STOWARZYSZENIE EKONOMISTÓW ROLNICTWA I AGROBIZNESU
Roczniki Naukowe ● tom XIII ● zeszyt 6

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REGIONAL ALLOCATION OF POLISH RURAL DEVELOPMENT PROGRAM 2007-2013

REGIONALNA ALOKACJA ŚRODKÓW PROW 2007-2013

Key words: rural development, regional allocation
Słowa kluczowe: rozwój obszarów wiejskich, alokacja regionalna

Abstract. The objective of the paper was to assess the regional allocation of Polish Rural Development Program 2007-2013 using optimization approach. The actual allocation was compared with the result of a model simulation. Relatively small differences between the actual and model allocation show that the regional allocation performed by the Ministry of Agriculture and Rural Development is relatively well tailored to the need of farmers in different regions.

Introduction

After many years of strong emphasis of the EU's Common Agriculture Policy on market intervention, recent reforms provide increased support for sustainable development of agriculture and rural areas. This policy shift involves a transformation of price support into direct payments for farmers, and a marked enhancement of structural rural-development policy programs. For each Financial Perspective of the EU (a 7-year budget period), member states are entitled to submit national or regional rural-development programs to the European Agricultural Fund for Rural Development (EAFRD). The programs are prepared based on the EU's strategic guidelines that offer a range of possible policy measures to be implemented on national or regional level. Poland selected a total of 22 measures from proposed by the Council Regulation No1698/2005. The total budget allocated to implement these measures amounts to over 17 billion Euros. The budget was allocated in a central way, and the financing of eight measures, which in total amount to 9 billion Euros, was distributed among regions.

The purpose of the paper is to assess the regional allocation of Polish Rural Development Program (PRDP) for years 2007-2013 using optimization model. The assessment is based on the comparison of the actual allocation by the Ministry of Agriculture and Rural Development (MARD) with the simulation performed using the model.

Methods

According to the Council Regulation No1698/2005, Polish Rural Development Program for years 2007-2013 comprises three official objectives: improving the competitiveness of agriculture and forestry, improving the environment and the countryside, and improving the quality of life in rural areas.

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 multi-objective 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:

$$Max\ C = \alpha \cdot \sum_{i=1}^{n} z1_i \cdot Bi + ß \sum_{i=1}^{n} z2_i \cdot Bi + \& \sum_{i=1}^{n} z3_i \cdot Bi$$

where:
$\alpha, \beta, \&$ – weighting coefficients of objectives,
Bi – budgetary expenses for a measure i,
$i = 1, ...,n$ – index of considered measures,
$z1i$ – average coefficient of the objective function describing the impact of the budgetary expenses for measure i on the 1st objective.

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

where:
$r = 1, ..., m$ – is the index of restrictions (equations or inequations),
a_{ri} – is the coefficient of restriction r for measure i.
$\alpha=\beta=\&$

Weighting coefficients ($\alpha, \beta, \&$) are real values that express the relative importance of three official objectives of the program, and balance their involvement in the overall utility measure. Coefficients for the objective function ($z1i$) were obtained froma surveyed sample of farmers' advisors. The electronic survey was sent to a randomly selected group of 1 000 advisors across all 16 administrative districts of Poland. In total, 650 (65%) of the advisors responded to the questionnaire. In the survey, the responders were asked to assess the contribution of Program's measures to its three main objectives, in the region they work. The assessment was done in a scale from one (low impact) to nine (high impact) proposed by Saaty [1980]. The scores were then averaged for each FAND region in Poland[1]. Thus, four different sets of coefficients were implemented in the model to represent regional differences of funds' effectiveness, expressed by advisors. The average score value is a universally used aggregation function in practice, although other procedures have also been suggested [Matsatisinis et al. 2005, Balinski, Laraki 2007].

Results

Table 1 presents the actual allocation of the PRDP 2007-2013 measures performed by the MARD. The allocation comprises only measures, which financing was regionalized. Table 2 presents a share of four analyzed regions in the total allocation of analyzed measures. Table 3 presents a share of regions in the model allocation of analyzed measures.

The actual and model allocation present some similarities. In both cases, Region C – Mazowsze and Podlasie receives the highest share of financing, while region A – Pomorze and Mazury the lowest. The order of financing of different measures in regions for both allocations remains the same. However, some differences between the two allocations are evident. In the model allocation, the total financing of region C – Mazowsze and Podlasie is higher, comparing to the actual one. In particular the difference concerns setting up for young farmers. The model allocation of this measure in region C amounts to 50% of its total financing. Moreover, the model allocation suggests to move the financial means for modernization of agricultural holdings from region D – Małopolska and Pogórze to all other regions. Region D would however receive bigger share in financing in diversification into non-agricultural activities, and establishment and development of micro-enterprises.

Table 1. Allocation of analyzed PRDP 2007-2013 measures
Tabela 1. Alokacja środków PROW 2007-2013 na analizowane działania rozwoju obszarów wiejskich w regionach

Measure/*Działanie*	**Actual allocation [mln EUR]/*Alokacja rzeczywista [mln EUR]***
Setting up of young farmers/*Ułatwienie startu młodym rolnikom*	420.0
Early retirement/*Renty strukturalne*	2549.6
Modernization of agricultural holdings/*Modernizacja gospodarstw rolnych*	1849.1
Improvement of infrastructure related to the development of agriculture/ *Poprawianie i rozwijanie infrastruktury związanej z rozwojem rolnictwa i leśnictwa*	637.5
Diversification into non-agricultural activities/ *Różnicowanie w kierunku działalności nierolniczej*	345.6
Establishment and development of micro-enterprises/ *Tworzenie i rozwój mikroprzedsiębiorstw*	1023.6
Basic services for the economy and rural population/ *Podstawowe usługi dla gospodarki i ludności wiejskiej*	1541.3
Village renewal and development/*Odnowa i rozwój wsi*	589.6
Total/*Razem*	8956.3

Source/*Źródło*: Rural Development Program 2007-2013… 2007

[1] Region A – Pomorze and Mazury, B – Wielkopolska and Śląsk, C – Mazowsze and Podlasie, D – Małopolska and Pogórze.

Table 2. Share of regions in the allocation of PRDP 2007-2013 (actual allocation)
Tabela 2. Udział regionów w alokacji poszczególnych działań PROW 2007-2013 (alokacja rzeczywista)

Measure/*Działanie*	**Region/*Region***				**Total/ *Razem***
	A	**B**	**C**	**D**	
Setting up of young farmers/*Ułatwienie startu młodym rolnikom*	12.7	25.3	45.2	16.8	100.0
Early retirement/*Renty strukturalne*	11.5	21.2	42.3	25.0	100.0
Modernization of agricultural holdings/*Modernizacja gospodarstw rolnych*	14.0	27.4	45.2	13.4	100.0
Improvement of infrastructure related to the development of agriculture/ *Poprawianie i rozwijanie infrastruktury związanejz rozwojem rolnictwa i leśnictwa*	23.9	28.1	27.3	20.7	100.0
Diversification into non-agricultural activities/ *Różnicowanie w kierunku działalności nierolniczej*	11.7	21.2	42.3	24.8	100.0
Establishment and development of micro-enterprises/ *Tworzenie i rozwój mikroprzedsiębiorstw*	15.4	24.8	29.3	30.5	100.0
Basic services for the economy and rural population/ *Podstawowe usługi dla gospodarki i ludności wiejskiej*	19.4	24.8	31.6	24.2	100.0
Village renewal and development/*Odnowa i rozwój wsi*	19.4	24.8	31.6	24.2	100.0

Explanations: A – Pomorze and Mazury, B – Wielkopolska and Śląsk, C – Mazowsze and Podlasie, D – Małopolska and Pogórze/*Objaśnienia: A – Pomorze i Mazury, B – Wielkopolska i Śląsk, C – Mazowsze i Podlasie, D – Małopolska i Pogórze*
Source: own study based on Regulations of Ministry of Agriculture and Rural Development
Źródło: opracowanie własne na podstawie Rozporządzeń Ministra Rolnictwa i Rozwoju Wsi

Table 3. Share of regions in the allocation of PRDP 2007-213 (model allocation)
Tabela 3. Udział regionów w alokacji poszczególnych działań PROW 2007-2013 (alokacja modelowa)

Measure/*Działanie*	**Region/*Region***				**Total/ *Razem***
	A	**B**	**C**	**D**	
Setting up of young farmers/*Ułatwienie startu młodym rolnikom*	11.2	20.7	50.4	17.7	100.0
Early retirement/*Renty strukturalne*	14.8	22.5	39.0	23.7	100.0
Modernization of agricultural holdings/*Modernizacja gospodarstw rolnych*	15.0	29.0	46.5	9.5	100.0
Improvement of infrastructure related to the development of agriculture/ *Poprawianie i rozwijanie infrastruktury związanej z rozwojem rolnictwa i leśnictwa*	21.8	27.1	31.4	19.7	100.0
Diversification into non-agricultural activities/ *Różnicowanie w kierunku działalności nierolniczej*	10.9	17.5	45.0	26.6	100.0
Establishment and development of micro-enterprises/ *Tworzenie i rozwój mikroprzedsiębiorstw*	12.0	26.0	29.0	33.0	100.0
Basic services for the economy and rural population/ *Podstawowe usługi dla gospodarki i ludności wiejskiej*	18.5	25.6	32.7	23.2	100.0
Village renewal and development/*Odnowa i rozwój wsi*	18.5	25.6	32.7	23.2	100.0

Explanation: see tab. 2/*Objaśnienia: jak w tab. 2*
Source: own study
Źródło: opracowanie własne

Table 4. Regional allocation (actual and model) of PRDP 2007-2013
Tabela 4. Alokacja regionalna (rzeczywista i modelowa) PROW 2007-2013

Specification/*Wyszczególnienie*	**Region/*Region***				**Total/ *Razem***
	A	**B**	**C**	**D**	
Actual allocation/*Alokacja rzeczywista*	1369.2	2188.1	3397.6	2001.3	8956.3
Model allocation/*Alokacja modelowa*	1395.4	2241.7	3415.2	1903.9	8956.3
Difference between the model and actual allocation/ *Różnica pomiędzy alokacją modelową, a rzeczywistą*	26.2	53.6	17.6	-97.4	0

Source: see tab. 2
Źródło: jak w tab. 2

Table 4 presents the actual and simulated regional allocation of PRDP measures for years 2007-2013. According to model allocation the total sum of 97.4 mln Euros should be moved from region D – Małopolska and Pogórze to regions A – Pomorze and Mazury, B – Wielkopolska and Śląsk and C – Mazowsze and Podlasie (26.2, 53.6 and 17.6 mln EUR respectively). However, this amount in the total allocation sum is marginal.

Conclusions

Optimization approach can be a useful tool in public sector to provide decision-makers with a structured and practical framework for making decisions. De Agostini [2006] underlines its importance in decision-making concerning environmental resources, such as agriculture and forestry planning.

The method presented in the paper provides the optimal (under initial restrictions and weighting coefficients of objectives) budget allocation of PRDP's resources for agricultural regions of Poland.

The model allocation suggests to reduce overall financing in region D, in favor of regions A, B and C, with relatively better developed agricultural structures. Model maximizing objective function seeks for Pareto optimal allocation- the most efficient one under given restrictions. Thus, according to model assumptions such a shift might enhance the overall effectiveness of the allocation.

However such a recommendation might seem problematic concerning one of the main objectives of structural policy of the EU – reducing economic and social disparities between regions. Conflict between efficiency and fairness of the allocation is well known in public choice. Ambiguous assessments of the allocation proves to be challenging and strongly depends on assessments criteria. In the paper effectiveness was taken as an assessment criterion. Thus, I conclude that relatively small differences between the actual and model allocation prove that the allocation performed by the MARD seems to be adequate. Nether-the-less, taking fairness of allocation into account, the post-assessment's recommendations would probably differ.

Bibliography

Balinski M., Laraki R. 2007: A Theory of Measuring, Electing, and Ranking. PNAS, 104, 21.

De Agostini P. 2006: Identifying the Best Combination of Environmental Functions Using Multi-Criteria Analysis. [In:] Integrated Assessment and Public Management of public Resources (eds. J.C. Cooper, F. Perali, M. Veronesi). Edward Elgar.

Matsatsinis N.F., Grigoroudis E., Samaras A. 2005: Aggregation and Disaggregation of Preferences for Collective Decision-Making, *Group Decision and Negotiation*, 14.

Rozporządzenie MRiRW z dnia 18 marca 2009 r. *w sprawie podziału środków Programu Rozwoju Obszarów Wiejskich na lata 2007-2013*.

Rural Development Program 2007-2013. 2007: Ministry of Agriculture and Rural Development, Warsaw.

Saaty T.L. 1980: The Analytic Hierarchy Process Planning. Priority Setting. Resource Allocation. MacGraw-Hill, New York International Book Company.

Streszczenie

Celem artykułu była ocena alokacji regionalnej środków PROW 2007-2013 przy wykorzystaniu metod optymalizacyjnych. Alokacja dokonana przez Ministerstwo Rolnictwa i Rozwoju Wsi została porównana z alokacją modelową. Stosunkowo małe różnice pomiędzy alokacją modelową a rzeczywistą świadczą o relatywnie trafnej regionalnej alokacji środków.

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