

## RESEARCH ON THE PROBLEMS OF SUSTAINABLE DEVELOPMENT OF RURAL TERRITORIES OF KLAIPĖDA REGION: CASES OF ŠILUTĖ DISTRICT AND RUSNĖ WARD

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### ABSTRACT

There are 33 rural, 18 semi-rural and 9 urban municipalities in Lithuania according to three criterias: 1) part of population living in rural areas; 2) population density and 3) distance of municipality from large towns/cities. Šilutė district municipality together with Rusnė ward has been studied in detail to search the main problems of sustainable development of these rural territories of Klaipėda region. System analysis approach and method of integrated sustainability index were applied with supplement of social inquiry fulfilled in Rusnė ward. The indices selected for calculations and comparison of rural and semi-rural municipalities, including Šilutė district, were social, economic and environmental: for Šilutė 4 different indices in each group were selected, for Rusnė ward – 3 indices. The integrated sustainability index was calculated for all rural municipalities of Lithuania and Rusnė ward. The research period for Šilutė and other municipalities was 2006-2012, and for Rusnė ward 2008-2012. Research has revealed that the main problems with sustainability in the studied territories are of social character. According to the Integrated sustainability index, Šilutė district municipality was somehow lower than other rural municipalities of Lithuania, and even in Rusnė ward this index was a little higher during 2011–2012, than in Šilutė district municipality.

KEYWORDS: *rural municipalities, semi-rural municipalities, sustainable development, indices of sustainability.*

JEL CODES: Q56, R11, J11

### Introduction

Population in world developing regions will remain predominantly rural until 2020, after that, the size of the rural population is expected to decline due to slower population growth and rapid urbanization in most countries (Trends..., 2009). Lithuania even in the beginning of 21st century remains the rural country searching sustainable development in different inner regions as other EU countries (Lazarevaitė et al., 2006). But the criterias to distinguish rural territorial regions in Lithuania are still under discussion due to the diversity of rural localities and changing criterias in different countries. More and more popular division nowadays not to ordinary two – rural and urban regions, but rather it is substituted by the calculation of degree of rurality of different regions or settlements. One of such methodology was proposed by OECD, divided regions to rural, semi-rural and urban ones (The Nature of Rural..., 2001). Three criterias are to be selected in order to deter-

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mine the degree of rurality: 1) part (in %) of population living in rural areas; 2) population density (number of people per 1 km<sup>2</sup>); 3) distance of municipality from large towns/cities. According to this methodology, if >50 % of population are living in rural areas, these territories are considered as rural regions; if 15–50 % of population live in rural areas, these regions have to be considered as semi-rural; if <15 % of population live in rural regions, these regions have to be considered as urban (Vidickienė, Melnikienė, 2008). It is recommended to use this methodology for the communities and settlements at NUTS-3 level. The strategies to deal with more sustainable rural development should take into consideration the remoteness, potentials and the most vital problems in rural areas in order to provide differentiated approaches (Šimanskienė et al., 2013; Jasaitis, Ratkevičienė, 2012). For example, in the regions with less soil fertility (Thrupp, 2000; Krankalis et al., 2012; Aleknavičius, 2007), it is important to pay more attention on diversified rural development rather than promoting traditional agricultural business.

The analysis of complicated objects and problems necessarily leads to the systems approach or theory (Von Bertalanffy, 2013). This approach integrates the analytic and the synthetic methods, and usage of them allows to make comparison of studied situation in different regions on different levels and to reveal more grounded conclusions concerning causality of different factors, influencing development process towards sustainability or unsustainability. Thus it was necessary the system approach to be included in this research too.

The objective of this paper – to focus on the problems of sustainability of Lithuanian rural territories through analysing more in detail the situation in Šilutė district municipality and Rusnė ward, both belonging to the Klaipėda region. For this few tasks were appointed:

- 1) to calculate the integrated index of sustainable development in Šilutė district and Rusnė ward and to compare it with other rural and semi-rural municipalities of Lithuania;
- 2) to search for reasons of non-sustainable development in the selected territories.

## Research methods

All the municipalities of Lithuania were divided to rural, semi-rural and urban municipalities (Verkulevičiūtė-Kriukienė et al., 2013; Pilipavičius, 2012). Šilutė district municipality in accordance to 3 criterias was distinguished as a rural one. In this research different statistical data was compiled from 2006 to 2012 according to the indices of sustainable development. Additionally to statistical data analysis, the social inquiry method for analysis of reasons for non-sustainable development was applied. 42 residents of Rusnė ward were inquired by questionnaire with 20 questions.

For calculation of integrated sustainability index (see formula below) three other components were necessary to be calculated: index of economical sustainability (1), index of social sustainability (2) and index of environmental sustainability (3) (Čiegis, 2004; Čiegis et al., 2010).

$$I_{SI} = \sum_i a_i I_i,$$

where:  $I_i$  – different indices of sustainable development;  $a_i$  – weights of different development indices (under the circumstance: = 1);  $I_{SI}$  – Integrated sustainability index.

Standart integrated index of sustainability embraces three aspects of sustainable development – economic, social and environmental (European Commission, 2001; Štreimikienė, Mikalauskienė, 2009; Burgis et al., 2014):

$$I_{SI} = a_1 \cdot I_{ES} + a_2 \cdot I_{SS} + a_3 \cdot I_{EnS}$$

where:  $I_{ES}$ ,  $I_{SS}$ ,  $I_{EnS}$  – Economic sustainability index, Social sustainability index and Environmental sustainability index as a consequence;  $a_1$ ,  $a_2$  and  $a_3$  – weights of indices of different sustainability (under the circumstance:  $a_1 + a_2 + a_3 = 1$ ) (Čiegis, Ramanauskienė, 2011; Šimanskienė et al., 2011).

The indices selected for calculations and comparison of rural municipalities, including Šilutė district, were as follows:

Social:

- Population (%) receiving social aid;
- Number of crimes per 1000 of population;
- Coefficient of demographic aging;
- Population density (per km<sup>2</sup>).

Economic:

- Number of small and medium enterprises per 1000 population;
- Utilised agricultural land (%);
- Share of working age population (%);
- Direct foreign investments (Lt) per capita.

Environmental:

- Municipality expenses for environmental protection in (Lt) per capita;
- Pollutants from stationary sources to atmosphere (kg/km<sup>2</sup>);
- Forestry (%);
- Waste water effluents (%) cleaned till norms.

Indices for Integrated sustainability index in Rusnė ward were selected as follows:

Social:

- Population (%) receiving social aid;
- Mortality of population per 1000;
- Population density (per km<sup>2</sup>).

Economic:

- Number of small and medium enterprises per 1000 of population;
- Share of working age people (%);
- Number of rural tourism homesteads per 1000 of population.

Environmental:

- Expenses for environment protection in (Lt) per capita;
- Number of waste water treatment facilities per 1000 of population;
- Number of ecological farms per 1000 population.

Selected indices in Rusnė ward were analysed from 2008 to 2012, because lack of statistical data for 2006–2007. The correlation-regression method was used to determine the reasons between different factors and studied indices. Programme ArcGIS 10.2.1 was used to prepare the maps.

## 1. Šilutė district municipality in the background of other rural and semi-rural municipalities

Different indices of sustainable development in our research were compared for rural and semi-rural district municipalities, and particularly in detail for Šilutė district of Klaipėda region (Fig. 1).



Fig. 1. Distribution of Lithuanian municipalities to rural, semi-rural and urban  
According to the source: Melnikienė, Vidickienė 2010

During research period 2006–2012, the share of pensioners within rural population made on the average 24.2 %. The highest number of pensioners was determined in Ignalina and Anykščiai district municipalities (30.3 and 29.1 % correspondingly), and the least in Šilutė and Šalčininkai district municipalities (19.2 and 20.0 % consequently). It was determined close positive correlation ( $p < 0.05$ ) between population density and birth rate per 1000 population in rural and semi-rural municipalities of Lithuania (Fig. 2).

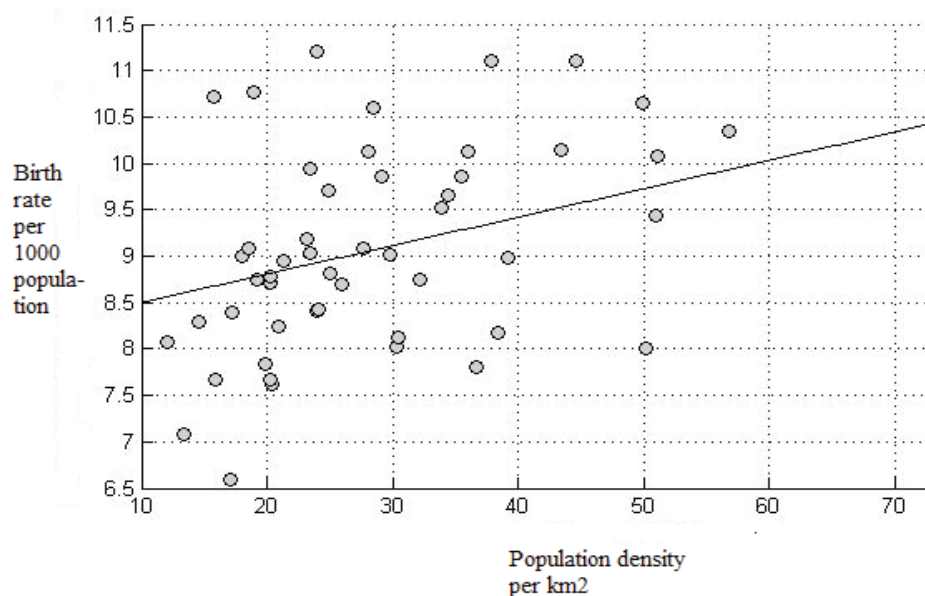


Fig. 2. Dependence of population density on birth rate per 1000 of population in rural and semi-rural municipalities in 2006–2012

Source: calculated according to the data of Lithuanian Statistical Department 2007–2013

Also it was determined statistically significant ( $p < 0.05$ ) negative correlation between population density and number of pensioners in rural and semi-rural municipalities (Fig. 3).

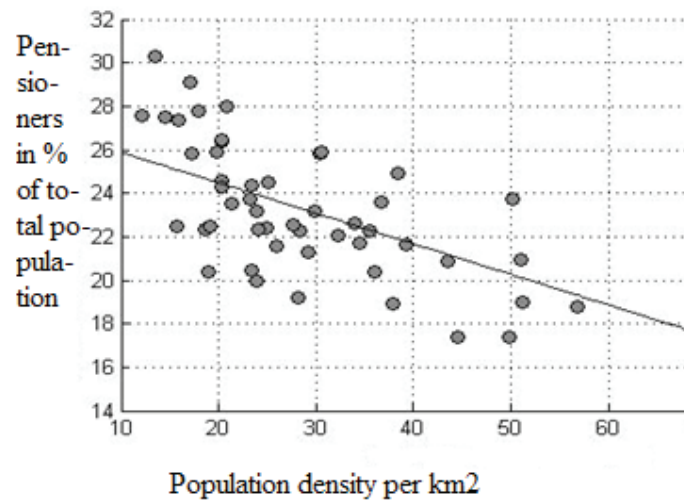


Fig. 3. Dependence of population density on number of pensioners (%) from 2006 to 2012

Source: calculated according to the data of Lithuanian Statistical Department 2007–2013

When analysing migration from rural territories during 2006–2012, there were no one rural municipality with positive migrational trend. Šilutė district has distinguished by the highest migration rate (-901.9), and the second highest was Kėdainiai district (-875.7), at the same time the least migration was characteristic to Kalvariija (-113.9) and Rietavas (-159.0) municipalities.

The number of small and medium enterprises per 1000 population in rural and semi-rural municipalities has changed during 2006–2012 as it is shown in Fig. 4.

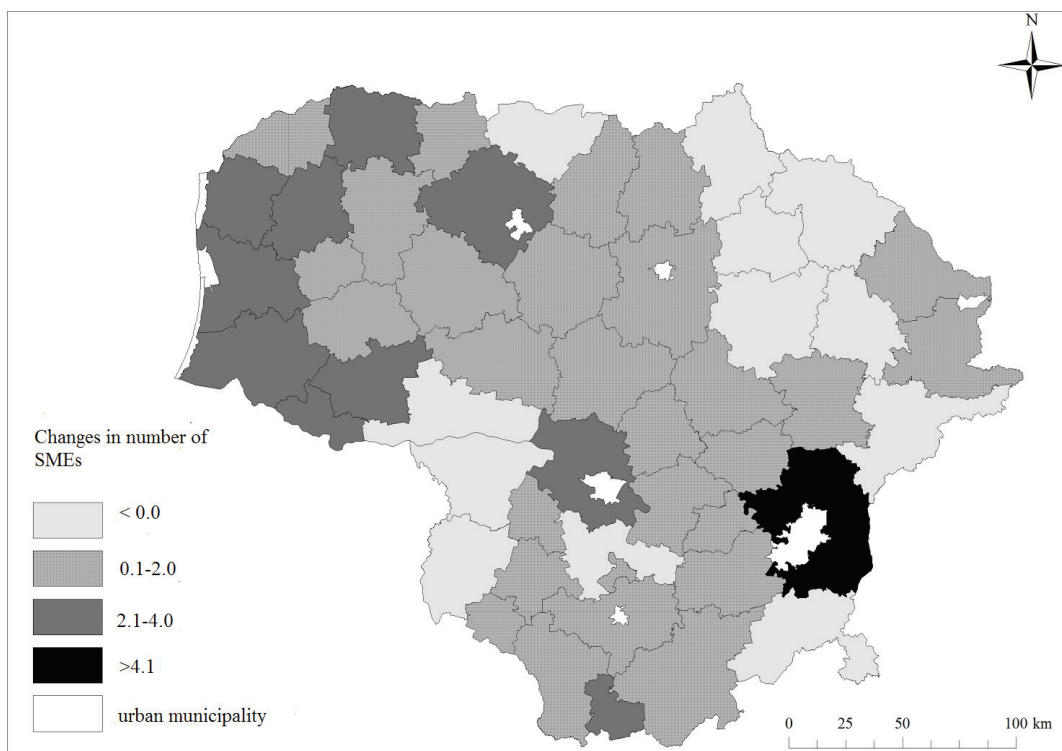


Fig. 4. The changes in number of registered small and medium enterprises in rural and semi-rural municipalities from 2006 to 2012

Source: made according to the data of Lithuanian Statistical Department 2007–2013

Šilutė district was among the districts which experienced the increase from 2.1 to 4.0 small and medium enterprises per 1000 population (the second highest group among the rural and semi-rural municipalities). But according to the number of people receiving social aid, Šilutė district was in the second highest group too (Fig. 5).

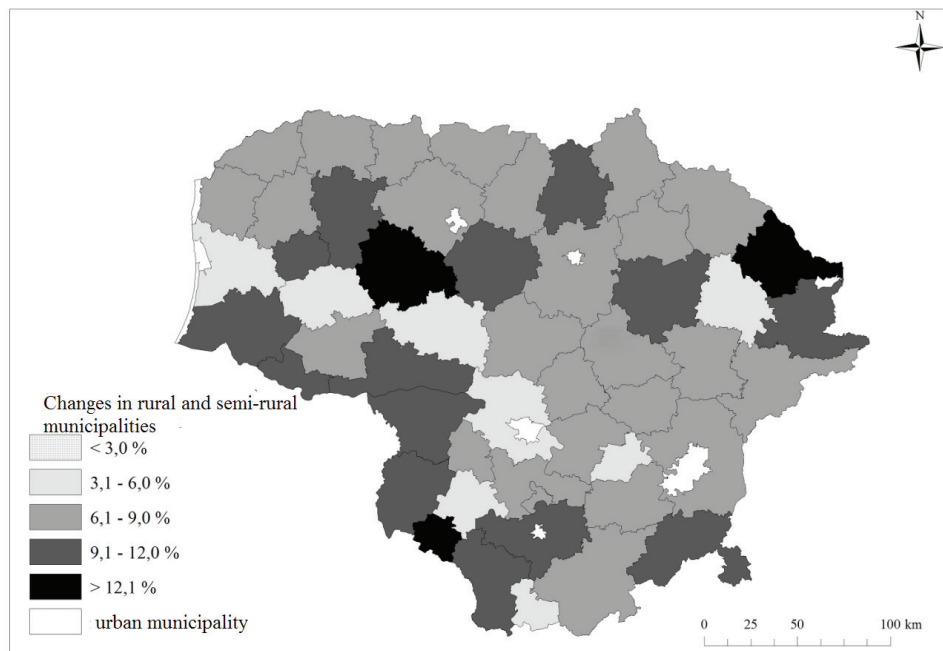


Fig. 5. Changes of number of population in rural and semi-rural municipalities, receiving social aid (%) from 2006 to 2012

Source: made according to the data of Lithuanian Statistical Department 2007–2013

Šilutė district has distinguished by the highest rate of criminality during the research period (Fig. 6).

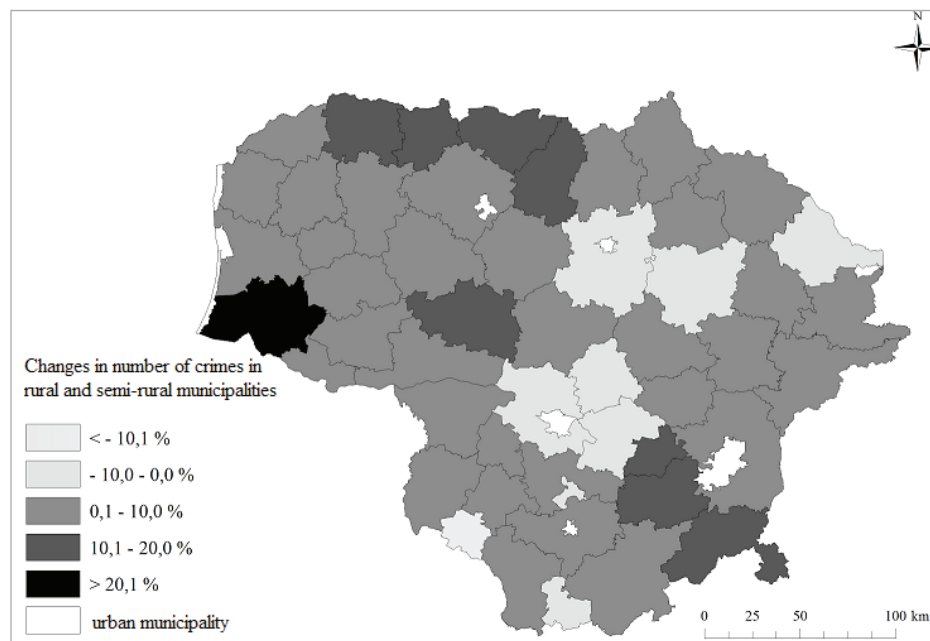


Fig. 6. Changes of registered number of crimes per 1000 population (%) in rural and semi-rural municipalities from 2006 to 2012

Source: made according to the data of Lithuanian Statistical Department 2007–2013

According to the expenses for environmental protection, Šilutė district was in the second highest group of municipalities (Fig. 7).

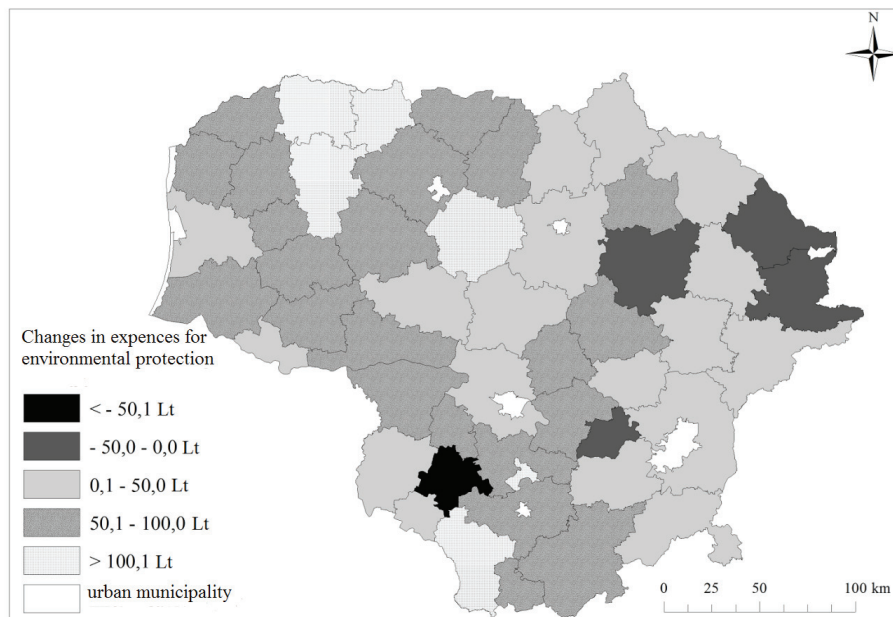


Fig. 7. Changes of expences for environmental protection per capita in Lt in rural and semi-rural municipalities, 2006–2012

Source: made according to the data of Lithuanian Statistical Department 2007–2013

The Social sustainability index (SSI) for Šilutė district was as it is shown in the Table 1.

Table 1. Average changes of SSI in rural and semi-rural municipalities of Lithuania and in Šilutė district municipality in 2006–2012

SSI values	2006	2007	2008	2009	2010	2011	2012
Average in all rural municipalities	33.3	33.5	31.5	22.2	-0.6	-12.2	-17.1
Average in all semi-rural municipalities	33.3	33.3	31.8	19.6	-15.3	-29.3	-32.6
Šilutė district municipality	33.3	33.1	31.4	23.3	0.3	-12.7	-25.7

Thus calculations show, that SSI in Šilutė district municipality in 2006–2011 was like average in all rural municipalities, however in 2012 it showed the sharp decrease from the average trend, but as compared with semi-rural municipalities, it was higher in Šilutė district.

The Economic sustainability index (ESI) in Šilutė district was higher than average in all rural municipalities from 2009 to 2012, but lower than in semi-rural municipalities over all research period (Table 2):

Table 2. Average changes of ESI in rural and semi-rural municipalities of Lithuania and in Šilutė district municipality in 2006–2012

ESI values	2006	2007	2008	2009	2010	2011	2012
Average in all rural municipalities	33.3	39.2	40.2	38.1	37.8	41.1	40.7
Average in all semi-rural municipalities	33.3	36.0	40.1	50.0	55.6	62.5	69.8
Šilutė district municipality	33.3	34.1	39.0	41.0	44.6	47.4	55.0

The Environmental sustainability index (EnSI) in Šilutė district municipality was a little lower than average trend in all rural municipalities, but from 2009 was sufficiently lower than in semi-rural municipalities (Table 3).

Table 3. Average changes of EnSI in rural and semi-rural municipalities of Lithuania and in Šilutė district municipality in 2006–2012

EnSI values	2006	2007	2008	2009	2010	2011	2012
Average in all rural municipalities	33.3	35.6	43.2	45.5	52.2	54.7	59.3
Average in all semi-rural municipalities	33.3	35.0	48.4	53.3	59.7	70.8	72.4
Šilutė district municipality	33.3	36.1	38.3	36.0	46.6	51.6	54.7

Values of Integrated sustainability index (ISI) in Šilutė district municipality were similar to average values of rural municipalities, but lower for period from 2007 to 2009, and much lower than in semi-rural municipalities (Fig. 8).

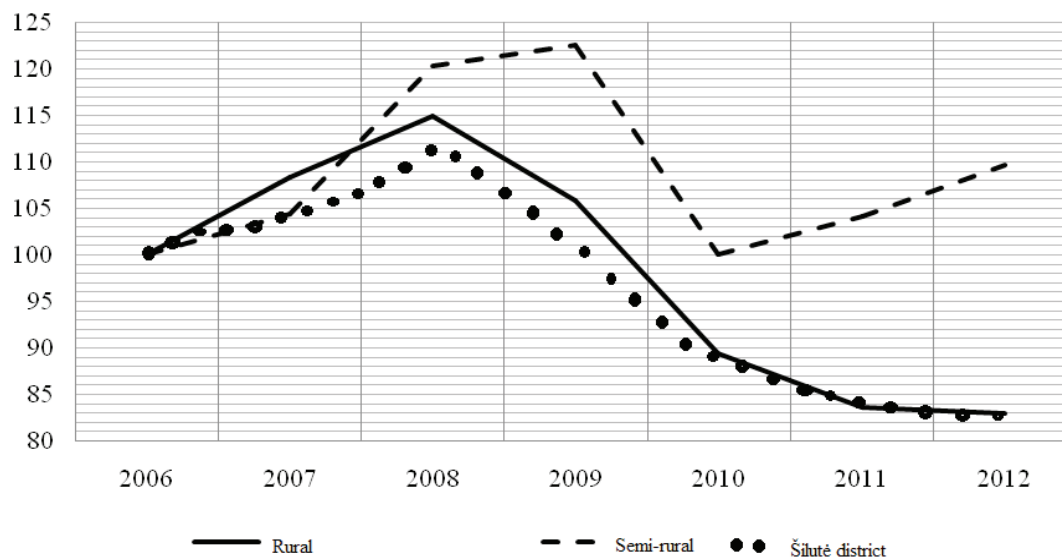


Fig. 8. Integrated sustainability index in rural and semi-rural municipalities and of Šilutė district from 2006 to 2012

## 2. Sustainability situation and problems in Rusnė ward

Rusnė ward is located in the main Rusnė island and many smaller islands, that belong to Šilutė district municipality. The total area of the ward is 5556 ha. About 40 % of territory of the ward is occupied by water, 50 % – by agricultural land, 10 % – by forests and bushes. There 20 water pumping stations for polders are located in Rusnė ward. Six settlements – town of Rusnė, and villages: Pakalnė, Skirvytė, Šyškrantė, Uostadvaris and Vorusnė – are distributed in the ward. The changes in natural increment of population of Rusnė ward from 2006 to 2012 are shown in the Table 4.

Table 4. Natural movement of population in Rusnė ward in 2006–2012

	2006	2007	2008	2009	2010	2011	2012
Number of births	14	17	17	15	17	24	18
Number of deaths	18	26	16	26	19	28	21
Natural movement	-4	-9	1	-11	-2	-4	-3



Only in 2008 there was positive natural movement of population in Rusnė ward, in rest of years it was negative, and most negative was in 2009.

The three indices of sustainability in Rusnė ward during 2008–2012 were distributed as it is shown in Fig. 9.

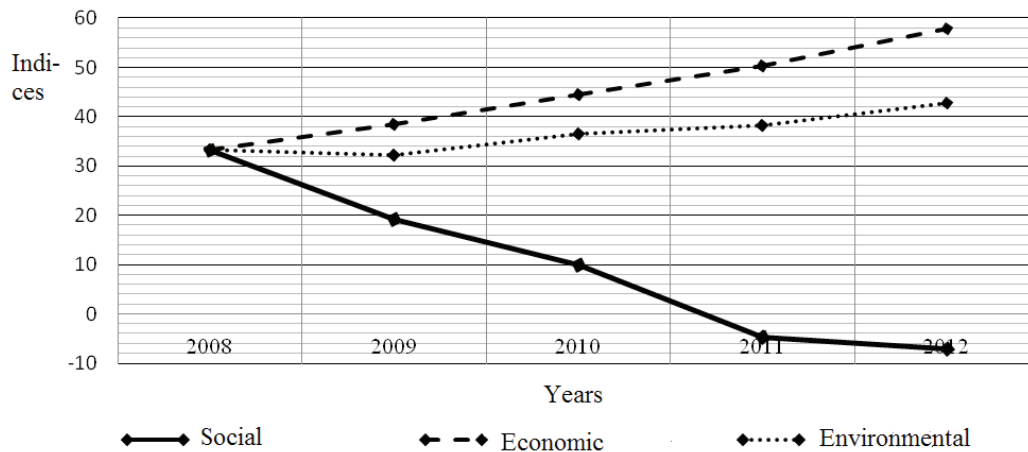


Fig. 9. Changes of sustainability indices in Rusnė ward from 2008 to 2012

Calculations show, that most problematic in Rusnė ward (and also in Šilutė district municipality) during 2008–2012 was social development, which is still not improving.

The Integrated sustainability index (ISI) in Rusnė ward showed a little improvement from 2011 to 2012, and it was a little higher than in Šilutė district municipality (Fig. 10 and 8):

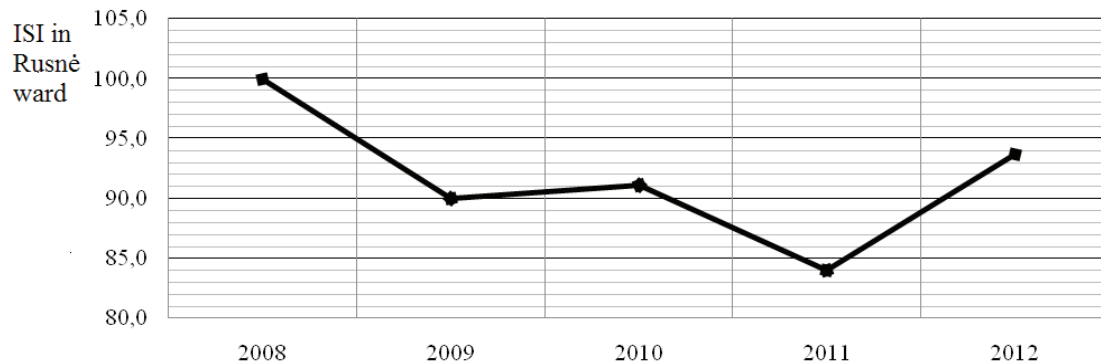


Fig. 10. Changes in ISI (Integrated Sustainability Index) in Rusnė ward from 2008 to 2012

After compilation of 42 answerings of occasionally selected respondents in Rusnė ward, it became more understandable some social and economic problems of local population. To the answer on the question about the incomes, most of respondents answered, that their incomes decreased or did not change during the recent 5 years (answered 76 % of all respondents), and those with increased incomes made only 24 % (Fig. 11).

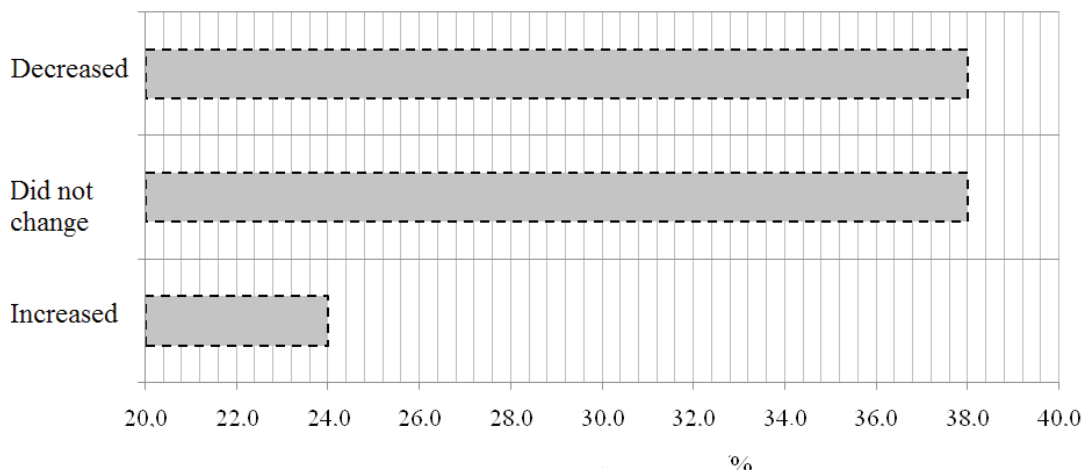


Fig. 11. Changes in respondent incomes during the last 5 years

Source: according to results of social inquiry

To the question, what are the incomes per month, the answers were as follows: till 1000 Lt – 42.0 % of respondents; from 1000 to 2000 Lt – 50.0 %; from 2000 to 3000 Lt – only 8.0 % of respondents. Almost 20 % of respondents in Rusnė showed, that the social aid for them is the main source of living. It is in correspondence to the situation in Šilutė district municipality as well.

To the question, is it worth to promote ecological farming in Rusnė ward, about 75 % of respondents answered positively. Concerning situation with waste management, the respondent’s answers were distributed as it is shown in Fig. 12.

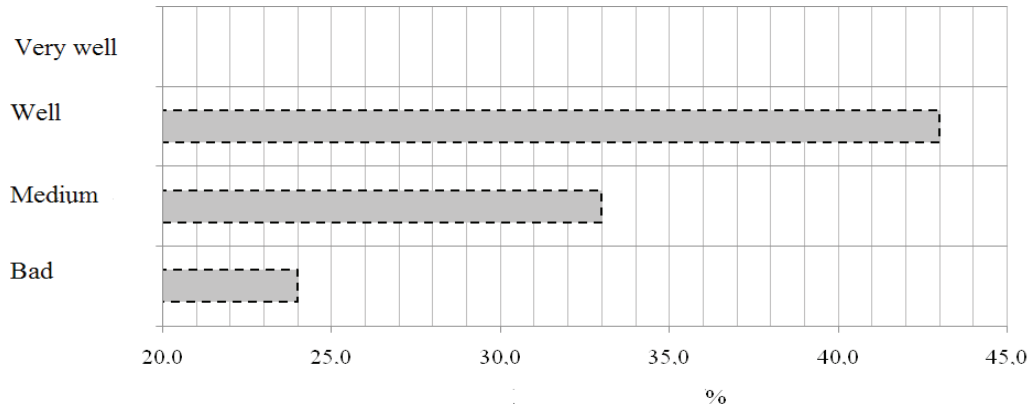


Fig. 12. Waste management evaluation by respondents in Rusnė ward

Source: according to results of social inquiry

About 43.8 % of respondents think, that waste management is fulfilled well, 31.2 % – evaluate it as medium situation, and 25.0 % – as bad. No one answered, that situation with waste management is very well.

## Conclusions and recommendation

1. According to the OECD methodology, there are 33 rural municipalities, 18 – semi-rural municipalities and 9 urban municipalities in Lithuania. Šilutė district with Rusnė ward belongs to rural municipality.

2. Šilutė district municipality has distinguished by one of the worst social sustainability index as compared with other rural municipalities. Among the reasons there are few: increase in number of pensioners, migration rate and people with social aid, and decrease in number of birth rate.
3. Integrated sustainability index in Šilutė district was a little lower than in other rural municipalities due to the better situation with small and medium enterprises number.
4. Integrated sustainability index in Rusnė has shown a little improvement from 2011 to 2012, and it was somehow higher than in Šilutė district municipality. However human resources in Rusnė ward are in bad situation, and that in connection with income decrease or unchanged amount of income during the last 5 years made local people to feel not satisfied with social and economic development. Citizens of Rusnė are positively evaluating waste management and they think, that ecological farming has to be promoted in the ward.
5. For Šilutė district municipality and Rusnė ward authorities and politicians: it is recommended to pay more attention on measures and solutions of social and human problems in these rural remote territories of Klaipėda region. The ecological agriculture, water tourism, catering with traditional meals, cultural and natural tourism, recreational fishery, watching of birds, crafts and sports have to be the prioritative directions of rural development in this part of western Lithuania.

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## **DARNIOS KAIMIŠKŲ TERITORIJŲ PLĖTROS PROBLEMŲ TYRIMAS KLAIPĖDOS REGIONE: ŠILUTĖS RAJONO IR RUSNĖS SENIŪNIJOS ATVEJAI**

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### Santrauka

Lietuva ir XXI amžiaus pradžioje išlieka kaimiška valstybė, o darnaus vystymosi siekis yra vienas svarbiausių ir Lietuvos, ir ES tikslų. Šiandienis netolygus paskirų Lietuvos regionų vystymasis kelia nemažai iššūkių. Visos savivaldybės veikia pagal tarybų patvirtintus strateginės plėtros planus, kurie apima esmines darnaus vystymosi sritis. Tačiau vien planų kūrimas negarantuoja laukiamų teigiamų pokyčių. Šiais tyrimais norima atskleisti vieno iš Klaipėdos regiono, Šilutės rajono savivaldybės ir jai priklausančios Rusnės seniūnijos, plėtros problemas, kurios trukdo darniam jų vystymosi procesui.

Visos savivaldybės Lietuvoje buvo sugrupuotos taikant OECD metodologiją į tris grupes: 1) kaimiškąsias; 2) iš dalies kaimiškąsias ir 3) miesto (OECD, 1994; Melnikienė, Vidickienė, 2010). Šilutės rajono savivaldybė pateko tarp kaimiškųjų savivaldybių kartu su jai priskiriama Rusnės seniūnija.

Integruoti indeksai atskleidžia įvairias tiriamų reiškinių kokybines puses, kaip šių rodiklių kitimas laikui bėgant veikia bendro integruoto indekso kitimo dinamiką. Tyrimuose analizuoti pasirinkti rodikliai ir jų kaita laikotarpiu nuo 2006 iki 2012 metų (Rusnės atveju imtas laikotarpis nuo 2008 m. iki 2012 m.). Remiantis R. Čiegio (2004) ir jo bei bendraautorių (Čiegis ir kt., 2010) metodika, nustatyti kaimiškųjų ir iš dalies kaimiškųjų savivaldybių socialinės darnos, ekonominės darnos ir aplinkosauginės darnos indeksai, kurių suma su vienodais įverčio koeficientais prilyginta integruotam darnos indeksui.

Lietuvos kaimiškųjų ir iš dalies kaimiškųjų savivaldybių integruotam darnos indeksui apskaičiuoti pasirinkta po 4 socialinius, ekonominius ir aplinkos rodiklius. Rusnės seniūnijos integruotam darnos indeksui skaičiuoti pasirinkta po 3 kiekvienos iš šių grupių rodiklius.

Papildomai problemų priežastingumui nustatyti apklausti 42 Rusnės seniūnijos gyventojai (atsitiktinė atranka), kurie atsakė į 20 anketos klausimų dėl jų gyvenimo kokybės ir kylančių problemų.

Darbe taikyti ir sisteminės analizės, koreliacijos-regresijos metodai priežastingumo ryšiams nagrinėti, duomenys apdoroti ArcGIS 10.2.1 programa. Keli tyrimo rezultatai: Šilutės rajono savivaldybė iš kitų kaimiškųjų savivaldybių išsiskiria prastesniu socialinės darnos indeksu. Šilutės rajono integruotas darnos indeksas panašus į kitų Lietuvos kaimiškųjų savivaldybių vidutines indekso reikšmes dėl aukštesnio

Ekonominės darnos indekso reikšmės, nes Šilutės rajonas patenka tarp gana aukštą mažų ir vidutinių įmonių skaičių turinčių savivaldybių. Teigiamai rusniškiai vertina ekologinių ūkių plėtrą ir paramą jai, daugelio jų teigimu, atliekų tvarkymas seniūnijoje vykdomas gerai arba patenkinamai. Ekologinė žemdirbystė, vandens turizmas, tradicinių patiekalų gamyba, kultūrinis ir gamtinis turizmas, rekreacinė žvejyba, paukščių stebėjimas, amatai, sportinė veikla turėtų tapti prioritetinėmis šio Vakarų Lietuvos regiono kaimiškųjų teritorijų plėtros kryptimis.

**PAGRINDINIAI ŽODŽIAI:** kaimiškiosios savivaldybės, iš dalies kaimiškiosios savivaldybės, darni plėtra, darnos indeksai.

**JEL KLASIFIKACIJA:** Q56, R11, J11