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## **EMPLOYMENT OF SENIOR CITIZENS IN THE BALTIC SEA REGION BIOECONOMY<sup>1</sup>**

### *ZATRUDNIENIE OSÓB STARSZYCH W BIOGOSPODARCE W KRAJACH REGIONU MORZA BAŁTYCKIEGO*

**Key words: senior citizens, Baltic Sea Region, agriculture**

*Słowa kluczowe: seniorzy, kraje regionu Morza Bałtyckiego, sektor rolny*

*JEL codes: J00, J14, J43*

**Abstract.** The scale of employment of the elderly in agriculture in the Baltic Sea Region is analysed. Classification of the countries according to the age structure of persons employed in agriculture is performed with the use of Ward's clustering method. The diagnostic features were the percentages of persons from particular age groups employed in agriculture of a given country. The mean contributions of persons aged 50-64 and above 65 in the Baltic Sea Region are similar to those working in agriculture in all 27 EU member states. The mean percentage of the elderly (above 65 years of age) was over twice smaller in the Baltic Sea Region from the group of EU-10 countries and in Denmark than the those from the EU-15 group including Finland, Germany and Sweden. In the first group of countries also the percentage of persons aged 50-64 working in agriculture was also smaller.

### **Introduction**

Recently much attention has been paid to the ageing of societies, both in Europe and in the world. This phenomenon has been observed in urban and rural areas. Consequences of this process are important for bioeconomy and in particular for food production sector as one of the key sectors of economy determining development of agriculture and other branches of economy. Increasing number of senior citizens employed in the rural areas has become an important problem for correct development of agriculture in each country. Changes in the demographic structure in rural areas have been enhanced also by migration of young people from villages to cities and vice versa. Literature on the scale of employment of senior citizens in different regions of Europe is scarce, although the problem seems very important in view of ageing societies, among others as a result of increasing life expectancy. In the presentation of the scale of the problem of ageing among inhabitants of rural areas, particular attention was paid to the share of senior citizens employed in one of the most important sectors of bioeconomy. In order to realise the scale of the problem of ageing societies a study of age structure of urban and rural areas inhabitants was undertaken in the Baltic Sea Region countries being EU members.

### **Material and methods**

The study was performed in the Baltic Sea Region countries belonging to EU, including Denmark, Estonia, Finland, Lithuania, Latvia, Germany, Poland and Sweden. The analysis was performed on the basis of the currently available data from the European Commission (EC). Ward's

<sup>1</sup> This examined issues constitute a part of the project: BaltSe@nioR: Innovative solutions to support BSR enterprises in product development aimed at raising comfort and safety of seniors home living. This work was part-financed by the European Union (European Regional Development Fund and European Neighbourhood and Partnership Instrument).

method of clustering was used. As EC has recently changed the methodology of counting persons in particular age groups it is impossible to compare the dynamics of changes in the phenomenon analysed in particular regions of EU countries because of the lack of data.

## Results

While performing analysis of employment of senior citizens in bioeconomy in particular Baltic Sea Region countries the differences in populations of the countries must be taken into regard (Fig. 1). The population of Germany is the highest and reaches 81.2 million, Poland is the second according to the size of population with about twice lower number of citizens. The third is Sweden inhabited by over 8 times fewer people in comparison to Germany and the smallest population is that of Estonia with 1.3 million citizens.

In all Baltic Sea Region countries the contribution of rural areas in the total areas of the countries is much greater than that of urban areas. The greatest contribution of rural areas is in Estonia and Finland (over 80%), while the smallest of about 40% in Germany and Sweden (Tab. 1). The contribution of inhabitants of rural areas in the entire populations of Baltic Sea Region countries is greater than that of inhabitants of urban areas in Denmark, Lithuania, Estonia, Finland and Poland while smaller in Latvia, Germany and Sweden. The highest contribution of inhabitants of rural areas

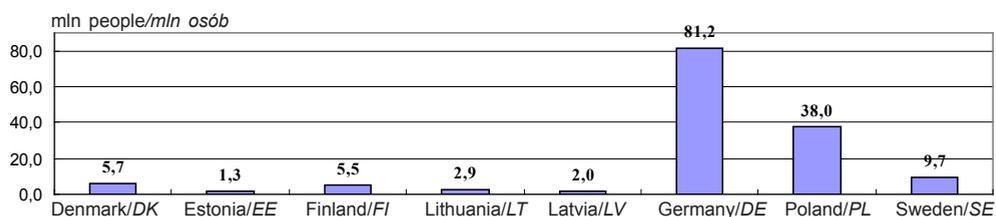


Figure 1. The populations of particular Baltic Sea Region countries

Rysunek 1. Liczba ludności w krajach regionu Morza Bałtyckiego (RMB)

Source: own study based on [FAOSTAT 2016]

Źródło: opracowanie własne na podstawie [FAOSTAT 2016]

Table 1. Comparison of selected indices characterising rural and urban areas with respect to the data for entire Baltic Sea Region

Tabela 1. Porównanie wybranych wskaźników charakteryzujących obszary wiejskie i miejskie w stosunku do ogólnych danych dla danego kraju RMB

Wyszczególnienie/ Specification	Territory/ Obszar [%]		People on the area/Zaludnienie [%]		Employment on the area/Zatrudnienie na obszarze [%]		% in GVA from the area/% w WDB z obszaru	
	rural/ wiejski	urban/ miejski	rural/ wiejski	urban/ miejski	rural/ wiejski	urban/ miejski	rural/ wiejski	urban/ miejski
Denmark/DK	51.3	1.2	29.5	21.5	27.1	27.3	24.9	31.3
Estonia/EE	82.4	9.9	48.1	39.3	43.2	46.3	32.0	59.7
Finland/FI	82.3	2.8	41.0	28.4	38.3	32.6	34.4	38.7
Lithuania/LT	64.7	14.9	43.1	25.5	39.9	28.6	30.2	38.5
Latvia/LV	62.8	16.2	37.9	48.7	36.2	50.5	22.6	66.9
Germany/DE	38.5	11.1	16.5	41.4	15.2	44.5	13.8	49.3
Poland/PL	51.2	9.3	36.0	28.3	33.5	33.1	26.0	41.6
Sweden/SE	44.0	1.5	16.4	21.6	15.5	25.4	14.7	29.7
Baltic Sea Region/Region Morza Bałtyckiego	59.7	8.4	33.6	31.8	31.1	36.0	24.8	44.5
EU-27/UE-27	51.6	9.9	22.6	42.3	20.6	45.4	15.6	54.4

\* the data do not add up to 100 as the data for the intermediate areas are disregarded/% nie sumują się do 100, gdyż w analizie pominięto obszary pośrednie.

Source/Źródło: [EC 2013, p. 54]

in total population equal to 44% is noted in Estonia, Lithuania and Finland, in which this share is almost twice higher than the mean value for EU-27. The structure of employment in rural and urban areas is more diverse. In Denmark, Poland and Estonia the percentages of people working in rural and urban areas are comparable. In Lithuania and Finland the percentage of people working in rural areas is greater than that of people employed in urban areas by 11.3 and 5.7 % points, respectively. In the other Baltic Sea Region countries the employment in urban areas is dominant. In Germany this predominance reaches 30% points, while in Latvia and Sweden about 10% points. In most of the Baltic Sea Region countries the contribution of economic activity in rural areas in the gross value added (GVA) is similar and varies from 23% in Latvia to 34% in Finland, the exceptions are Germany and Sweden in which economic activity from rural areas brings only 14% of GVA.

The differences become more pronounced when analysing the contribution to GVA coming from the economic activities in rural areas in comparison to those from urban areas. The greatest differences are found in Latvia and Germany in which the contributions from economic activity in urban areas are by almost 40% points higher than from rural areas.

A comparison of the number of people above 65 year of age living in the rural and urban areas has shown that except Poland the number of senior citizens living in rural areas is greater than that living in the cities (Tab. 2). The greatest differences between the number of senior citizens in rural and urban areas of over 6% points is noted in Sweden, while the smallest in Germany and Latvia where the difference is smaller than 1% point. The contribution of persons aged 65+ living in rural areas in the Baltic Sea Region is similar, close to 19.6%, in the majority of countries, only in Poland it is smaller and reaches 13.5%. Another important index that should be analysed in the aspect of ageing societies is the number of senior citizens per 100 persons in working age in rural and urban areas, Table 3. According to the data presented in Table 3, in all Baltic Sea Region countries except Poland, this index reaches higher values in rural areas, which is a negative phenomenon. The greatest differences between the values of this index in rural and urban areas, reaching 10%, were found in Sweden, Finland and Denmark.

A growing number of persons in immobile age and post-production age has become a challenge to the Baltic Sea Region. The problem is how to use the potential of people in these age groups. In rural areas the work resources are one of the most important components of the potential production of agriculture [Wiśniewski, Zegar 1979].

Differences in the production resources in agriculture between countries are related to the area of the country and the level of economic development achieved. The work resources in agriculture and development challenges to the bioeconomy of a given country can be characterised by analysis

Table 2. Age structure of inhabitants of rural and urban areas in the Baltic Sea Region  
Tabela 2. Struktura wiekowa ludności na obszarach wiejskich i miejskich w krajach RMB

Wyszczególnienie/ Specification	Age structure in rural area [years old]/ Struktura wiekowa na obszarach wiejskich [%]			Age structure in urban area [years old]/ Struktura wiekowa na obszarach miejskich [%]		
	years/lata					
	≤ 14	15-64	≥ 65	≤ 14	15-64	≥ 65
Denmark/DK	17.4	63.6	19.0	16.8	68.9	14.3
Estonia/EE	15.2	67.1	17.6	16.5	67.1	16.4
Finland/FI	16.7	63.8	19.5	16.9	68.5	14.6
Lithuania/LT	14.6	66.0	19.4	15.2	68.9	15.9
Latvia/LV	14.0	67.0	19.0	14.3	67.5	18.2
Germany/DE	13.5	65.8	20.8	13.2	66.8	20.1
Poland/PL	15.8	70.7	13.5	13.9	71.1	14.9
Sweden/SE	15.6	62.8	21.6	18.2	66.6	15.2
Baltic Sea Region/Region Morza Bałtyckiego	15.4	65.9	18.8	15.6	68.2	16.2
EU-27/UE-27	15.3	66.0	18.6	16.0	67.0	17.0

Source/Źródło: [EC 2013, p. 62]

of age structure of persons working in this sector. Table 4 presents the age structure of persons working in agriculture in the Baltic Sea Region. The countries in which the percentage of immobile age people is the highest are Finland and Germany, the mean value is 38.4%. In Lithuania, Sweden, Latvia and Poland this percentage is just a little smaller and varies from 33.2% to 35.2%. The age structure of people working in agriculture implies certain problems for the countries, one of them is how to ensure an adequate level of living for those above 65 years of age. Another problem is related to the fact established by sociology that persons of more than 55 years of age tend not to take essential decisions on changes in their farms [Krzyżanowska 1998]. The lowest number of immobile age persons working in agriculture is found in Estonia, only 21.2% and Denmark – 27.3%. The mean number of persons of this age group employed in agriculture in all Baltic Sea Region countries is 32.7% , which is close to the mean value for all EU-27 states – 34.1%.

Application of the Ward's clustering method to the data from Table 4 permitted a distinction of two groups of Baltic Sea Region countries differing in the age structure of people working in agriculture (Fig. 2). The first group included all Baltic Sea Region countries from EU-10, so Poland, Lithuania, Latvia and Estonia and Denmark as the only country from EU-15. In the group of Poland, Lithuania, Latvia, Estonia and Denmark the mean contribution of persons above 65 years of age working in agriculture to all employed in agriculture is 5.2%, which is more than twice smaller than the corresponding value for the other group of countries: Finland, Germany and Sweden. In the former group of countries the

Table 3. Old-age dependency ratio in the age from 15 to 64 in the rural and urban areas in Baltic Sea Region  
*Tabela 3. Wskaźnik zależności osób starszych od osób w wieku 15-64 lat w krajach RMB na obszarach wiejskich i miejskich*

Wyszczególnienie/ Specification	People over 65 years old per 100 persons in 15-64 years old/ <i>Liczba ludności &gt;65. roku życia na 100 osób w wieku 15-64 lat</i>	
	rural area/ <i>obszar wiejski</i>	urban area/ <i>obszar miejski</i>
Denmark/DK	29.9	20.8
Estonia/EE	26.3	24.5
Finland/FI	30.6	21.3
Lithuania/LT	29.4	23.0
Latvia/LV	28.4	27.0
Germany/DE	31.6	30.1
Poland/PL	19.1	21.0
Sweden/SE	34.5	22.8
Baltic Sea Region/ <i>Region Morza Bałtyckiego</i>	28.7	23.8
EU-27/UE-27	28.2	25.4

Source/Źródło: [EC 2013, p. 63]

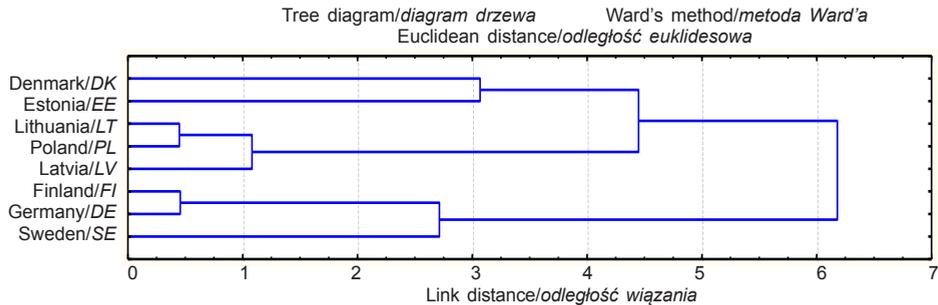
Table 4. Age structure of persons working in agriculture in the Baltic Sea Region countries belonging to EU in 2012  
*Tabela 4. Struktura osób zatrudnionych w sektorze rolnym wg wieku w krajach regionu Morza Bałtyckiego UE w 2012 roku*

Wyszczególnienie/ Specification	Age structure/Struktura wiekowa [%]					
	years old/ <i>lat</i>				mobility age/ <i>wiek mobilny</i>	production age/ <i>wiek produkcyjny</i>
	< 25	25-49	50-64*	>65		
Denmark/DK	15.2	47.1	27.3	8.5	62.3	89.6
Estonia/EE	7.6	54.9	21.2	6.9	62.5	83.7
Finland/FI	9.4	41.9	39.3	9.4	51.3	90.6
Lithuania/LT	5.8	56.2	35.2	3.7	62.0	97.2
Latvia/LV	8.3	53.1	33.2	5.6	61.4	94.6
Germany/DE	9.2	44.1	37.5	9.1	53.3	90.8
Poland/PL	6.5	54.9	33.9	4.7	61.4	95.3
Sweden/SE	10.1	38.4	34.2	17.1	48.5	82.7
Baltic Sea Region/ <i>Region Morza Bałtyckiego</i>	9.0	48.8	32.7	8.1	57.8	90.6
EU-27/UE-27	7.4	48.1	34.1	10.2	55.4	89.5

\* assumed in the study as corresponding to the immobile age/*przyjęto na potrzeby badań jako odpowiednik wieku niemobilnego*

Source: own study based on [EC 2013, p. 133]

Źródło: badania własne na podstawie [EC 2013, p. 133]



In all analyses where the coefficient of variation exceeded 50% a median was calculated instead of a mean, while the coefficient of variation calculated for position measures are given in brackets/*We wszystkich analizach, gdzie współczynnik zmienności przekroczył 50% obliczono medianę zamiast średniej, a w nawiasie podano obliczony współczynnik zmienności dla miar pozycyjnych*

Figure 2. Results of Ward's clustering analysis of Table 4 data for Baltic Sea Region

*Rysunek 2. Analiza skupień krajów regionu Morza Bałtyckiego ze względu na wiek osób zatrudnionych w sektorze rolnym*

Source: see tab. 4

*Źródło: jak w tab. 4*

mean percentage of 50-64 year old persons working in agriculture is 30.9% of all employed in this sector, which is by 6.1% points smaller than the corresponding mean for the second group of countries.

The typology of Baltic Sea Region countries made with regard to the contribution of senior citizens working in agriculture is important for tackling the challenges to bioeconomy in these countries. Taking into regard the fact that in some countries the contribution of persons in immobile age working in agriculture is very high, the financial aid should be directed to the project concerning activities not directly related to farming that would provide an adequate income and living conditions to the persons in this age group [Rosner 2001].

The problem of ageing of people working in agriculture is a difficult challenge for all EU countries. The policy of each EU country is aimed at acceleration of positive tendencies leading to structural transformations in agriculture and in rural areas in general [Woś 2004]. All kinds of incentives aimed at increasing the employment of rural area inhabitants in spheres not directly related to farming will significantly improve the structure of employment, agrarian structure and the income of people living in the rural areas, so that the agriculture of particular EU members will find the optimum position in the EU structures.

## Summary

1. In the majority of Baltic Sea Region countries, except for Latvia, Germany and Sweden, the fraction of people living in rural areas in the total population of a given country is greater than that of inhabitants of urban areas.
2. The fractions of people employed in the rural and urban areas in Denmark, Poland and Estonia are comparable, in Lithuania and Finland the fraction of people working in agriculture is higher, while in the other Baltic Sea Region countries – lower than that working in urban areas.
3. In all Baltic Sea Region countries the contribution of economic activity in rural areas to the GVA is smaller than that of the economic activity in urban areas. The former contribution varies from 23% in Latvia to 34% in Finland. The exceptions are Germany and Sweden.
4. In the Baltic Sea Region countries, except Poland, the fraction of persons over 65 years of age living in rural areas is greater than that of people from the same age group living in urban areas. The highest percentage of persons from this age group was found in Sweden and Germany, near 21%, while the lowest in Poland, 13.5%.

5. In all Baltic Sea Region countries, except Poland, the index describing the number of persons of over 65 years of age per 100 of persons aged 15 – 64 is higher in rural areas. The highest values of this index, of about 32%, are noted in Sweden, Finland and Denmark, while the lowest in Poland, near 19%.
6. The percentage of people of immobile age (50-64 years of age) working in agriculture is the highest in Finland and Germany (38%), while the lowest in Estonia (21%). High percentage of senior citizens employed in agriculture is a challenge for bioeconomies of these countries tackled by directing financial aid to the projects aimed also at development of activity not directly related to farming in order to use the potential of senior citizens and ensure an adequate life standard for them.
7. The typology performed for the Baltic Sea Region countries based on the contribution of senior citizens employed in the agricultural sector of their economies permitted distinction of two groups of states. The first group included all countries belonging to EU-10: Poland, Latvia, Lithuania and Estonia and Denmark, representing the group of EU-15. In the countries from this group the fraction of 65+ persons working in agriculture is at about 5% of the total number of those working in this sector. This index value is over twice smaller than the value established for the second group of countries including Finland, Germany and Sweden. In the latter countries also the mean percentage of persons aged 50-64 employed in agriculture is by about 6% points higher than in the first group of states.

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### Streszczenie

Przedstawiono skalę zatrudnienia osób starszych w sektorze rolnym w krajach Unii Europejskiej Regionu Morza Bałtyckiego (RMB). Dokonano typologii badanych krajów według struktury wiekowej osób pracujących w rolnictwie, wykorzystując w tym celu analizę skupień metodą Warda. Jako cechy diagnostyczne przyjęto odsetek osób pracujących w rolnictwie badanych krajów w poszczególnych grupach wiekowych. Średni dla krajów Regionu Morza Bałtyckiego udział osób zatrudnionych w rolnictwie w wieku od 50 do 64 lat i powyżej 65. roku życia był bardzo zbliżony do średniego udziału tych grup wiekowych w sektorze rolnym dla całej UE-27. Wśród krajów Regionu Morza Bałtyckiego mniejszym odsetkiem osób starszych zatrudnionych w rolnictwie charakteryzowały się wszystkie kraje z UE-10, a z UE-15 tylko Dania. Przeciętna dla tych państw wartość tego wskaźnika była ponad 2-krotnie mniejsza niż w drugiej grupie, w której znalazły się pozostałe kraje analizowanego regionu, czyli Finlandia, Niemcy i Szwecja. Pierwsza wymieniona grupa krajów odznaczała się także mniejszym odsetkiem osób zatrudnionych w rolnictwie, a należących do grupy wiekowej 50-64 lat.

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