrównoważenie środowiskowe gmin wiejskich województwa małopolskiego. Do przeprowadzenia analiz posłużyła metoda regresji wielorakiej reprezentująca podejście oparte na metodzie klasycznej analizy statystycznej (z ang. Classical Statistics Analysis), pozwalającej na obserwację zależności struktur wielowymiarowych. Badaniami objęto 125 gmin województwa małopolskiego o statusie wiejskim. Uzyskane wyniki wykazały, że największy wpływ na poziom zrównoważenia rozwoju badanych gmin wiejskich w wymiarze środowiskowym mają głównie czynniki natury ekonomicznej, w tym szczególnie wielkość ich dochodów własnych oraz rozmiar środków pozyskanych na finansowanie projektów UE.

Słowa kluczowe: zrównoważony rozwój, unitaryzacja zerowana, regresja wieloraka, dochody własne, gminy wiejskie, województwo małopolskie