

## FORECASTING THE COMMUNE INCOME AS A DETERMINANT OF LOCAL SUSTAINABLE DEVELOPMENT

## PROGNOZOWANIE DOCHODÓW GMIN JAKO DETERMINANTA ZRÓWNOWAŻONEGO ROZWOJU LOKALNEGO

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**Abstract.** At the present time it is difficult to overcome problems with research in sustainable local development due to their diversity and the large-scale social and economic changes in development conditions. The complexity and significance of issues connected with local development assessment require a comprehensive and methodological approach which can form grounds for planning desirable events and shaping the future condition of local government units. Changes taking place in the competitive environment conditions reveal the need for a consistent, prospective and effective attitude to local processes and defining the main directions of development. Planning the development at the local level is inevitable owing to the necessity of optimising budget expenses and performing public tasks properly. The purpose of the paper is to present a forecast of the rural commune income in 2018-2020. The data from 2003-2016 (GUS) was used in order to prepare rural commune income and expenditure forecasts for 2018-2020. The level of budgetary income and expenditure and the increment of the smoothed variable representing the linear trend coefficient were subject to exponential smoothing. The local government units subject to the analysis are very diversified, often characterised by large-scale development gaps and low attractiveness of location; the situation is most difficult in rural areas.

**Keywords:** forecasting, sustainable development, income, expenditure, local government units

**Streszczenie.** W obecnym czasie problemy występujące w badaniach zrównoważonego rozwoju lokalnego są trudne do przezwyciężenia ze względu na ich złożoność i zachodzące zmiany społeczno-gospodarczych uwarunkowań rozwoju. Złożoność oraz istotność zagadnień związanych z oceną rozwoju lokalnego wymaga kompleksowego i metodycznego podejścia, które może być podstawą planowania pożądanych zdarzeń i stanów lokalnych jednostek samorządu z punktu widzenia przyszłej sytuacji. W warunkach otoczenia konkurencyjnego zachodzące zmiany ujawniają potrzeby konsekwentnego, perspektywicznego oraz prawidłowego postrzegania procesów lokalnych oraz wyznaczania kluczowych kierunków ich rozwoju. Planowanie rozwoju na szczeblu lokalnym jest niezbędne ze względu na konieczność optymalizacji wydatków budżetowych i właściwego wykonywania zadań publicznych. Celem artykułu było przedstawienie prognozy dochodów gmin wiejskich na lata 2018-2020, która ma istotne znaczenie w procesie projektowania najbardziej oczekiwanych zdarzeń i stanów jednostek samorządowych z punktu widzenia przyszłej sytuacji. W celu zbudowania prognoz gmin wiejskich na lata 2018-2020 wykorzystano dane (GUS) z lat 2003-2016. Wygładzaniu wykładniczemu poddano poziom dochodów i wydatków budżetowych oraz przyrost wygładzonej zmiennej, reprezentujące współczynnik trendu liniowego. Analizowane jednostki samorządowe są bardzo zróżnicowane, często o dużej skali opóźnień rozwojowych oraz mniejszej atrakcyjności lokalizacyjnej, najtrudniejsza sytuacja występuje na obszarach wiejskich.

**Słowa kluczowe:** prognozowanie, zrównoważony rozwój, dochody, wydatki, jednostki samorządu terytorialnego

## Introduction

Local government financial management requires both expertise and skills to accomplish the tasks that the local community finds to be priorities and the tasks that local authorities aim to fulfil as part of their duties and competence. Completing tasks by communes is closely related to finance, and what projects the picture of the commune financial management is the budget.

A budget, or an annual financing scheme, formulates the policy on the management of the potential the commune has and is the basis for taking optimal decisions and setting the directions of commune actions in each field of its operation. What should be planned within a single budget year is both the current expenditure, serving the accomplishment of obligatory tasks, and the expenses borne in relation to investments. Owing to their financial scope, investments should be well thought out and planned in detail. Therefore local governments should review the financial consequences of previous decisions, development plans prepared and of each intended investment.

The core of commune financial management is the conscious shaping of income and revenues, and rational management of resources possessed. The rational management of resources is possible only when the commune has made a forecast of income and expenses and adopted a long-term development strategy. Then, it is achievable to plan

expenses of both performing respective tasks and accomplishing investments in a given budget year.

Local governments are entitled to external income as well. That includes general subsidies and special-purpose subsidies from the State budget. A general subsidy is a special form of funding from the state budget. It is determined separately for each unit and can be granted for any purpose. It is recognised as part of general income (Pietrzak, Polanski, Woźniak, 2008). There are three types of general subsidies for communes: balancing subsidies, compensating subsidies and education subsidies. Special-purpose subsidies need to be used in accordance with its intended purpose, and if unused, they need to be refunded to the State budget. They are a very convenient and effective way of influencing local governments by the state authorities (Owsiak, 2016). The Act on income of local government units also lists other types of income apart from the typical ones: non-refundable appropriations from foreign resources; appropriations from the European Union budget; other appropriations as laid down in separate provisions.

The nature of the Polish system of LGU income is varied. Communes have their own resources of income, which are supplemented with the income transferred in the form of general and special-purpose subsidies, and the revenues from the commune share in the State budget income (Jastrzębska, 2012).

**Table 1.** General subsidy and special-purpose subsidy

General subsidy	Special-purpose subsidy
The local government decides about the distribution of appropriations	For tasks specified by the awarding authority
Objectiveness as the criterion of awarding appropriations	Calculation of amounts on the basis of the accomplished tasks funded from the State budget
The function of balancing the total income	Subsidy granted regardless of the commune potential
Motivating function - balancing is not exhaustive	The sum of appropriations awarded covers the whole expenses on the tasks
Non-refundable regardless of the level of task accomplishment	Refundable up to the amount corresponding with the unfulfilled tasks
Audited only in terms of the legality of the use of appropriations	Audited in terms of legality, purposefulness, reliability and cost-effectiveness
Certainty of receiving the appropriations	Certainty of receiving the amounts arranged
Supplements commune own resources	Supplements commune's own resources

Source: own work on the basis of A. Miszczuk, M. Miszczuk, K. Żuk, (2007). *Gospodarka samorządu terytorialnego*. Warszawa: PWN, p. 86.

There is a wide range of commune own resources since communes are the only level of local government authorised to levy local taxes (Piotrowska-Marczak, Uryszek, 2009). Commune resources are categorised within three groups: revenues from taxes, revenues from charges, and other commune

own resources. Taxes, or public law, non-refundable, free of charge and obligatory payments for the commune local government are the basic forms of commune budget income. They are the expression of the public sector's obligation to accept appropriations in order to finance public tasks.

**Table 2.** Commune own resources

Revenue from taxes	Revenue from charges	Other sources of income
<ul style="list-style-type: none"> <li>- real estate tax;</li> <li>- agricultural tax;</li> <li>- forest tax;</li> <li>- motor car tax;</li> <li>- personal income tax paid under the tax card system;</li> <li>- tax on inheritance and donations;</li> <li>- tax on civil-law transactions.</li> </ul>	<ul style="list-style-type: none"> <li>- stamp duty;</li> <li>- market fee;</li> <li>- visitor's tax;</li> <li>- resort tax;</li> <li>- dog licence;</li> <li>- service charges;</li> <li>- other charges that are recognised as commune income.</li> </ul>	<ul style="list-style-type: none"> <li>- income obtained by commune budget units, payments from budgetary agencies and extra-budgetary units, and commune budgetary units;</li> <li>- income from commune property;</li> <li>- gifts, donations and bequests to communes;</li> <li>- income from pecuniary charges and fines;</li> <li>- income obtained for the State budget in connection with the accomplishment of government administration tasks and other tasks;</li> <li>- interest on loans granted by communes;</li> <li>- interest on delinquent receivables;</li> <li>- interest on funds kept in bank accounts;</li> <li>- donations from LGU budgets;</li> <li>- other income owed to communes;</li> <li>- share in central taxes.</li> </ul>

Source: own work on the basis of Piotrowska-Marczak, K., Uryszek, T. (2009). Zarządzanie finansami publicznymi. Warsaw: Difin. p. 106.

The commune budget is also credited with taxes which the local government has a limited fiscal sovereignty of, i.e. a tax card, or a flat-rate form of personal income tax. A tax card can be applied to income from a business activity. The income subject to a tax card is not combined with other taxpayer's income and the fixed rate of tax paid under the tax card system is defined in an annex to the act on the monthly rate (Miszczuk, Żuk, 2007). Shares in revenues from personal income tax (PIT) and corporate income tax (CIT) are important commune resources. The participation of communes in PIT in 2015 was 37.67% and in 2016, 37.79%.

Communes' share in personal income tax (PIT) in 2016 was 0.12 percentage points higher than the share in 2015. The share in income from CIT in 2016 did not change compared with the one in 2015 and was still 6.71%.

Public income is fundamental to local government financing activities. Without sufficient income no commune is able to operate effectively. Therefore, collecting income is the basic task of communes and a condition of their functioning. It is their income that lets communes represent local government units and act by their own means and on their own responsibility.

As a basic local government unit, a commune represents the interest of people living in its area and thus is a crucial element of local development. It manages its own funds independently. The independent

financial management is based on the local budget and directly relates to the accomplishment of commune tasks. A well-managed commune needs to provide proper conditions that are friendly to economic development in order to attract potential investors. The actions have to cover the infrastructure level, environmental protection, educated staff, etc. That is the purpose of funds possessed by communes. A lack of financial resources makes the development of local government units impossible. The essence of a local government is the performance of public tasks delegated to it by the law in force, tasks which the commune fulfils on its own behalf and on its own responsibility. Pursuant to the Constitution of the Republic of Poland (Article 16 (2)), the local government participates in exercising public authority. has been subject to the new Act on maintaining cleanliness and order in communes (Act of 13 September 1996).

The purpose of the paper is to present a forecast of the rural commune income in 2018-2020. The data from 2003-2016 (GUS) was used in order to prepare rural commune income and expenditure forecasts for 2018-2020. The level of budgetary income and expenditure and the increment of the smoothed variable representing the linear trend coefficient were subject to exponential smoothing.

## Material and methods

Since 2014 the new Act on maintaining cleanliness and order in communes (Act of 13 September 1996) has been subject to the commune financial management. Under the provisions of the relevant law, apart from the obligation to manage waste, communes are obliged to set through a resolution, the upper limit of the fees paid by real estate owners for waste management. The revenue from the payments increases commune resources. In 2015 a new category of fees was added to the catalogue of commune resources. It was then that a change in the law on local taxes and charges was introduced, which made it possible for commune councils to pass resolutions imposing an advertising fee on advertising boards and advertising devices (Act of 24 April 2015). The Energy Law Act introduced regulations which clarify communes' duties to finance the lighting of sections of trunk roads (Act of 27 May 2015). What was reduced as a result was the cost of financing the lighting in the sections of trunk roads outside developed areas.

A new act that entered into force on 1 January 2016 introduced a possibility of making changes in local taxes (Act of 25 June 2015). In the case of the forest tax, it was the preferential forest tax rates referring to protective forests that were abolished, in the case of the tax on inheritance and donation, a free-of-charge acquisition of an entity or its part by current co-owners who continue to co-own the entity was taxed, and in the case of the tax on civil-law transactions, the partial removal of shared ownership was taxed. The changes let communes increase their own resources. The Act of 11 February 2016 on the State's assistance in raising children introduced an upbringing benefit addressed to families with children under 18, so-called "Family 500+" programme (Act of 11 February 2016). The benefit is financed from the state budget through commune local governments, which receive funds to cover the costs of servicing the benefit.

Commune income may also take the form of finance from the European Union budget (Act of 13 November 2003). Under the Act, communes may also obtain means from the state budget for partially funding their own contribution required when realising projects and programmes financed with EU resources (Act of 6 December 2006). Since 2010, means for accomplishing projects and programmes in the part corresponding to the contribution of European funds

In force since 1 January 2010, the Act on public finance (Act of 27 August 2009) has systematized

are transferred to LGUs as payments, and the part of the means corresponding to the national contribution is transferred as special-purpose subsidies.

Under the currently binding *Act on public finance* it is possible to establish target reserves on a broad scale in order to liberalize the commune financial management. So far target reserves in commune budgets could be made for expenses in the case of which the allocation according to the budget classification could not be made while drawing up the budget. At present it is additionally possible to create target reserves for commune expenses relating to programmes financed with funds from the European Union budget and non-refundable funds granted as part of support measures by the member states of European Free Trade Association (EFTA). Unlike other types of target reserves, the target reserves for expenses for the execution of the aforementioned programmes are not restricted to 5% of total commune budget expenditure.

The Law on the 2016 budget provides for the target reserve named "Increasing the availability of pre-school education". Funds allocated for the special-purpose subsidies for communes and cities with county rights amount to 1,562.6 m zlotys. Additionally, communes are returned part of expenses borne in the preceding year within the village fund (*fundusz sołecki*) in the form of special-purpose subsidies by the state budget. Since 2014 the Act on the village fund has been in force. For that time it has increased the reimbursement of expenses from the state budget by 10% (Act on 21 February 2014).

According to the administrative division of the country, there were: 16 provinces, 314 counties and 2,478 communes in 2016. Within the communes there were: 303 municipalities comprising cities, including 66 cities with county's rights, 616 urban and rural communes comprising towns and rural areas around them, and 1,559 rural communes covering rural areas. Compared with 2015, the number of municipalities dropped by 1, the number of urban and rural communes went up by 5, and the number of rural communes decreased by 4.

In 2016 the population of Poland totalled 38,427 thousand. Municipalities were inhabited by 48.3% of the population, i.e. 18,577 thousand people, including 32,8% in cities with county's rights, i.e. 12,614 thousand people. Rural communes were resided by 28.5% of the population, 10,951 people, and 23.2% of the population, which is 8,899 people, lived in urban and rural communes.

the law on the LGU budget; it also introduced certain elements of multiannual perspective of managing

LGU finances by imposing the obligation to prepare a multiannual financial forecast that is drawn up for a given budget year and at least the next three consecutive years. Thus the Minister of Finance is able to plan the State Treasury's four-year debt management strategy and its influence on the government debt. The list of multiannual undertakings kept by LGUs contains multiannual programmes, projects and tasks, including those connected with programmes financed with EU means and public-private partnership agreements.

The great flexibility of adaptive models and their adaptability to the irregular changes in the direction and speed of trends or distortions and shifts in periodic fluctuations make them a convenient tool for mid-term economic forecasts. Adaptive models take into account the instability of economic regularities over time. Adaptive methods do not require assuming a dynamic balance of budget income or expenditure because the results are smoothed with methods for filtering time series, and thus are partly independent of the influence of random factors. The adaptability also makes it possible to detect and take into account any deviations from regularities, and hence correct the model over time and add new data to it. Moreover, all adaptive forecasting methods require adding optimal parameters (Guzik, 2009). An *ex post* point forecast (prediction) error is calculated with the following equation:

$$e_{\tau}^* = y_{\tau}^* - \hat{y}_{\tau}^* \text{ for } \tau = 1, 2, \dots, T^* \dots (1),$$

The relative forecast error  $Vp$  is a forecast accuracy measure. It is expressed as a percentage and equals  $Vp$ .

$$\frac{e_{\tau}^*}{y_{\tau}^*} \quad (2),$$

Average forecast errors are usually determined for the whole forecast period; these are usually:

- Mean error (ME) - it helps to assess the average burden of the forecast and is expressed with the following quotation:

$$ME = \frac{1}{T^*} \sum_{\tau=1}^{T^*} (y_{\tau}^* - \hat{y}_{\tau}^*) \quad (3),$$

- Mean absolute error (MAE) (expressed in absolute units), if the forecast is on average different from the actual value, the error is calculated with the following equation:

$$MAE = \frac{1}{T^*} \sum_{\tau=1}^{T^*} |y_{\tau}^* - \hat{y}_{\tau}^*| \quad (4),$$

- Root mean squared error (RMSE) - it is interpreted similarly to the mean absolute error (MAE), but it is much more sensitive to extreme values and is calculated with the following equation:

$$RMSE = \sqrt{\frac{1}{T^*} \sum_{\tau=1}^{T^*} (y_{\tau}^* - \hat{y}_{\tau}^*)^2} \quad (5),$$

- Mean absolute percentage error (MAPE) informs about the percentage difference between the forecast and the actual value, and is calculated with the following formula:

$$MAPE = \frac{1}{T^*} \sum_{\tau=1}^{T^*} \left| \frac{y_{\tau}^* - \hat{y}_{\tau}^*}{y_{\tau}^*} \right| \quad (6),$$

Mean errors are calculated when the actual value of the forecast variable is already known and can become a measure of the difference between the forecast value and the observed value of the forecast variable. A forecast for period  $(n + 1)$  is deemed to be acceptable if the relative error is not greater than the value set in advance (usually up to 10%).

If *ex ante* and *ex post* errors in forecasts for periods prior to the period of the subject forecast have been calculated, the forecast can be deemed to be sufficient, acceptable and applicable (Faraway, 2006).

There are two smoothing constants in the exponential smoothing with linear trend:  $\alpha$  - smoothing constant for the variable,  $\beta$  - smoothing constant for the trend coefficient, the increment resulting from the trend estimation. The equations exponentially smoothing the level of the variable and the trend coefficient were calculated with the following formulas:

$$F_t = \alpha \times y_t + (1 - \alpha) \times (F_{t-1} + S_{t-1}) \quad (7),$$

$$S_t = \beta(F_t - F_{t-1}) + (1 - \beta) \times S_{t-1} \quad (8).$$

The forecast for period  $t + 1$  was estimated by adding up the smoothed values:

$$\hat{y}_{t+1} = F_t + S_t \quad (9)$$

$$\hat{y}_{t+\tau} = F_t + \tau \times S_t \quad (10)$$

The forecast for  $\tau$  periods was estimated by adding up the smoothed variable and the smoothed trend coefficient multiplied by  $\tau$ .

## Results and discussion

Since 2013 LGUs have been transmitting data from multiannual financial forecasts to the Ministry of Finance. The forecast data include the basic financial

categories that are found in local government units, namely income, expenditure, financial result and debt. The LGU financial situation drawn up on the basis of

the data from resolutions passed in relation to the LGU multiannual financial forecasts (MFF) for 2016-2019 is presented in Table 3.

**Table 3.** LGU income, expenditure and financial result forecast for 2016-2019

Local government units	2016	2017	2018	2019	2017/ 2016	2018/ 2017	2019/ 2018
Total income, in mill. zł	209,559	206,322	208,957	205,384	98,5	101,3	98,3
Total expenditure, in mill. zł	217,972	209,677	206,274	200,391	96,2	98,4	97,
Financial result, in mill. zł	-8,413	-3,355	2,684	4,993			

Source: LGU multiannual financial forecasts for 2016-2019, Ministry of Finance 2017.

The data relating to multiannual financial forecasts for 2016-2019 shows that local government units planned a fall in budget deficit in 2016-2017, and a budget surplus in 2018 and later. The expected budget surplus was 2.684 mill. zł in 2018, and 4.993 mill. zł.

in 2019. LGUs intended to reduce their indebtedness in 2016-2019.

The data referring to the execution of commune budget is presented in table 4. In 2016 communes generated income of 101.795 mill. zł, and recorded expenditure of 98.175 mill. zł.

**Table 4.** Commune budget implementation in Poland

All communes	Implementation 2015	Plan 2016	Implementation 2016	Implementation rate (%)	Dynamics 2016/2015
Income, in mill. zł	87,667	102,129	101,795	99,7	116,1
Expenditure, in mill. zł	85,944	104,840	98,175	93,6	114,2
Financial result, in mill. zł	1,723	-2,711	3,620		
Rural communes					
Income, in mill. zł	38,507	44,682	44,450	99,5	115,4
Expenditure, in mill. zł	37,575	46,055	42,816	93,0	113,9
Financial result, in mill. zł	932,000	-1,373	1,634		

Source: Annual commune budget implementation reports for 2015 and 2016. Ministry of Finance 2017.

With deficit planned to reach 2.711 mill. zł, commune budgets were 3.620 mill. zł in surplus, and the surplus recorded in rural communes was 1.634 mill. zł. The data relating to multiannual financial forecasts for 2016-2019 shows that local government units planned a much higher budget deficit, which was expected to amount to 8,413 mill. zł.

Compared with 2015, the income generated in 2016 by communes was 16.1% higher (15.4% higher in the case of rural communes), and the expenditure

incurred was 14.2% higher (13.9% higher in the case of rural communes).

In 2016 own resources constituted 44.3% of the total commune income, special-purpose subsidies - 29.8%, and the general subsidy - 25.9% (Table 5). In the structure of rural commune income, own resources constituted a smaller share than in the structure of income of all communes, namely 37.8%; the share made up by special-purpose subsidies was higher - 31.5%, the same as that made by the general subsidy - 30.7%.

**Table 5.** Commune income and its dynamics in 2015-2016

All communes	Implementation 2015 mill. zł	Share (%)	Plan 2016	Implementation 2016 mill. zł	Share (%)	Implementation rate (%)	Dynamics 2016/2015
Income in total	87,667	100,0	102,128	101,794	100,0	99,7	116,1
Own resources	43,573	49,7	44,973	45,134	44,3	100,4	103,6
Total special-purpose subsidies	18,674	21,3	30,801	30,298	29,8	98,4	162,2
General subsidy	25,419	29,0	26,353	26,361	25,9	100,0	103,7
<b>Rural communes</b>							
Income in total	38,507	100,0	44,682	44,449	100,0	99,5	115,4
Own resources	16,452	42,7	16,742	16,785	37,8	100,3	102,0
Total special-purpose subsidies	8,797	22,9	14,294	14,012	31,5	98,0	159,3
General subsidy	13,257	34,4	13,644	13,651	30,7	100,1	103,0

Source: own work on the basis of annual LGU budget implementation reports for 2015-2016, Ministry of Finance 2017.

Compared with 2015, in 2016 the share of own resources in the structure of total commune income fell by 5.4 percentage points (in rural communes by 4.9 pp.), and the share of general subsidies declined by 3.1 pp. (in rural communes by 3.7 pp.); on the other hand, the share of special-purpose subsidies went up by 8.5 pp. (in rural communes by 8.7 pp.).

In 2016 the total commune income amounted to 101,794 mill. zł and was 16.1% higher than the total commune income generated in 2015. On the other hand, commune own resources pooled in 2016 rose by 3.6%, compared to the year 2015.

As a consequence of reducing the upper limits of taxes, tax reliefs and exemptions, and decisions about cancelling, spreading out over some period or postponing the deadlines of payments, in 2016 commune budgets were not credited with 3,377 mill. zł, which constituted 3.3% of total income and 7.5% of own resources (Table 6). 76.3% of reliefs and exemp-

tions approved by communes in 2016 referred to lowering the upper limits of tax rates. What made up the highest share in the total tax-rate upper-limit reduction was the lowering of real estate tax rates (72.7%), rates of tax on motor car (21.2%) and agricultural tax rates (5.3%).

The largest share in the total amount of reliefs and exemptions approved by communes in 2016 was contributed by reliefs and exemptions in the scope of the real estate tax - 99.1%. The biggest number of cancellations of tax arrears was also recorded in the case of the real estate tax (68.4%) and agricultural tax (7.0%).

As far as the total amount of payments spread over some time or with postponed deadlines is concerned, the biggest share was also made up by the real estate tax (75.6%), followed by the tax on inheritance and donations (6.6%) and the tax on motor cars.

**Table 6.** Reliefs granted by communes in 2016

Communes	Implementation	Reliefs in total	Reduction in tax rates	Reliefs and exemptions	Cancelling tax arrears	Instalments/postponed deadline
Total income, in mill. zł	101 794,8	3 377,4	2 578,3	592,1	125,8	81,2
Own resources, in mill. zł, including taxes:	45 134,6	3 377,4	2 578,3	592,1	125,8	81,1
Real estate tax	12 626,5	2 609,2	1 875,2	586,7	86,0	61,4
Agricultural tax	1 491,4	149,9	137,2	1,3	8,8	2,6
Forest tax	291,4	2,9	2,1	0,5	0,2	0,04
Motor car tax	724,9	558,1	547,6	2,5	3,8	4,2
Tax on inheritance and donations	114,8	9,4	0,0	0,01	4,0	5,4
Revenue from market fees.	133,5	3,9	3,7	0,0	0,2	0,02

Source: own work on the basis of annual LGU budget implementation reports for 2015-2016, Ministry of Finance, 2017.

The ratio of the total amount of reliefs and exemptions to the income generated from a given source was 77.0% in the case of the tax on motor cars, 20.7% in the case of real-estate tax, 10.1% in the case of agricultural tax, and 8.2% - the tax on inheritance and donations.

The consequences of tax reliefs and exemptions approved by authorised bodies are taken into account when calculating income from taxes, which is the basis for determining the balancing subsidy.

Otherwise the state budget would compensate communes for the consequences of the decisions made by their bodies (Report, 2017).

Total commune expenditure in 2016 amounted to 98,175 mill. zł and was 14.2% higher than the expenditure incurred in the preceding year (see Table 7). In 2016 current expenditure and capital expenses incurred by both rural communes and by all communes was lower than expected in that year.

**Table 7.** Commune expenditure and its dynamics in 2015-2016

All communes	Implementa- tion 2015, in mill. zł	Share (%)	Plan 2016	Imple- mentation 2016, in mill. zł	Share (%)	Imple- menta- tion (%)	Dynamics 2016/2015
Expenditure in total, including:	85,944	100,0	104,840	98,175	100,0	93,6	114,2
Capital expenses	14,489	16,9	13,334	10,954	11,2	82,1	75,6
Current expenditure	71,455	83,1	91,506	87,221	88,8	95,3	122,1
<b>Rural communes</b>							
Expenditure in total	37,575	100,0	46,055	42,816	100,0	93,0	113,9
Capital expenses	6,818	18,1	6,096	4,892	11,4	80,2	71,8
Current expenditure	30,758	81,9	39,959	37,924	88,6	94,9	123,3

Source: own work on the basis of annual LGU budget implementation reports for 2015-2016, Ministry of Finance 2017.

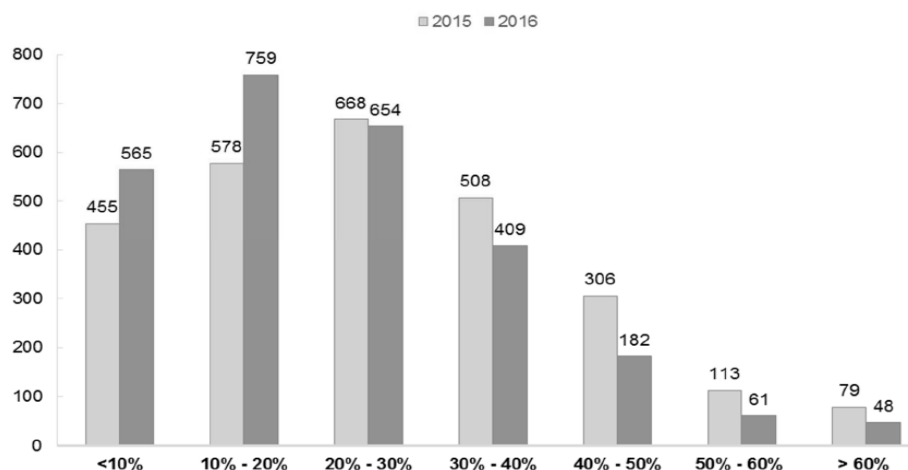
Commune current expenditure was 22.1% higher than current expenditure incurred in 2015. What worries in the structure of spending is a fall in investment expenditure by 6.7 pp in rural communes and by 5.7 pp in all communes. Capital expenses were 24.4% lower than in 2015. LGU individual debt ratio is subject to modifications depending on a number of factors, i.a. the total outstanding amount of liabilities, income and current expenses, income from the sale of real estate and relations between those figures over the past three years.

Figure 1 illustrates the number of LGUs according to their indebtedness in 2015-2016. 95.4% of LGUs were indebted in 2016 (including 85.5% of communes), and the debt up to 40% was recorded in the case of 89.1% of units (including 77.5% of communes). In 2016, the debt in most LGUs (759, including 654 communes) was within a range of 10 - 20% - a rise of 31.3 pp. compared with the year 2015. A positive phenomenon is a fall in the LGU indebtedness exceeding 20% - a drop of 19.1 pp in relation to

2015. Commune budget financial result was positive (recorded a surplus) in 2016 and totalled 3,619.7 mill. zł. The deficit planned in 2016 was expected to reach 2,711.8 mill. zł. Rural communes recorded a budget surplus of 1,633.7 mill. zł, while urban and rural communes and municipalities reported positive financial results of 1,198.2 mill. zł and 787.9 mill. zł, respectively.

A budget surplus was seen in 1,924 communes (79.8% of all communes) in 2016. A positive ratio of the financial result to income, exceeding 10%, was attained by 179 communes. A deficit was recorded in 488 communes, which is 20.2% of the total. In the group of communes that recorded a deficit, 19 reported a negative financial result to income ratio that exceeded 10%. For the sake of comparison, in 2015 a surplus was produced in 1,748 communes (72.5% of the total), while a deficit took place in 664 communes, i.e. 27.5% of the total. The analysis of LGU 2016 budgets shows large disparities in planning the financial performance.





**Figure 1.** LGUs by the debt level in 2015-2016

Source: Annual LGU budget implementation reports for 2015 and 2016. (Ministry of Finance) 2017.

The data referring to multiannual financial forecasts indicates that the budgetary deficit in 2016 was expected to reach 8,413 mill. zł, in communes - 2.711 mill. zł. However, the year was 3.620 mill. zł in surplus (a difference of 12.033 mill. zł), and in the case of rural communes it was 1.634 mill. zł in surplus. The key element of preparing local government income forecasts is the choice of an optimal forecasting method that will let communes minimize the discrepancies between the planned and attained financial results, and then also manage the development of local government units more effectively.

The data from 2003-2016 was used in order to prepare rural commune income and expenditure forecasts for 2018-2020. The level of budgetary income

and expenditure and the increment of the smoothed variable representing the linear trend coefficient were subject to exponential smoothing.

The forecast rural commune income in 2018 was 46,489.7 mill. zł, and the forecast rural commune expenses - 43,240.4 mill. zł. The forecast financial result amounts to 3,249.3 mill. zł and such earnings are acceptable since the relative forecast error does not exceed 10% (3.5% - income, 5.8% - expenditure).

The income and expenditure forecast for 2019 and 2020 shows an upward tendency (see Table 9), The forecast income in 2019 and 2020 is 48,940 mill. zł and 51,390.3 mill. zł, respectively, and the forecast expenditure is 44,845.4 mill. zł and 46,450.1 mill. zł, respectively.

**Table 8.** Calculation of the forecast past rural commune income and expenditure in 2003-2016 (mill. zł)

t	$y_{t \text{ inc.}}$	$F_t(0,4)$	$S_t(0,7)$	$y_t^*$	$y_{t \text{ exp.}}$	$F_t(0,4)$	$S_t(0,7)$	$y_t^*$
1	15 680.4	15 680.4	1 844.6	-	15 968.3	15 968.3	1 929.8	-
2	17 525.0	17 525.0	1 844.6	17 525.0	17 898.1	17 898.1	1 929.8	17 898.1
3	19 941.4	19 598.3	2 004.7	19 369.6	19 742.3	19 793.7	1 905.8	19 827.9
4	22 648.6	22 021.2	2 297.5	21 603.0	23 213.6	22 305.1	2 329.8	21 699.5
5	24 637.3	24 446.1	2 386.7	24 318.7	24 286.7	24 495.6	2 232.3	24 634.9
6	27 035.9	26 914.0	2 443.5	26 832.8	27 100.3	26 876.8	2 336.5	26 727.9
7	28 476.6	29 005.2	2 196.9	29 357.6	30 195.6	29 606.3	2 611.6	29 213.4
8	31 865.3	31 467.3	2 382.6	31 202.0	35 301.6	33 451.3	3 475.0	32 217.8
9	33 241.5	33 606.6	2 212.2	33 849.9	34 976.5	36 146.4	2 929.1	36 926.4
10	34 447.9	35 270.4	1 828.4	35 818.8	34 191.5	37 121.9	1 561.5	39 075.5
11	35 367.5	36 406.3	1 343.6	37 098.8	35 028.6	37 221.5	538.2	38 683.4
12	37 033.0	37 463.1	1 142.9	37 749.9	37 416.5	37 622.4	442.1	37 759.7
13	38 507.4	38 566.6	1 115.3	38 606.0	37 575.1	37 868.8	305.1	38 064.5
14	44 449.8	41 589.1	2 450.3	39 681.9	42 815.9	40 030.7	1 604.9	38 173.8

Source: own work on the basis of data from the Regional Data Bank 2004-2017, Central Statistical Office, Warsaw 2017.

**Table 9.** Mid-term forecast and rural commune income and expenditure forecast errors

Years	Income forecast mill. zł	Mean square error, in mill. zł	Mean relative forecast error in %	Relative mean forecast error	Expenditure forecast, in mill. zł	Mean relative forecast error in %	Relative mean forecast error	Mean square forecast error, in mill. zł
2017	44039.4	1614.6	3.67	3.2	41635.5	6.04	5.4	2515.8
2018	46489.7	1614.6	3.47	3.2	43240.4	5.82	5.4	2515.8
2019	48940.0	1614.6	3.30	3.2	44845.2	5.61	5.4	2515.8
2020	51390.3	1614.6	3.14	3.2	46450.1	5.42	5.4	2515.8

Source: own work.

The forecasts can be accepted because the relative forecast errors do not exceed 10%. The rural commune financial result is expected to be 4,094.7 mill. zł in 2019 and 4,940.2 mill. zł in 2010, and just like in the past years indicate an upward tendency.

## Conclusions

The development of communes is an integral component of sustainable development. An important challenge for local policies is to bring prosperity to all residents, minimize discrepancies between residents' wealth and avoid polarization. The strong internal diversification of rural communes, which is typical of that level of public administration, determines the manner of running local policies by them, the policies that are focused on giving equal opportunities of development. Being the smallest unit of local government, a rural commune is best equipped with the tools for managing rural areas. Pursuant to the Constitution, its purpose is to perform all public tasks as long as they are not assigned to other bodies by the Constitution or other laws. A commune is also provided with the independence of actions, which lets it perform tasks according to its own agenda and without the interference of other local government units. The principles of commune operations are governed by the Act on commune local government under which communes perform their own tasks and tasks assigned to them, which lets them meet the local societies' needs optimally and effectively. The accomplishment of commune tasks is possible thanks to the assets possessed.

A commune budget is the most important instrument of local financial management. Local government authorities' actions are not very effective if deprived of permanent income. A proper structure of the budget permits communes fulfil their planning functions, and as a consequence monitor and audit

commune financial operations. Problems with modelling local development are difficult to overcome due to their complexity and changeable conditions of the development; hence forecasting budget income and expenditure is very important in the process of defining developmental priorities, the scope of actions and the ways of financing them. The development of communes is a long-term and complex process of operational qualitative and quantitative changes. For it to become a series of positive changes, it is necessary to select optimal methods of forecasting economic phenomena taking place within a given area.

## References

- Act of 13 November 2003 on the income of local government units (official codification, Journal of Laws of 2016, item 198)
- Act of 13 September 1996 on the maintaining cleanliness and order in communes (Journal of Laws of 2016, item 250.).
- Act on 21 February 2014 on the village fund (Journal of Laws of 2014, item 301.).
- Act of 24 April 2015 on amending certain acts due to the strengthening of the tools of landscape protection (Journal of Laws 2015, item 774).
- Act of 25 June 2015 on amending the act on commune local government and certain other acts (Journal of Laws of 2015, item 1045).
- Act of 27 May 2015 Energy Law (official codification, Journal of Laws 2017, item 220).
- Act of 27 August 2009 on public finance (official codification, Journal of Laws no 2016, item 1870, as amended).
- Act of 6 December 2006 on the principles of development policy (official codification, Journal of Laws of 2016, item 383.).

- Act of 11 February 2016 on the state's assistance in raising children (Journal of laws of 2016, item 195).
- Faraway, J.J. (2006). *Extendig the Linear Model with R*. Chapman&Hall/CRC.
- Guzik, B. (2009). *Podstawowe modele DEA w badaniu efektywności gospodarczej i społecznej*. Poznan: Uniwersyty of Economy.
- Jastrzębska, M. (2012). *Finanse jednostek samorządu terytorialnego*. Warszawa: Wolters Kluwer Business.
- Miszczuk, A., Miszczuk, M., Żuk, K. (2007). *Gospodarka samorządu terytorialnego*. Warszawa: PWN.
- Owsiak, S. (2016). *Finanse publiczne. Współczesne ujęcie*. Warszawa: PWN.
- Pietrzak, B., Polańsk, Z., Woźniak, B. (2008). *System finansowy w Polsce. Tom 1*. Warszawa: PWN.
- Piotrowska-Marczak, K., Uryszek, T. (2009). *Zarządzanie finansami publicznymi*. Warszawa: Difin.