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**PRIORITY SETTING FOR RURAL DEVELOPMENT
IN POLAND IN YEARS 2007-2013**

*UKŁAD PRIORYTETÓW W ROZWOJU OBSZARÓW WIEJSKICH
W POLSCE W LATACH 2007-2013*

Key words: priority setting, MCDM, rural development budget

Słowa kluczowe: priorytety budżetowe, modelowanie wielokryterialne, rozwój obszarów wiejskich

Abstract. The objective of the paper was to demonstrate how decision-makers in Poland can be supported in setting priorities for allocating budgets for rural development policy measures using MCDM methods. Weighted sum approach was applied in the paper in order to optimize the resource allocation of Rural Development Program 2007-2013. Three different simulation scenarios were performed using the model, with the maximum weights respectively for objective 1– competitiveness (scenario 1), objective 2– environment and the countryside (scenario 2) and objective 3 of the Program – quality of life in rural areas (scenario 3). The results were compared with the actual allocation performed by the Ministry of Agriculture and Rural Development in Poland.

Introduction

Since the accession to the European Union (EU) in 2004, rural areas in Poland strongly benefit from structural funds. In years 2004-2006 Poland implemented two programmes for rural development, namely the Rural Development Plan and the Sectoral Operational Programme, co-financed by the EU structural funds. In years 2004-2006, their total budget amounted to 5347 mln EUR, while the expected budget of the Polish Rural Development Program 2007-2013 amounts for 17 mln EUR. As Wilkin (2006) states „structural programmes created a great chance for the development of Polish agriculture and rural areas”. Nether-the-less they constitute an important challenge for decision-makers. First, there is still open and normative question of the most appropriate development path for the Polish agriculture, and thus which of the objectives and measures should receive more support. Second, structural programs are still relatively new for Polish administration, which has minimal previous experience in setting priorities for their rural development budget.

As Candler [1981] state the typical policy problem is characterized by more than one objective that the policy makers wishes to maximize or observe. Polish Rural Development Program for years 2007-2013 consists of three official objectives:

- improving the competitiveness of the agricultural and forestry sector,
- improvement of the environment and the countryside,
- the quality of life in rural areas and diversification of the rural economy.

Each of the objectives is to be achieved by the specific measures co-financed from the EU budget. Poland implemented 22 measures: 11 – under the objective 1, 4 – under the objective 2 and 3 and 3 – initiatives in LEADER program. Allocation decisions were taken on the country level with only one restriction coming from UE: minimal share of financing the objectives of the Program (respectively: 10, 25 and 10% of total budget). Rational allocation of Rural Development Program resources is fundamental for the development of agriculture and rural areas in Poland. Thus, the important question has arisen of how decision-makers in Poland can be supported in setting priorities for allocating budgets for policy measures. Problems that involve multiple, usually conflicting objectives can be solved using Multiple Criteria Decision Making (MCDM) methods. Quantitative models have provided substantial benefits to corporations and governments over the past half century. Recently they gained on the importance also in social sciences where the decision problems are often based on subjective preferences of the decision makers [Kacprzyk,

Węglarz 2002]. Larichev and Moshkovich [1997] underline that decision-making support for the formation of structural policies has to consider special conditions:

- the decision problems are unique and have characteristics not previously experienced,
- the objectives are mostly qualitative in their nature,
- evaluation of alternatives against the objectives maybe obtained only from experts or from the decision makers,
- an overall evaluation of alternatives maybe obtained only through subjective preferences of the decision maker.

Munda [2004] and Martinez-Alier et al. [1998] propose the use of multi-criteria decision-making methods for these kind of problems. Kirschke and Jechlitschka [2002, 2003] propose an interactive linear and parametric programming approach to support the budgeting for structural policies. Wegner and Kiryluk [2008] show in an exemplary way how linear programming can be used for regional specific budgeting and priority-setting.

The purpose of this paper is to demonstrate how decision-makers in Poland can be supported in setting priorities for allocating budgets for rural development policy measures using MCDM methods.

Method

Weighted sum approach was applied in the paper in order to optimize the resource allocation of Rural Development Program 2007-2013. It seeks the combination of activities (rural development policy measures) that maximizes the total benefit of Polish Rural Development Program without exceeding the given budget. The weighted sum method converts the multiobjective problem of maximizing the objectives into a scalar one by constructing a weighted sum of all the objectives. Hence, the programming approach can be formulated as follows:

$$\text{Max } C = \alpha \sum_{i=1}^n z_{1i} \cdot B_i + \beta \sum_{i=1}^n z_{2i} \cdot B_i + \& \sum_{i=1}^n z_{3i} \cdot B_i$$

with:

$\alpha, \beta, \&$ – weighting coefficients of objectives,

B_i – budgetary expenses for a measure i ,

$i = 1, \dots, n$ – index of considered measures,

z_{1i} – average coefficient of the objective function describing the impact of the budgetary expenses for measure i on the 1st objective.

$$\text{subject to: } \sum_{i=1}^n a_{ri} \cdot B_i \begin{cases} \leq \\ = \\ \geq \end{cases} b_r \quad \text{for } r = 1, \dots, m \text{ and } B_i \geq 0$$

where:

$r = 1, \dots, m$ – is the index of restrictions (equations or inequations),

a_{ri} – is the coefficient of restriction r for measure i .

Weighting coefficients of objectives ($\alpha, \beta, \&$) are real values that express the relative importance of the objectives and balance their involvement in the overall utility measure.

Coefficients for the objective function (z_{1i}) were obtained from experts assessments. The group of 46 experts were asked to evaluate the possible impact of the Program measures on its 3 objectives, with an assumption that each measure has got an impact on each objective.

Eighteen measures were taken into account in the modeling approach. Due to their specificity the LEADER measures were not implemented in the model. The final sum of the allocation does not enclose also the liabilities for the period 2004–2006 for the measure support for semi-subsistence farms. Thus the budget of 15 774.3 mln EUR became the object of optimization. Lower and upper bounds- the minimum and maximum possible budget for each measure were assessed for each measure with respect to absorption possibilities (Tab. 1).

With compliance with the basic assumptions of the model, the allocation of rural development policy measures that maximizes the total benefit of Polish Rural Development Program would change with different weighting coefficients of objectives. One of the methods to test the functioning of the model is to examine the differences between the results of the allocation with the maximum weights for the objectives. Thus, three different simulation scenarios were performed using the model, with the maximum weights respectively for objective 1 – competitiveness (scenario 1), objective 2 – environment and the countryside (scenario 2) and objective 3 – quality of life in rural areas (scenario 3). The EU restriction of minimal share of financing the three objectives (respectively 10% – 1774, 25% – 4354,3 and 10% – 1774 mln EUR) was implemented in the model. The results were compared with the actual allocation performed by the Ministry of Agriculture and Rural Development in Poland.

Table 1. Lower and upper bounds for the financing of Polish Rural Development Program measures

Measure	Lower	Upper
Training	9.6	48.0
Young farmer	103.3	520.0
Early retirement	1400.0	5000.0
Advisory services	180.0	900.0
Modernisation	920.0	4608.0
Increasing value added of production	400.0	2000.0
Infrastructure	19.0	765.0
Food quality schemes	40.0	207.0
Information and promotion	7.2	36.0
Producer groups	10.0	168.0
LFA	2449.0	2449.0
Agri-environmental programme	853.8	3860.0
Afforestation	183.0	545.1
Forestry production potential	28.0	140.0
Diversification of activities	101.4	506.9
Microenterprises	420.0	2100.0
Services for rural population	860.0	4300.0
Rural renewal and development	246.0	1230.0

Source: own study.

Results

Table 2 presents the results of the model allocation for three analyzed scenarios compared with actual allocation. The results show that there are important differences between three scenarios, however the financing of some measures in each scenario would be the same. The amount spent for training, young farmer, early retirement, food quality schemes, information and promotion and producer groups would not exceed the lower bound of their financing. It is mainly a result of relatively low impact of these measures on the objectives, expressed in the model by coefficients values. The total sum spent for LFA is equal in each case, while the LFA area was delimited by the Ministry and cannot change with the scenarios.

According to the actual allocation 44% (6896,2 mln EUR) of total sum¹ is allocated under the objective 1, 34% (5378 mln EUR) under the objective 2 and 22% (3500,1 mln EUR) in measures of objective 3. These proportions vary in different scenarios. In scenario 1 almost 9680 mln EUR (over 60% of total allocation sum) would be allocated under the objective 1 – competitiveness, while the other objectives would only obtain the minimal sum of financing coming from EU restrictions: 4354 mln EUR for the objective 2 and 1774 mln EUR for the objective 3.

With the maximum weight for the competitiveness more financing than set in actual Polish Rural Development Program budget should be allocated in modernization, advisory services, increasing of the value added to basic agricultural production and improvement of the infrastructure related to agriculture. All these measures are placed under the objective 1 of the Polish Rural Development Program. According to model simulation with maximum value for competitiveness all other measures should be less financed than planned in the program. The biggest cut in financing would concern early retirement, which would receive only minimal value of financing and agri-environmental measures. The modernization should reach the financing of 4 608 million Euro which is almost 2,5 times higher than in current program budget.

¹ Total of the sum 15 774.3 mln EUR used in the model calculations.

Table 2. Allocation of Polish Rural Development program budget – results of the model simulations

Measure	Program budget [mln EUR]			
	scenario 1	scenario 2	scenario 3	actual allocation
Training	9.6	9.6	9.6	40.0
Young farmer	103.3	103.3	103.3	420.0
Early retirement	1400.0	1400.0	1400.0	2549.6
Advisory services	900.0	180.0	315.2	218.0
Modernisation	4608.0	920.0	978.8	1849.1
Increasing value added of production	1835.2	1023.7	400.0	932.0
Infrastructure	765.0	19.0	19.0	637.5
Food quality schemes	40.0	40.0	40.0	80.0
Information and promotion	7.2	7.2	7.2	30.0
Producer groups	10.0	10.0	10.0	140.0
Sum for the objective 1	9678.3	3712.8	3283.1	6896.2
LFA	2449.0	2449.0	2449.0	2449.0
Information and promotion	7.2	7.2	7.2	30.0
Producer groups	10.0	10.0	10.0	140.0
Sum for the objective 1	9678.3	3712.8	3283.1	6896.2
LFA	2449.0	2449.0	2449.0	2449.0
Diversification of activities	101.4	101.4	506.9	345.6
Microenterprises	420.0	420.0	2100.0	1023.6
Services for rural population	860.0	4300.0	4300.0	1541.3
Rural renewal and development	360.3	246.0	1230.0	589.6
Sum for the objective 3	1741.7	5067.4	8136.9	3500.1
Total	15774.3	15774.3	15774.3	15774.3

Source: own calculations based on the Polish Rural Development Program data.

In scenario 2 – maximum weight for the environment the proportion of financing the three objectives would be: 24, 44 and 32% respectively. The results of the simulations for the scenario 2 show that if objective 2 was to be the most important one, then the agri- environmental measures and afforestation would need to get the maximal bound of financing. More money should also be allocated in this case for services for rural population, while the financing of almost all measures under the objective 1 should be decreased. The results prove that the trade-off between competitiveness of agriculture and environmental needs of rural areas is quite visible.

With the maximum value for the objective three- quality of life in rural areas over 50% of the total budget sum would be allocated in the measures of objective 3. Thus, diversification towards non-agricultural activities, services for rural population, establishment of microenterprises and rural renewal would get the upper bounds of financing. Objective one would get only 21% share in total budget, while objective two 28%.

The model simulations show that if priority in financing would be given to objective 3 all other measures would need to be financed less than in the Polish Rural Development Program, with the highest cut in financing of early retirement, modernization and agri-environmental programs.

Conclusions

Multiple Criteria Decision Making (MCDM) assumes that a decision maker is to choose among a number of alternatives that he or she evaluates on the basis of two or more criteria or attributes. Because most its problems involve multiple conflicting objectives the public sector is an increasingly interested user of Multiple Criteria Decision Making models. However, as Dyer et al. [1992] underlines there is a continuing need for good documented application.

The results of the paper prove that weighted sum method could be applied in priority setting for rural development. The model allocates the Program funds into its measures with respect to given restrictions. The approach presented in the paper of making scenarios with maximum weights of objectives is only one of possible ways of supporting budget allocation process with MCDM.

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Streszczenie

Celem publikacji było zaprezentowanie metody modelowania wielokryterialnego jako narzędzia ułatwiającego podejmowanie decyzji dotyczących alokacji budżetu PROW 2007-2013. Zastosowano metodę kryteriów ważonych w celu symulacji optymalnej alokacji środków PROW przy danych założeniach wyjściowych. Symulowano trzy różne scenariusze, zakładając maksymalne wagi kolejno dla trzech priorytetów programu (konkurencyjność, środowisko i poziom życia na obszarach wiejskich). Wyniki porównano z rzeczywistą alokacją dokonaną przez MRiRW.

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