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FOOD SELF-SUPPLY AND INCOME OF RURAL HOUSEHOLDS

Agnieszka Biernat-Jarka, Paulina Tuka
Warsaw University of Life Sciences – SGGW

Abstract. Food self-supply is one of the ways of satisfying food needs, which is achieved through bypassing the market, in households located in rural areas. The studies conducted in 2011 and 2012 in 1000 households in Mazowieckie Province demonstrated a large scale of self-supply. A significant portion of households declares consumption of fresh fruit and vegetables, as well as homemade preserves produced in their own household. The main objective of this article is to assess the phenomenon of food self-supply of households located in rural areas of Mazowieckie Province, with particular emphasis on their income. Based on the literature and conducted studies, the authors have formulated a hypothesis that the significance of food self-supply in rural households diminishes with the increase in household income.

Key words: food self-supply, natural consumption, household income, rural areas

INTRODUCTION

Households located in rural areas most often opt for a form of self-supply of food as a way to meet their consumption needs [Strzelecka 2012, p. 311]. Self-supply of food (natural consumption, self-consumption) is defined in literature as the part of consumed food which is obtained by the household with the exclusion of the market [Gutkowska 2003, p. 152].

Households which opt for natural consumption are both producers and consumers of food, which results in the significant shortening of the way between production and consumption of food [Rembisz and Floriańczyk 2014, p. 147]. In economic theory, we are dealing with natural consumption if the object of consumption are goods and services produced by the consumer himself/herself, as part of his/her household. On the other hand, we can speak of market consumption if the consumer purchases goods and services

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on the market, using his/her own money. The foregoing is a division of consumption according to the source of origin of consumer goods, i.e. the manner in which consumer goods and services are sourced [Zalega 2012, p. 25]. The share of market consumption in the total consumption of households increases together with the process of growing globalisation and economic and social development. This phenomenon is usually referred to as commercialisation of consumption (Fig. 1). The degree of commercialisation of consumption varies between different types of households, and primarily depends on the financial status of the household, its development phase, place of domicile, market supply and personal preferences of consumers. On the other hand, the phenomenon of decrease of the share of natural consumption in the overall consumption of households is referred to as denaturalisation of consumption [Bywalec 2007, p. 15]. Between these two types of consumption, natural and market, there is a mutually inverse relationship which indicates that natural consumption increases with a decrease in market consumption and vice versa. To a large extent, the level of natural consumption depends on the activity of the consumer in the market: if such activity is low, the share of natural consumption in household spending is large.

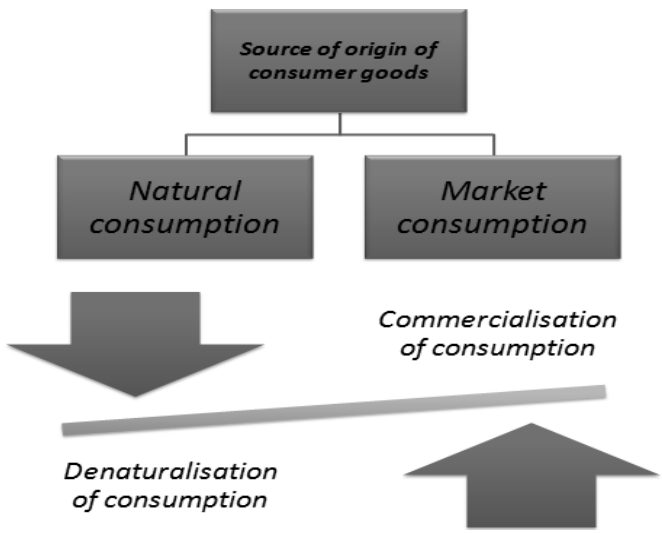

Fig. 1. Classification of consumption by source of origin of consumer goods
Source: Authors' own study on the basis of Zalega T.: Konsumpcja. Determinanty, teorie, modele [Consumption. Determinants, Theories, Models]. PWE, Warsaw 2012, pp. 25–26.

Natural consumption primarily relates to food and occurs, in most cases, in rural areas. According to the data provided by GUS (Main Statistical Office), in Poland, due to considerable fragmentation in agriculture, in 2013, almost every fifth individual agricultural farm produced goods mainly for the purposes of consumption by its own household [Characteristics... 2014, p. 154]. When it comes to urban households, the object of such consumption involves fruit and vegetables grown in the so-called allotment gardens and small livestock bred at home.

The changes that manifest themselves in the functioning of households in conditions of globalisation and market changes are related, i.a., to food issues. As a result, there are changes in the structure of consumption and the structure of spending (purchase of food). Moreover, there is a growing willingness among members of households to produce food on their own, due to a healthy lifestyle or food safety.

The level of satisfaction of food needs, as observed by consumers, is a result of many determinants, both objective and subjective. Research conducted by I. Ozimek and M. Jeżewska-Zychowicz shows that the level of satisfaction of food needs depends mainly on the income status, and to a lesser degree, on the age, level of education and place of residence [Ozimek and Jeżewska-Zychowicz 2001, p. 24]. Thus, the degree of economic development of the country and the level of income earned by society are important factors affecting the share of self-supply in food consumption. It is assumed that transition from self-supply of food to more frequent purchases on the market, accompanying growing incomes and economic development of the country, is an important feature of changes in food sourcing [Zalega 2011, p. 121]. It has been observed that an improved financial condition of a farmer household implies a lower percentage of households making use of self-supply [Stanisławska 2014, p. 195]. Periods of economic crisis are usually an exception to this rule, with the increased consumption of products originating from the household itself. Such a phenomenon was observed by B. Chmielewska, who conducted surveys in families associated with agriculture, mainly with dual employment, who are most affected by rising unemployment, and in an attempt to reduce their maintenance costs, return to self-supply of food [Chmielewska 2000, p. 125]. In turn, the economic development of the country and a high standard of living of population contribute to the reduction in self-consumption, and thus, to the increase in market purchases as a source of food. On the other hand, it has been determined that tradition and food consumption patterns, developed over the years, may have a stronger influence on the formation of natural consumption than the level of income itself [Tracy 1997, pp. 101–102].

In terms of self-supply of food or services, particular attention should be given to the role of women. As housewives, they take care of their home gardens and orchards, i.e. the source of food used mainly for the purpose of self-supply of the household. They also perform care and educational functions in terms of upbringing their children and taking care of the elderly. In addition, they run the household and maintain social ties [Michalska 2013, p. 127].

MATERIAL AND METHODS

1000 households located in the rural areas of Mazowieckie Province were surveyed. The study was carried out within the framework of the grant awarded by the Ministry of Science and Higher Education, grant number N N114 115439, titled "Living Conditions and Work of Women in Rural Areas", in 2011 and 2012.

The study population consisted of 1000 households. Replies were given by 77% women and 23% men, residents of selected municipalities and rural communes of Mazovia. In the study population, the largest group were people with secondary education (40%) and vocational education (39.2%). There were fewer people with higher education

(10.5%) and primary education (9.9%). Almost half of the respondents came from households composed of 3–4 persons (49.3%), and a slightly smaller group were respondents who came from households composed of 5–6 persons (30.1%) and 1–2 persons (16.6%). Only 4% of the respondents represented households composed of 7 and more people. Among the respondents, in every fifth household (19%) there were no children, and in every fourth (26.2%) there was only one child, while in 36% of the households there were two children. In nearly 19% of the households there were three or more children. In total, there were 16.9% of household without any freehold, or perpetual usufruct of, land. The other households owned freehold land or perpetual usufruct. Nearly 1/3 of the respondents had farms with an area ranging from 5 to 10 ha. A slightly smaller group were respondents who owned farms with an area ranging from 2 to 5 ha (26.6%) and from 10 to 15 ha (17.8%). The smallest farms, up to 2 ha, were owned by 12.1% of the total number of respondents, and the largest farms, i.e. over 50 ha – by less than 1%. In the survey, the average monthly income per person in the household over the last year was adopted as the indicator of income amount. Four income categories were distinguished:

- below PLN 500;
- from PLN 501 to 700;
- from PLN 701 to 1,400;
- above PLN 1,401.

The largest group were respondents from households with the average monthly income per person over the last year ranging from PLN 701 to 1,400 (34.7%), and the smallest group – with the average monthly income per person over the last year above PLN 1,401 (12%). In every third household, the gross income per person ranged between PLN 501–700, and nearly in every fifth – the monthly income per person amounted to less than PLN 500 (Table 1).

Table 1. The amount of income generated by surveyed households

Income category	Number of households	Structure (%)
Below PLN 500	178	17.8
PLN 501–700	328	32.8
PLN 701–1 400	347	34.7
Above PLN 1 401	120	12.0
No response	27	2.7
Total	1 000	100.0

Source: Authors' own study based on surveys.

Given the declared income of households, the largest group of respondents were from households in which the main source of income was the sale of farm produce (36.9%) (Table 2). Regular employment (other than self-employment) was the main source of income of 35.8% of the surveyed households. Disability or retirement pension was the only source of income for almost every tenth household. Just over 5% of respondents declared that they earned their living with the income from self-employment, which is a very low percentage. In the future, this share should increase with the continuing support of entrepreneurship in rural areas and farmers seeking additional sources of income

Table 2. Main source of income generated by surveyed households

Main source of income in the household	Number of households	Structure (%)
Sale of farm produce	369	36.9
Regular employment	358	35.8
Disability pension, retirement pension	96	9.6
Self-employment	56	5.6
Regular employment and sale of farm produce	56	5.6
Regular employment and self-employment	44	4.4
Other	21	2.1
Total	1 000	100.0

Source: Authors' own study based on surveys.

by developing non-agricultural activities. Recently, we have observed increasing occupational mobility among rural residents, hence 4.4% of respondents earn their incomes both in regular employment and self-employment. Another group of respondents, representing 5.6% of the total number of people who participated in the survey, is composed of people involved in two types of employment, with the predominant source of income in the form of agricultural activity and regular (paid) employment. According to the focus survey conducted on a group of mayors (heads of local rural governments), such dual employment in villages is a desirable form of gaining sources of income [Qualitative Research Report... 2007, p. 5]. Other sources of income included profits from investments or savings deposits, small paid jobs or social benefits.

RESULTS OF OWN STUDIES

Food self-supply is an important element of the structure of household budgets, and in particular, farmers, residents of rural areas and less affluent people. In the survey, respondents were asked to what extent they supply (produce) their own fresh food and homemade preserves. This question was answered by 985 respondents. Figure 2 indicates a high level of declared food self-supply in the surveyed households in the rural areas of Mazowieckie Province. In the analysed period, every fifth household produced all the fresh fruit and vegetables as well as homemade preserves consumed and produced by itself. Approximately 44% of household members produced almost half of the food consumed by the household, and only 10.6% of respondents in the surveyed households did not produce any food for their own needs.

Data presented in Table 3 show that the share of food self-supply in the surveyed households decreases with the increase in average household income. Among the more affluent families, the significance of natural consumption is disappearing, which may result from both quantitative and qualitative changes in the availability and diversity of product assortment on the market. In every fourth household with income below PLN 500, the family produces its own food and preserves. Every second respondent, both in the first and second category of household income, declares that almost half of the food is produced on his/her own farm (Fig. 3).

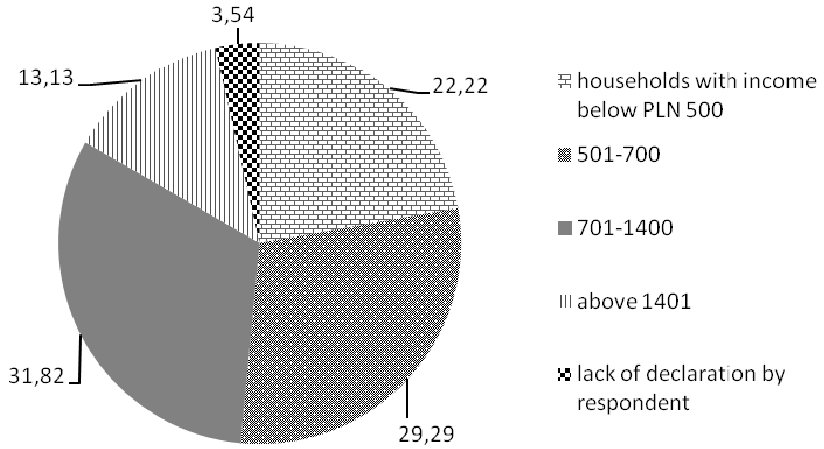

Fig. 2. Degree of food self-supply in surveyed households
Source: Authors' own study based on surveys.

Table 3. The amount of generated income and the share of food self-supply in the consumption of surveyed households

Specification	All the food		Almost half of the food		A portion, less than half of the food		None		Total number of households	
	number	%	number	%	number	%	number	%	number	%
Total	198	20.1	429	43.6	254	25.8	104	10.5	985	100
Income categories of households										
Above PLN 500	44	24.6	83	46.4	35	19.6	17	9.5	179	100
PLN 501–700	58	18.0	167	51.7	78	24.1	20	6.2	323	100
PLN 701–1 400	63	18.5	139	40.9	94	27.6	44	12.9	340	100
Above PLN 1 401	26	21.7	30	25.0	42	35.0	22	18.3	120	100
No response	7	30.4	10	43.5	5	21.7	1	4.3	23	100

Source: Authors' own study based on surveys.

The largest group of respondents who do not produce food for their own needs belongs to the income category of households generating an average monthly income in excess of PLN 1,401 per person.

In the households, where people earn their living from the sales of farm produce, food self-supply has the greatest influence on the food consumption patterns (Table 4). In every second household in this group, almost half of the food is produced in the form of self-supply, while 29.7% of respondents declared a 100% share, and 19.5% declared less than half of the share of self-supply. In the other groups of households, the importance of natural consumption is less pronounced, but still at a fairly high level.

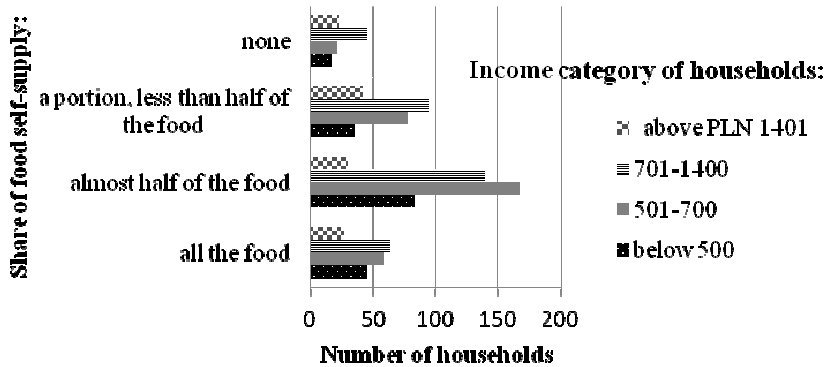

Fig. 3. Share of food self-supply in surveyed households according to income category
Source: Authors' own study based on surveys.

Table 4. Main sources of generated income and share of food self-supply in the consumption of surveyed households

Specification	All the food		Almost half of the food		A portion, less than half of the food		None		Total number of households	
	number	%	number	%	number	%	number	%	number	%
Total	198	20.1	429	43.6	254	25.8	104	10.5	985	100
Sale of farm produce	108	29.7	179	49.2	71	19.5	6	1.6	364	100
Regular employment	49	13.9	124	35.1	123	34.8	57	16.1	353	100
Disability or retirement pension	12	12.6	41	43.2	25	26.3	17	17.9	95	100
Self-employment	11	21.2	20	38.5	7	13.5	14	26.9	52	100
Regular employment and sale of farm produce	7	11.9	37	62.7	14	23.7	1	1.7	59	100
Regular employment and self-employment	8	18.2	17	38.6	11	25.0	8	18.2	44	100
Other source of income	3	16.7	11	61.1	3	16.7	1	5.6	18	100

Source: Authors' own study based on surveys.

The lowest share of self-supply in fresh food and homemade preserves has been declared by respondents from the group of households involved in regular employment or conducting their own business (self-employment) – Figure 4. In 2012, consumption of all the farm produce was declared by 29.7% of respondents from typically agricultural farms, 21.2% of self-employed respondents, and 13.9% of respondents from households involved in regular employment. Furthermore, a significant portion of respondents (62.7%) from households combining two types of employment declared consumption of almost half of the food produced for the purpose of self-supply.

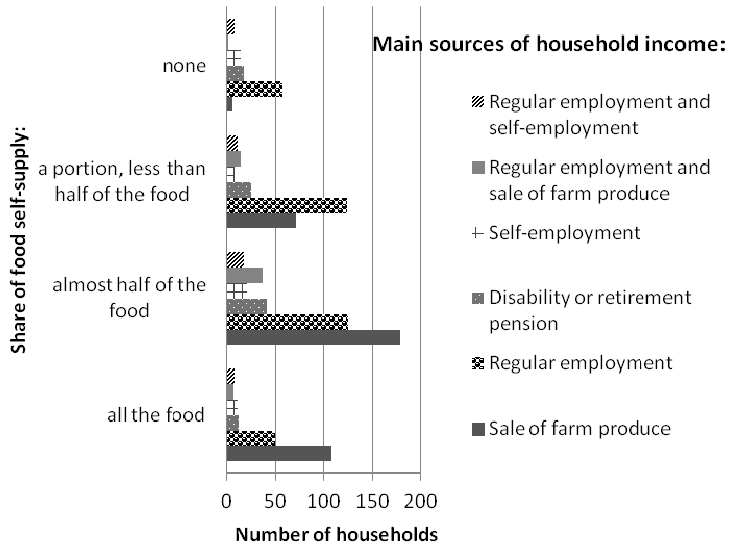

Fig. 4. Share of food self-supply in surveyed households as per main source of income
Source: Authors' own study based on surveys.

CONCLUSIONS

The surveys confirm the hypothesis adopted in the introduction to this article. Indeed, the significance of food self-supply in rural households diminishes with the increase in household income. This is due to the change in the consumption pattern in households, located in rural areas, in which people earn the highest income and there is a growing consumption of more expensive food products purchased on the market [Gulbicka and Kwasek 2007, p. 19]. In the households of farmers, there is also a notable shift from food self-supply to increased purchases on the market, although this group of households still demonstrates a very high level of natural consumption in terms of food. Recently, some households have returned to self-consumption due to the nutritional value of such food products or care about the health of family members and the condition of the natural environment.

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SAMOZAOPATRZENIE ŻYWNOŚCIOWE A DOCHODY WIEJSKICH GOSPODARSTW DOMOWYCH

Streszczenie. Samozaopatrzenie żywnościowe to jedna z form zaspokajania potrzeb żywnościowych, która uzyskiwana jest z pominięciem rynku w gospodarstwach domowych zlokalizowanych na obszarach wiejskich. Na podstawie badań przeprowadzonych w latach 2011 i 2012 w 1000 gospodarstwach domowych w województwie mazowieckim wykazano, że skala samozaopatrzenia jest bardzo duża. Znaczna część gospodarstw domowych deklaruje spożycie świeżych owoców i warzyw oraz przetworów domowych wytworzonych we własnym gospodarstwie domowym. Podstawowym celem artykułu jest ocena zjawiska samozaopatrzenia żywnościowego gospodarstw domowych położonych na obszarach wiejskich województwa mazowieckiego ze szczególnym uwzględnieniem uzyskiwanych przez nie dochodów. Na podstawie studiów literaturowych oraz przeprowadzonych badań sformułowano hipotezę, iż wraz ze wzrostem dochodu w gospodarstwie domowym maleje znaczenie samozaopatrzenia żywnościowego w wiejskich gospodarstwach domowych.

Słowa kluczowe: samozaopatrzenie żywnościowe, spożycie naturalne, dochody gospodarstw domowych, obszary wiejskie

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CHARACTERISTICS OF VEGETABLE OIL CONSUMERS IN POLAND IN A VIEW OF SUSTAINABLE CONSUMPTION PRINCIPLES

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Abstract. The paper presents problems of the sustainable consumption. The study focused on an example product, i.e. vegetable oils. One of the elements ensuring sustainable consumption is connected with the development of proper consumption patterns. It is a complex issue, since it requires multifaceted interdisciplinary studies. The starting point for their development is provided by the characteristics of profiles of vegetable oil consumers in Poland in a view of sustainable consumption principles. This study is based on the results of national survey. Recorded results may be useful also when preparing public awareness campaigns concerning sustainable consumption.

Key words: vegetable oils, sustainable consumption, consumption patterns, Poland

INTRODUCTION

Sustainable consumption patterns are defined as the consumption of material goods and services to a degree sufficient to satisfy basic needs and attain a higher quality of life, while minimizing the consumption of natural resources, materials harmful for the natural environment formed at all stages of production and at the same time not infringing on the rights of future generations to a comparable level of consumption [Kramer 2011]. Sustainable consumption is an optimal, conscious and responsible use of available natural resources, goods and services at the level of individuals, households, local communities, business circles, local and national governments, as well as international structures [Ministerstwo Gospodarki 2011]. Thus the problem of sustainable consumption may be

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considered in relation to individual households, regions or countries, while its level is influenced by the behavior of individual market participants.

Moreover, Kiełczewski [2007] stressed that sustainable consumption is to be a set of rational purchase decisions aiming not only at attaining the consumer equilibrium, but also realizing objectives of sustainable development. Thus, as it was reported by Kieżel [2004], consumer choices should be purposeful, conscious, well-thought, deliberate and planned, comprehensive and calculated. In this sense choices made by consumers are justified not only economically. Purchase decisions should be also influenced by factors connected with broadly understood ethnocentrism, quality of purchased products and relatively low harmfulness for the natural environment. The role of economic factors may obviously be connected with the effect of price on consumer decisions. In turn, loyalty towards local enterprises may be indicated, among other things, by the selection of purchase outlets as well as the importance of the type and origin of the raw material among factors determining the purchase of the product. A separate problem is connected with the assessment of the effect of ecological consciousness on purchase decisions made by consumers.

When defining sustainable consumption various studies also indicated the need to develop new consumption patterns. Borkiewicz [2008] define that rational behavior and rational consumption patterns may contribute to enhanced sustainable consumption. In turn, Łuczka-Bakuła [2007] emphasised the need for such a reorganization of current consumption patterns so as to ensure minimization of their pressure on the natural environment. The role of proper consumption patterns as a factor guaranteeing sustainable consumption was also mentioned by Borowska [2002], Mózner [2014] and Verain et al. [2014]. Michaliszyn [2012] citing Szczepański [1981], defines the consumption pattern as a comprehensive complex of phenomena connected with satisfying consumer needs, which reflect all consumption models. In turn, Kramer [1997] defined consumption patterns as the level of consumption structure, fixed in time and repeated on a massive scale under specific social and economic conditions, with a cohesive system of relationships and dependencies. Thus a consumption pattern describes a given reality, the existing state, while a consumption model defines the state desirable from the point of view of adopted standards [Michaliszyn 2012].

Food consumption is a special area of consumption, important from the point of view of both a single consumer and the entire economy [Schösler et al. 2012, Verain et al. 2012]. Research concerning consumption patterns refers to all or specific groups of consumed products [see e.g. Borowska 2002]. Due to the complexity of the problem of sustainable consumption the development of a pattern for vegetable oils requires comprehensive and multifaceted interdisciplinary studies. Thus the aim of this study was to provide characteristics of Polish vegetable oil consumers in view of principles of sustainable consumption. Its results may prove useful for the development of sustainable consumption patterns for vegetable oils in Poland, as well as public awareness campaigns promoting such consumption.

MATERIAL AND METHODS

In order to provide a characteristic of vegetable oil consumers both secondary and primary data were used. The former, concerning the level of consumption of vegetable oils, come from the FAOSTAT data base. In turn, primary data comprise survey results

on "Customs connected with the consumption of vegetable fats". That survey was conducted between 26 and 30 April 2012 and was concerned the period from May 2011 to April 2012. The objective of that survey was to collect information on the declared consumption and purchase of individual types of vegetable fats, i.e. margarines, mixes and vegetable oils, frequencies of their consumption and purchase, criteria considered at their purchase and opinions concerning vegetable fats. The survey was conducted on a population of Poles aged 15+, representative in terms of their sex, age, education, size of household and net income. This study comprised direct interviews at the residence of respondents within the framework of multi-subject syndicated cyclical survey conducted by GfK CAPIBUS[1]. These interviews were conducted with the householder. The population comprised 910 respondents, including 205 men and 705 women.

Since it was not possible on the basis of the survey to specify the type of vegetable oil contained in margarines and spread mixes, the study includes only the results concerning pure vegetable oils. The incorporated data refer to rapeseed, soy, sunflower and olive oils. What is more, due to the small number of responses soy oil was eliminated from this study.

One of the criteria[2] determining the specification of consumption as sustainable is the consumption of products made from domestic raw materials, processed by national enterprises and sold by them [Ministerstwo Gospodarki 2011]. For this reason it was assumed in this paper that among vegetable oils consumed in Poland the criterion for a sustainable product was met to the greatest degree by rapeseed oil. Its economic importance was described e.g. by Bielski [2012]. Thus the characteristics of consumers of all vegetable oils jointly as well as sunflower and olive oils were referred to those of rapeseed oil.

The starting point for the conduced studies concerning vegetable oils in Poland consisted in defining profiles of consumers of individual oils. For this purpose the respondents were divided in terms of the declared level of consumption for vegetable oils or olive oil. Thus, consumers of rapeseed oil were those who in this survey declared that they use this oil more than once a week. They constituted 56% all respondents. In turn, the same level of consumption of sunflower oil was declared by 37% respondents, while for olive oil it was 11%. It needs to be stressed here that the declaration of a single respondent concerning the consumption of one oil did not exclude a simultaneous choice of other types of vegetable fats.

For such defined profiles of consumers further analyses were conducted to determine the importance of principles of sustainable consumption in their choices. Next to such characteristics differentiating respondents as sex, age, stage in life, size of household,

[1]OMNIBUS survey conducted by CAPI – Computer Assisted Personal Interview.

[2]Sustainable consumption is realised by the consumption of sustainable products. Today we lack a comprehensive definition of sustainable products, but their attributes as target requirements may be defined. The major characteristics include e.g. [Ministerstwo Gospodarki 2011]: these products are safe and meet international environmental and ethical standards at all stages of the life cycle; their production and use should have a positive effect both on consumers and the local community, e.g. contribute to the improvement of conditions on the local labour market thanks to the activation of individuals threatened with social exclusion; the production process and distribution of sustainable products should stimulate the service sector, using mainly the labour resources and thus contributing to a reduction of unemployment.

education, income, professional status as well as residence, also the ranking of factors determining purchase was applied. The latter was established as a result of the conjont analysis. The principles of this analysis and the method of its performance were presented by Walesiak and Bąk [2000] and Szymańska and Dziedzic [2005].

RESULTS

Analysis of the level and structure of vegetable oil consumption in Poland

The starting point for the characteristics of vegetable oil consumers is provided by description of consumption structure for oils and vegetable fats in Poland in the years 2000–2011. Among households the average annual consumption of all vegetable fats in 2012 amounted to 11.2 kg per person and in comparison with the figure for 2000 decreased by 1 kg [Rynek rzepaku 2004 and 2013]. Among vegetable fats the consumption of margarine and other fats decreased considerably from 7.3 kg per person in 2000 to 5.5 in 2012. In the same period the consumption of vegetable oils increased from 5.2 to 5.9 l per person, respectively. In turn, the consumption of olive oil for many years remained on the very low, but stable level: from 0.1 to 0.2 l per person.

Rapeseed oil predominates in the structure of consumption, although its share changed in the period 2000–2011. In the years 2000–2006 the importance of rapeseed oil in the structure[3] of consumption decreased from 60 to 30%. In the next three years this index remained at 30–37%, to reach 46% in 2009 and to fall again in the next two years to 33%. In the analysed period the share of soy oil also decreased from over twenty percent to around a dozen percent. The diminishing importance of these two oils was compensated for by palm oil. Its share in the structure of consumption at the end of the analysed period was approximately 30%. In the consumption structure the role of sunflower oil increased as well, although to a lesser extent as that of palm oil. In the period of 2000–2011 it increased from 8 to 12%. In turn, the share of olive oil in the analysed period remained relatively low, ranging from 1 to 3%. Fluctuations in the structure of consumption of vegetable oils resulted mainly from the variable amounts of these oils used by the oil industry to produce margarine and spread mixes [Rolnictwo w 2012 roku].

It results from the analysis of the level and the structure of consumption of vegetable oils in Poland that rapeseed oil and palm oil have the greatest share in the consumption, the latter being used in Polish processing industry mainly to produce margarine [Rolnictwo w 2012 roku]. As it was mentioned in the Methods chapter, on the basis of the conducted survey we may not accurately specify the type of vegetable oil consumed in the form of margarine or spread mixes. Thus this study comprises only the results concerning individually packaged vegetable oils, i.e. rapeseed oil, sunflower oil and olive oil.

Vegetable oil consumers in view of the sustainable consumption principles

The starting point for the characteristic of consumers of rapeseed oil, sunflower oil and olive oil was provided by the list of data concerning their sex, age, stage in life, size of household, education, level of income, professional status and residence. They were

[3]Cited values were calculated on the basis of FAOSTAT 2014.

presented in Tables 1–7. Values presented in individual table and referring to the above mentioned characteristics denote deviations of consumer evaluation scores for individual oils from average results obtained for all respondents. In order to ensure comparability of scores they are presented as relative values. Thus a positive value of the score means that consumers of a given oil gave these declarations relatively more frequently than the average.

Prepared lists of results showed that the purchase structure of analysed oils in terms of respondents' sex was similar to the structure for all respondents. However, we need to mention here that slightly more men declared purchase of rapeseed oil, while sunflower oil was bought more frequently by women (Table 1).

Table 1. Results recorded in identified consumer groups in terms of respondents' sex (%)

Sex	Total	Rapeseed oil	Sunflower oil	Olive oil
Women	77	74	79	76
Men	23	26	21	24

Source: The authors' calculations based on GfK Polonia.

In turn, in terms of the age of consumers (Table 2) we need to observe that rapeseed oil is purchased by relatively more older people (60 years and older), which may result from the common availability of rapeseed oil and from its price[4]. Kowalczuk [2007] indicated in his study that this situation is also connected with a lesser trust of the elderly in new products and new distribution channels and a relatively more frequent use of local convenience stores as well as street markets. In turn, olive oil was purchased more often by middle-aged people (from 40 to 59 years old). In contrast, sunflower oil was relatively most often bought by young people.

Table 2. Results recorded in identified consumer groups in terms of respondents' age (%)

Terms of age	Total	Rapeseed oil	Sunflower oil	Olive oil
15–29	14	12	14	12
30–39	16	15	16	16
40–49	19	20	20	25
50–59	19	18	23	24
60 and above	32	35	27	23

Source: The authors' calculations based on GfK Polonia.

The findings for the importance of age of consumers in this aspect may be confirmed by the fact that rapeseed oil was relatively more willingly selected by older unemployed families, having no children, including e.g. retired respondents (Table 3). Such families used relatively less olive oil. The latter was purchased more frequently than the average by families with children.

[4]According to IERiGŻ the average price of 1 l rapeseed oil for the period of the study, i.e. May 2011 – April 2012 was PLN 6.87 while that of sunflower oil was PLN 7.65, i.e. 1 l rapeseed oil was on average by 78 grosz cheaper than 1 l sunflower oil. In turn, the mean price of 0.5 l olive oil was PLN 18.2 [Rynek rzepaku stan i perspektywy 2012, no 41].

Table 3. Results recorded in identified consumer groups in terms of respondents' stage in life (%)

Terms of age	Total	Rapeseed oil	Sunflower oil	Olive oil
Students, free, live with their parents	2	1	2	1
Workers, free, live with their parents	3	3	3	3
Younger, without children, self-holding	6	4	3	0
Family with children	40	41	44	49
Older family, working, without children	16	15	15	17
Older family, not working, without children	33	35	32	29

Source: The authors' calculations based on GfK Polonia.

In turn, results listed in Table 4 indicate that the higher the education level, the less frequently they used rapeseed oil. An opposite trend was recorded in the case of sunflower oil and olive oil; however, in the case of olive oil this trend was stronger than in the case of sunflower oil. Individuals whose monthly income per household ranged from PLN 2.5 thousand to 3.5 thousand relatively more frequently used sunflower oil, while the wealthiest respondents chose relatively more frequently olive oil (Table 5). Thus less affluent respondents purchased relatively more often rapeseed and sunflower oils than olive oil.

Table 4. Results recorded in identified consumer groups in terms of respondents' education (%)

Level of education	Total	Rapeseed oil	Sunflower oil	Olive oil
Primary	20	22	15	8
Vocational	30	32	26	12
Secondary	36	32	43	56
Higher	15	13	16	24

Source: The authors' calculations based on GfK Polonia.

Table 5. Results recorded in identified consumer groups in terms of respondents' income (%)

Professional status	Total	Rapeseed oil	Sunflower oil	Olive oil
Bellow 1,500 PLN	21	22	26	15
1,500.00–2,499.99 PLN	27	27	15	19
2,500.00–3,499.99 PLN	27	28	43	31
3,500.00 PLN and more	25	23	16	36

Source: The authors' calculations based on GfK Polonia.

In turn, based on Table 6 it may be stated that only farmers chose rapeseed oil more often than average. Sunflower oil relatively more frequently was bought by workers, while olive oil was used by office workers, directors, managers and enterprise owners. In turn, taking into consideration the size of town where respondents were living, measured by the number of inhabitants (Table 7), it may be stated that the smaller the town, the greater the loyalty to domestic products.

Table 6. Results recorded in identified consumer groups in terms of respondents' of professional status (%)

Professional status	Total	Rapeseed oil	Sunflower oil	Olive oil
Unemployed	9	9	9	13
Pensioners	31	31	30	28
Farmers	13	16	14	9
Blue-collar workers	16	12	19	12
White-collar workers	20	19	17	24
Directors, managers and enterprise owners	5	4	4	7
Others	6	9	7	7

Source: The authors' calculations based on GfK Polonia.

Table 7. Results recorded in identified consumer groups in terms of respondents' residence (%)

Type of residence	Total	Rapeseed oil	Sunflower oil	Olive oil
Village	39	44	38	33
Town to 50,000 inhibitans	24	24	24	16
Town to 500,000 inhibitans	27	24	30	45
City over 500,000 inhibitans	10	8	8	5

Source: The authors' calculations based on GfK Polonia.

It needs to be stressed that both income and education proved to be factors considerably differentiating the identified groups of consumers. Katona [1975] was of an opinion that conscious and deliberate behavior characterises rather consumers with at least a medium income level, better educated, younger and those, for whom shopping is a pleasure and not a chore [Rudnicki 2012]. However, studies showed that except for the age factor such a group relatively less often chose rapeseed oil than sunflower or olive oil. Thus this is the target group for public awareness campaigns presenting the problem of sustainable consumption.

Purchase decisions of vegetable oil consumers in view of principles of sustainable consumption

One of the manifestations of sustainable consumption is the conscious selection of point of purchase. Shopping in large super- or hypermarkets may indicate that consumers on the one hand are motivated by the relatively lower prices of products, while on the other hand – by the availability of a broader range of products. In turn, shopping in smaller shops may indicate willingness to support local entrepreneurs or convenience.

Results of the listed points of purchase of vegetable oils and olive oil in terms of the division into individual groups of consumers are presented in Table 8. Among respondents, who declared use of vegetable oils or olive oil at least once a week, the most frequently declared point of purchase was a cheap supermarket or a discount store. Such an indication was recorded for 35% consumers of rapeseed oil, 36% of sunflower oil and 40% of olive oil. The latter product was purchased relatively more frequently in

Table 8. Vegetable oils and olive oil (relative values) depending on points of purchase in distinguished consumers' groups (%)

Point of purchase[a]	Rapeseed oil	Sunflower oil	Olive oil
Hypermarket	10	10	15
Supermarket	19	25	25
Cheap supermarket, discount store (e.g. Biedronka, Lidl)	35	36	40
Small self-service shop	16	16	13
Small grocery shop, no self-service section	16	9	4

[a]Due to low values the table does not contain response categories: Health food store / Organic food store, Street market/ fair, others, what, I don't know / hard to say.
Source: The authors' study based on GfK Polonia.

hypermarkets. In turn, rapeseed oil was purchased by respondents more often in small shops. Such a declaration was given by 1/3 consumers of this oil. In the case of sunflower and olive oils such a declaration was given by 25 and 17% respondents, respectively. Thus it may be stated that consumers of rapeseed oil, in comparison with consumers of the other oils, to a greater degree supported local shop owners.

The theory of sustainable consumption assumes that consumers are motivated by conscious choices, determined not only by economic factors, but also factors connected with health, degree of nuisance of a given product to the natural environment or ethnocentrism. In order to verify this assumption a verification was conducted on the ranking of factors determining purchase of vegetable oils and olive oil (Table 9), obtained based on the conjoint analysis.

Results indicate that in the case of vegetable oil consumption and olive oil a decisive role in their purchase was played by their price. However, we need to mention here that for consumers of rapeseed and sunflower oil the price factor played a great role, but it was comparable to that for the opinions of all respondents. In turn, for individuals preferring olive oil the price factor had a comparable strength as quality of the purchased product. What is more, consumers of olive oil in comparison with all the respondents attributed a relatively greater importance to health promoting health and quality of the product, as well as the type of raw material, from which oil was produced and their experience so far. A relatively lesser effect on the purchase decisions was observed for taste and advertising. We need to stress here that for consumers of rapeseed oil, in comparison with all the respondents, a relatively greater role at the time of purchase was played by such purchase factors as taste, enrichment with vitamins, nice aroma, experience so far, natural character of the product and colour of the product. In turn, a basic principle of sustainable consumption, i.e. the country of product origin and the type of raw material from which it was produced, played for them an even lesser role than the mean ranking results for all respondents.

Table 9. Ranking of factors determining the purchase of vegetable oil or olive oil (mean values) in distinguished consumers groups

Factors	Total	Rapeseed oil	Sunflower oil	Olive oil
Price	30.55	29.92	30.15	17.51
Taste	15.35	16.37	17.13	12.37
High quality	12.39	12.29	12.96	18.07
Natural product	8.08	8.12	7.76	10.90
Health promoting value	7.84	7.89	8.26	10.75
Enriched with vitamins	2.59	2.73	2.44	2.87
Nice aroma	2.04	2.15	1.95	2.04
Multiple use/versatile product	1.10	1.10	0.85	1.26
Colour of product	0.80	0.84	0.67	0.70
Promotion in shop	2.42	2.32	2.40	2.50
Known brand	1.29	1.23	1.13	1.36
Product advertised in mass media	0.58	0.56	0.46	0.46
Size of packaging	0.85	0.83	0.72	0.79
Practical packaging/easy to use	0.73	0.71	0.61	0.74
Attractive packaging	0.66	0.65	0.59	0.59
Type of raw material from which the product is made, e.g. rapeseed, sunflower	6.03	5.59	5.55	8.40
Experience so far	5.67	5.77	5.42	7.41
Country of product origin	1.01	0.92	0.94	1.24

Source: The authors' study based on GfK Polonia.

Attitudes towards oils and fats

Characteristics of consumers of vegetable oils were supplemented with an analysis of knowledge of respondents on problems connected with the effect of consumption of vegetable and animal fats on human health. A similar analysis was conducted e.g. by Duchin [2005]. Respondents were to indicate whether they agree with a specific statement. Figure 1 presents the contents of the statements and the percentage of responses to specific questions, arranged in terms of the share of positive responses to a given question. Statements presented in Figure 9 may indicate knowledge on nutrition of the respondents. Thus, 82% all respondents were of an opinion that vegetable fats are healthier than animal fats, 81% respondents considered the statement that vegetable fats are recommended by doctors treating diabetics to be true, 80% agreed with the statement that vegetable fats contain less cholesterol than animal fats, 75% respondents admitted that vegetable fats are appropriate for children and the elderly, 71% respondents confirmed that vegetable fats may be used in all dishes, while 63% surveyed indicated that vegetable fats are proper for other dishes than animal fats. In view of the percentages of positive responses it may be stated that knowledge on nutrition in all the groups of vegetable oil consumers is relatively high. However, as indicated by the results, the highest share of positive responses was recorded for consumers of sunflower oil and olive oil. In turn, the number of positive responses of consumers of rapeseed oil was similar to the average.

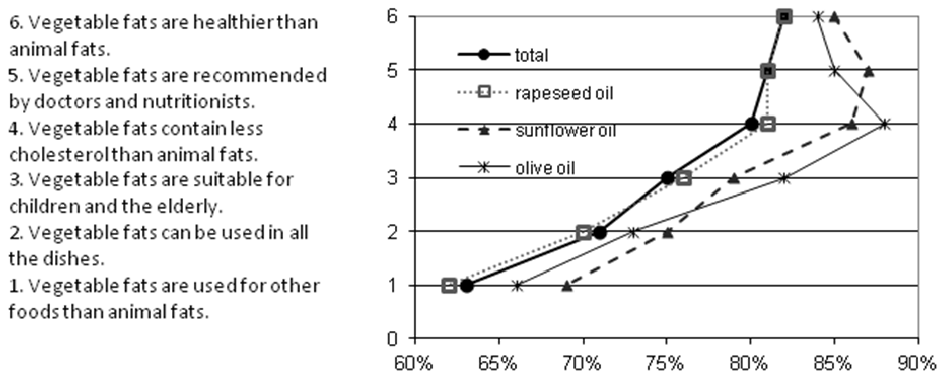

Fig. 1. Proportions of positive responses to questions concerning attitudes towards oils and fats in distinguished groups of consumers
Source: The authors' calculations based on GfK Polonia.

CONCLUSIONS

The phenomenon of sustainable consumption may be analysed on the global level as well as the level of a single household. It needs to be stressed that consumption may not be perceived as a phenomenon, which threatens continuous development. However, it should ensure economic, environmental and social equilibrium. For this purpose we need to develop e.g. appropriate consumption patterns. An indispensable element of this process is also modification of public awareness in this respect.

The authors of this study focused on the analysis of a selected food product from the point of view of principles of sustainable consumption. This study comprises characteristics of Polish consumers of three vegetable oils, i.e. rapeseed, sunflower and olive oil. Based on the results of the analysis we may formulate the following conclusions concerning the profiles of consumers:

1. Relatively more often, in comparison with sunflower and olive oil, men are consumers of rapeseed oil. This oil was chosen rather by older families, individuals aged 60+. Consumption of rapeseed oil turned out to be closely related with education and standard of living. The lower the education declared by the respondent, the more often they chose this oil. It was purchased also relatively more often by individuals less affluent, living in the countryside. In terms of professional groups rapeseed oil was markedly more often preferred by farmers. What is more, consumers of rapeseed oil more often purchased this product in smaller shops. Thus it may be stated that thanks to such choices consumers to a greater degree support domestic producers and entrepreneurs operating in their immediate surroundings, which is consistent with the principles of sustainable consumption.
2. In turn, sunflower oil was slightly more often purchased by women. It was preferred rather by families with children, with more than 3 family members, rather than single householders. Sunflower oil was more often chosen by individuals with secondary and higher education. It was relatively less often chosen by individuals with the

lowest income, e.g. retirees and pensioners, to the advantage of workers. Results also showed lesser than average frequency for office workers and managers.

3. Consumers of olive oil proved to be, more often than in the case of rapeseed and sunflower oils, were individuals aged 40–59. It was significantly more often chosen by families with children. What is more, its consumption is closely related with the education and income levels declared by respondents. Olive oil was relatively less often used by individuals with lower education levels as well as retirees and pensioners. This oil was purchased more often by individuals with higher incomes. It was chosen by office workers, directors, managers and enterprise owners. Olive oil was purchased most often by inhabitants of towns with the population of 50 up to 500 thousand, and relatively less often by inhabitants of villages.

Assumptions of this study and conducted analysis made it possible to formulate the statement that among the analyzed oils rapeseed oil to the greatest degree meets the principles of sustainable consumption, which will be ensured when consumers behave rationally and make rational choices. Investigations showed that consumers of rapeseed oils are not motivated by the quality or origin of the raw material, which could be associated with their awareness of sustainable consumption, but rather by price factors. A decisive role in the choice of vegetable oils is thus played by the economic considerations. This situation is dangerous, since in the case of a radical change in the price of rapeseed oils we may not expect consumers to consciously support products of local entrepreneurs, motivated by principles of consumer ethnocentrism.

This study also showed that consumers with high education and income levels, living in cities purchased mainly sunflower oil and olive oil. Thus public awareness campaigns are required for these groups of consumers, emphasizing the importance of rapeseed oil as a product to the greatest degree fulfilling the principles of sustainable consumption.

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CHARAKTERYSTYKA KONSUMENTÓW OLEJÓW ROŚLINNYCH W POLSCE W KONTEKŚCIE ZAŁOŻEŃ ZRÓWNOWAŻONEJ KONSUMPCJI

Streszczenie. W opracowaniu przedstawiono zagadnienie zrównoważonej konsumpcji. W pracy skupiono się na przykładowym produkcie, jakim są oleje roślinne. Jednym z elementów zapewniających zrównoważoną konsumpcję jest wypracowanie odpowiednich wzorców konsumpcji. Jest to zagadnienie złożone, gdyż wymaga przekrojowych badań interdyscyplinarnych. Punktem wyjścia do ich stworzenia może być przeprowadzona w artykule charakterystyka profilów konsumentów olejów roślinnych w Polsce w kontekście założeń zrównoważonej konsumpcji. W jej opracowaniu wykorzystano wyniki ogólnopolskich badań ankietowych. Uzyskane wyniki mogą być przydatne także przy przygotowywaniu kampanii społecznych dotyczących tego zagadnienia.

Słowa kluczowe: oleje roślinne, zrównoważona konsumpcja, wzorce konsumpcji, Polska

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ARRANGEMENTS IN DEVELOPING AGRICULTURAL MARKETS: CONTRACT FARMING IN SUB-SAHARAN AFRICA

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Abstract. Smallholder farmers in the region of Sub-Saharan Africa have begun to participate in global supply chains through applying contract farming (CF). The main aims of this paper are: to present a typology of CF and to describe the contract farming in Sub-Saharan African countries. This article has synthesised the findings from contract farming agreements in Sub-Saharan African countries to form a conceptual framework of the determinants and dynamics of farmers' participation in CF agreements. This article can be treated as an introduction to a complex comparative study of the Sub-Saharan African CF schemes and may spur further integrative analysis of the transformation in agriculture in developing countries.

Key words: contract farming, Sub-Saharan Africa, agriculture

INTRODUCTION

Recently, product supply chains for agricultural commodity have become increasingly globalised and internationalised. The omnipresent delocalisation and fragmentation of production have not left this sector unaffected. Large food corporations and smaller companies are interested in more fragmented and diversified supply chains. Hence, they have focused on agriculture in developing countries. As a result, more smallholder farmers in the region of Sub-Saharan Africa have begun to participate in global supply chains through applying contract farming (CF) schemes[1]. A number of theoretical approaches can be used to explain the linkages between growers and companies. Nevertheless, no conclusive theory or approach exist as yet [Rehber 2007].

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[1]The fragmentation of farms has been visible in developing countries. According to the African Development Bank statistics, an average farm size in Africa is 1.6 ha [e.g. in Ethiopia 1 ha, in Uganda and Kenya 2.5 ha, in Tanzania 2 ha] [African Development Bank Group 2014].

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Arrangements between a farmer and a firm seem to be popular in many countries. Unfortunately, reliable data and information on their size in developing states still remain poor. Contrary to developed states, it is difficult to assess the size of CF in Sub-Saharan Africa due to lack of data. Plausibly, the proportion of agricultural production under CF in developing countries may not exceed 15%, but this remains a hypothesis [Oya 2012]. Usually, when estimating the CF share in agricultural production, we rely on surveys covering the largest corporations, e.g. Nestle or PepsiCo. According to "World Investment Report 2009", CF activities by transnational corporations covered over 110 developing and transition economies [UNCTAD 2009]. Brüntrup and Peltzer have estimated that contract farmers represent from 30 to 40% of the farmers in Burkina Faso, Zambia, and Kenya and 33–43% of farmers in Cameroon [Brüntrup and Peltzer 2007]. In Mozambique around 10% of smallholders are involved into CF [UNCTAD 2009].

Contract farming has existed for a long time; however, since the end of the 20th century it has become more important, especially in developing countries. Developments in food industry, global value chains, the process of globalisation, consumer demands, and technology in agriculture networks of supermarkets have accelerated the changes in CF patterns. Expansion of various forms of institutional solutions in developing countries as well as endemic imperfect market information on prices, costs, technology, financing, etc., combined with preferential market access to the most developed countries have led to great interest in CF arrangements. Generally, a CF agreement consists of two or sometimes three parts. This type of production refers to the contractual agreement between a corporation (firm, integrators) and farmers (growers). These two actors are essential. Occasionally, this two-side agreement can be extended to a third party. CF may be understood as a farmer's commitment to provide an agricultural commodity of a type to the contractor. According to Kusterer and Glover [1990], CF can be simply defined as arrangements between a grower and firms (exporters, processors, retail outlets, shippers) in which nontransferable contracts specify one or more conditions of marketing and production. In literature we can find two terms related to the linkages between farmers and firms: "CF" and "outgrower scheme". Usually, these terms are synonymous. However, some authors point towards some slight differences between them. Some researchers indicate that the term "CF" often refers to private contractor arrangements, while "outgrower schemes" describes agreements between growers and public enterprises and entities controlled by the state [Kusterer and Glover 1990]. Moreover, the so-called grower schemes are usually used in Sub-Saharan Africa [Eaton and Shepherd 2001]. Each contract basically involves four elements: price, which is pre-agreed, required quality, quantity or acreage (minimum/maximum) of agricultural commodity and time when the delivery should be completed [Key and Rusten 1999][2].

[2]In CF we can usually find following provisions: the duration of the contract, the quality standards to be applied, quality control, quantity, the cultivation and raising methods required by the contractor, time of delivery, packaging, transport, price, technical assistance, procedures for paying farmers, insurance, procedures for dispute resolution [Bijman 2008].

MATERIAL AND METHODS

The paper tries to characterize African CF features and selected consequences of CF. The main aims of this study are: (1) to present a typology of contract farming and (2) to describe the contract farming in Sub-Saharan African countries. The article is theoretical. The study uses secondary sources of research material. These secondary sources include: literature in the area of contract farming in developing countries and available databases, mostly of international organisations, such as the World Bank, FAO and UNCTAD. The applied research method is based on the detailed analysis of available literature and information on CF agreements in the selected regions. The serious obstacle to deepened research is the limited knowledge on the institutional arrangements and strategies adopted both by the farmers and the corporations. In the analysis, not only literature sources, but also press releases were used.

This paper consists of two parts that refer to the research questions of the article. First, this article presents the overview of the typology of CF which may be found in developing countries. This section bases on the literature review. The second part is a study on African CF schemes in terms of crucial, according to the author, features of CF. In the conclusions, selected recommendations for further regulation in these specific areas of agricultural production in the light of the presented drawbacks are presented and some alternative solutions to CF are delineated.

TYPOLOGY OF CONTRACT FARMING: OVERVIEW OF LITERATURE

The most popular categorisation of CF models has been elaborated by the FAO. The organisation indicates 5 models of CF: centralised, nucleus estate, multipartite, informal, and intermediary. The centralised model involves a centralised contractor and numerous small farmers. It is vertically coordinated with the control of quality and quantity. The nucleus estate model is similar to the centralised type of CF, but the sponsor manages a central estate or plantation. It involves a significant provision of material and management inputs. In the multipartite model, we can find many cooperating organisations. This model is located in between the centralised and nucleus estate models. Individual entrepreneurs and small companies are involved in the informal model. This scheme applies informal production contracts (usually on seasonal basis) and often requires government support. It is connected to higher risk. In the intermediary model we can find a sponsor in subcontracting linkages with farmers to intermediaries. There is a danger that the sponsor loses control of production, quality, and prices received by farmers [Eaton and Shepherd 2001].

Williams and Karen [1985] have bridged the gap between the above-mentioned models and practice by adding some new forms of CF: modified nucleus estates, nearby processing and CF, distant processing and CF, and CF and marketing companies. Modified nucleus estates are similar to standard nucleus estate models. They are a combination of small scale and larger commercial operations. Nearby processing and CF includes enterprises that obtain all of their raw materials through a system of CF, using small scale operators mainly, but possibly including larger scale, commercial farms also. Such firms

do not have a farm or plantation operated by the processing plant. The model of distant processing and CF is similar to the previous ones, but farming takes place some distance away from the processing plant. In the scheme "CF and marketing companies" enterprises have no investments in a processing plant. They market raw materials obtained through a system of CF, using small-scale farmers mainly, but sometimes including large-scale commercial farms and plantations.

According to Mighell and Jones [1963], we can distinguish three types of contract in agriculture: market-specification contracts, production–management contracts, and resource–providing contracts. The first kind of contract is the pre-harvest agreement between the farmer and the company that specifies the time and the location of the sale and the quality of the product. Market specification contracts are associated with retaining the control of production and management in the farmer's hands, and shifting most of the production risk on the farmer. Information and coordination costs are limited. In turn, production–management contracts give more control to the company that specifies and coordinates the production process. Under this type of contract, the farmer delegates a substantial part of his decision rights to the contractor, who should bear most of the market risks. This type of contract optimises costs and improves farmers' skills. In the resource–providing contract the company secures the market and provides inputs for production. Usually, this contract is applied when there is a great divergence between input and output. The division of risk between two sides of the contract varies and depends mostly on the agreement between a contractor and a farmer. Moreover, Minot [1986] has expanded this typology by discussing how these models of contracts may solve the most frequent transactional problems. Mighell's and Jones' classification has been strongly criticised by Hueth et al. [2007] on the basis of their empirical research conducted in the United States.

Regarding the level and number of strictly specified elements of the contract, the arrangements may be divided also into three types. First, procurement contracts, under which only sale and purchase conditions are specified, seem to be the simplest form of farmer–firm linkage. The second type of linkages are partial contracts in which only some of the inputs are supplied by the contracting company and output is bought at pre-agreed prices. Finally, we can distinguish total contracts, under which the contracting company supplies and manages all the inputs and the farmer becomes only a supplier of land and labour [Key and Rusten 1999].

Gulati et al. have acknowledged the differences between two main forms of farm–company linkages: direct procurement and the so-called open source intermediation. Each of these models contains different combinations of arrangements. The first one ranges from simple marketing agreements to very complicated schemes of risk sharing or futures contracting. This type of linkages may be treated as a standard CF model. The second one involves the provision of information about market prices, crop, and cultivation practices to farmers without any buy back guarantee. The main goal of open-source intermediation is to diminish the knowledge, technological, and information gap and provide farmers with inputs without forcing them to sign agreements such as CF [Gulati et al. 2008].

Agriculture is a specific economic area where contracts are not complicated and very often only verbal [Bogetoft and Olsen 2004]. That is why another useful typology of CF makes a distinction between written formal contracts and verbal informal contracts. In

many developing countries, it is natural that the linkages between companies and farmers are unwritten. These informal agreements are respected by both sides. Moreover, we can find a number of reasons why contracts are informal and incomplete on purpose, because the agreements contain some variables that cannot be easily verified by the jurisdiction system in case of contract breach. Should the contract parties be able to write complete contracts, it may be less expensive to engage in verbal informal contracting and rely on self-enforcement instead of on the court or the third party protection [Fafchamps 2004].

The typologies of CF mentioned above do not exhaust the patterns and possibilities of arrangements in agriculture. The presented selection of agreements aims to prove that there is still no consensus regarding CF perfect models. Researchers, farmers, and contractors are searching for improvements in this area. Under no circumstances should the CF be constructed without taking into consideration the cultural context and the tradition. The process of development process and the more and more close relations between farmers (growers) and companies have led to a rapid increase of new types of CF. The popular typology of CF has been proposed by the FAO; nevertheless, in many developing countries these patterns have been modified and adjusted to the local requirements and conditions. For instance, in Bangladesh three kinds of contracts are popular: formal production–marketing, formal input marketing, and informal output marketing. All of them stem from the most basic parts of CF known from literature, but many elements of these contracts are more suitable to the local markets and tradition.

CONTRACT FARMING IN SUB-SAHARAN AFRICAN COUNTRIES

This section presents the literature review regarding CF in Sub-Saharan African countries. It has been decided to present CF in these countries applying the following criteria: forms of CF; products that CF covers; the significance of CF for poverty alleviation; and the factor that drives CF development. These criteria seem to be important in the light of previous literature review, though they do not exhaust the possible questions that we may ask analysing CF and its results.

What forms does CF take?

Contract farming schemes can take numerous forms, so a rigid categorisation is a difficult task. The centralised model is popular in countries where crops are popular agricultural product, for example, Gambia, Ghana, and Kenya. The same model is also applied when we deal with products that need processing, e.g. milk, poultry, sugarcane, tea, or coffee. The nucleus estate model is recommended for tree crops and is applied in Ghana. Palm industrie is also a nucleus estate with contracted outgrowers established and managed by the state. When we try to distinguish CF models regarding the number of partners, there is a wide range of configurations. Very often a significant side in CF scheme is a financial institution, e.g. a bank or a microfinance institution. For example, in Nigeria banks are advised to provide a loan to farmers engaged in CF as well as the entrepreneur to ensure fair prices of agricultural products. Sometimes we can find multipartite schemes involved with franchises and the above-mentioned contractors. Informal

models are popular in the African countries where vegetables and short-term crops are under contracts [Eaton and Shepherd 2001].

Analysing the forms of CF across Africa, ownership structures are diverse and range from fully controlled state schemes to multipartite arrangements and full private agribusiness control. Nevertheless, it is worth considering the state role in CF. Depending on the country and the political system, the state has interfered with different intensity. When we analyse the existing case studies, it turns out that the state in African countries is highly involved in CF. The results of this interference, however, have been different depending on the country and its domestic socio-economic conditions. The success of the state's role in Africa in promoting CF was visible in Kenyan or South African cases [Little and Watts 1994]. On the contrary, in Sudan the cooperation between state and farmers was a failure [Kontos 1990].

One more aspect is also important: the reduction of the state's role in agriculture. As part of market liberalisation policies, governments in developing countries often reduced their expenditures for and direct involvement in providing inputs and technical assistance as well as in marketing farm products. Contract farming seems to fill the significant gap between farmers' needs and their access to inputs. Another problem of the role of the state is the form of CF. Many developing countries do not have the tradition of written contracts, especially in Sub-Saharan Africa. Consequently, informal contracts do not need any institutional and formal environment such as the state, juridical system, and agency. In the light of the above-mentioned aspects, the role of the state remains under question [Stessens et al. 2004, Narayanan 2012].

What products does CF cover?

Usually CF schemes cover agricultural products with following features: (1) high perishability products; (2) economically important quality variation (high quality products); (3) technically difficult production; (4) high initial costs or inputs costs; (5) crop is difficult to grow, it is new to farmer [Minot 2011]. In Africa CF covers usually plants. Livestock or dairy products are not so popular, contrary to Asian developing countries where CF is also popular agricultural arrangement. These structures of products under contracts derive mostly from the agricultural traditions in the analyzed regions. In Africa plants are more developed area of agriculture, what explains the contractor's interests in this type of production (Table 1).

How significant is CF for poverty alleviation?

In fact, the greatest success stories in agricultural growth and poverty alleviation originated from the "green revolution". This wave covered Asia, especially China and India, but unfortunately omitted Sub-Saharan Africa [Dorwar et al. 2004]. Currently, CF in developing Africa is perceived as an important tool against poverty [Hazell et al. 2006]. There is plenty empirical evidence that contract farmers in developing countries profit more than non-contract growers[3]. Many researchers have indicated connections between

[3]Contract farmers in Kenya incomes are as much as 100% higher than incomes of conventional farmers [The World Bank 2007].

Table 1. CF products in the African countries

Country	Farming product
Benin	cotton
Burkina Faso	cotton
Cote d'Ivoire	coffee, rubber
Ethiopia	passion fruit, green beans, vegetables, coffee, flowers
Gambia	rice
Ghana	palm oil, fruit, cocoa, cashew, rice, maize, sorghum, tomato, rubber
Kenya	horticultural seeds, tea, tobacco, fruit [pineapple, mango, passion fruit], vegetable [dehydrated], sugarcane, sunflower, rice, potatoes, French beans [canning], sesame seed, milk, poultry, coffee
Lesotho	asparagus
Madagascar	French beans, vegetables, maize, barley, rice
Malawi	paprika, chilies, tea, tobacco, sugarcane
Mali	cotton
Mozambique	tobacco, cotton, vegetables, sugarcane
Nigeria	rice, sorghum, fruit [guava, pineapple, mango, and passion fruit], cocoa, cotton
Rwanda	tea, coffee
Senegal	fruits, vegetables, French beans
South Africa	sugarcane, timber, tea, fruits
Sudan	sugarcane
Swaziland	sugarcane
Tanzania	tea, coffee, tobacco, cotton, sugarcane, vegetables
Uganda	flowers, milk, coffee, tea, rice, tobacco
Zambia	cotton, tobacco, paprika, sugarcane
Zimbabwe	sugarcane, tea, cotton, flowers, tobacco, vegetables, legume crops, paprika, sorghum, fruits, ostriches, chickens

Source: Author's own study.

CF and poverty alleviation. Minot [2011] and Adjognon [2012] have examined the general positive impact of CF on poverty in Sub-Saharan Africa; Bolwig [2012] tested organic tropical products under CF in Uganda; Porter and Phillips-Howard [1997] examined CF in Nigeria and South Africa; Minten et al. [2007] observed the technology diffusion to agriculture in Madagascar; Nsiku with Botha [2007] examined the tobacco sector in Malawi; and Vermeulen et al. [2008] examined over 60 case studies assessing the impact of African forestry on poverty reduction. However, despite the fact that CF can be intended to reduce poverty, this goal is not accomplished in every case and the role of CF is limited [Salami et al. 2010, Freguin-Gresh et al. 2012, Mwambi et al. 2013]. The critics of the positive role of CF in poverty reduction see in these arrangements the means of exploiting for minimum wages and taking control over small farms.

As a whole, there is no agreement with regard to the role of CF in promoting economic development in Sub-Saharan Africa. Empirical evidence presents ambiguous effects

of CF introduction on poverty alleviation in the analysed regions. Usually, farmers treat participation in CF as a diversification strategy, which multiplies the sources of income and influences income. It seems to be the main reason of the debate concerning the point of the farmer's agreements in the light of the manipulation of contracts by companies and the growing social tensions generated by this externally induced change [Carney and Watts 1990]. The conclusion from this part of analysis is that CF should be assessed in a regional context.

There is a serendipitous aspect of the interdependence of poverty and CF – increasing the likelihood of poor and small farmers being included in these schemes. There are three explanations of this phenomenon. First, public schemes are more likely to welcome smallholders than private ones when there are political objectives of inclusion and poverty reduction. It is quite a popular action that governments and donors subsidise the credit available to private companies when they decide to include farmers with small holding. Second, smallholders are generally perceived as partners without bargaining power. Nevertheless, they might be able to overcome the preference for contracting with larger farmers if they lobby through farmers' cooperatives, have local authority support or are represented within the scheme's management. For example, in Ghana a lot of institutions, ranging from local to governmental, support the small agribusiness sector and are involved in CF [Rotteger 2004]. Third, poorer farmers are better able to participate when there are low or no barriers to entry. This can be quite interesting: in the example from Kenya, the company in question placed a limit on the amount of French beans or horticultural sub-sector that each contract farmer could grow in order to discourage side-selling, which meant that smaller farmers could participate [English et al. 2004].

To sum up, it is worth presenting the latest evidence of small farmers' participation in CF. The data on the degree of smallholders' participation in CF suggests that poorer smallholders are often excluded. For example, there are several studies that find a strong association between asset holdings, mostly land, geographic factors (such as market access and agro-ecological zone), and participation [Barrett 2008]. Though CF generally improves the agricultural output of participants, some studies show that CF mostly involves the better resourced, who have previously benefitted from e.g. public support [Freguin-Gresh et al. 2012]. Bellemare [2012] has shown similar results. He examined 1,200 households in Madagascar and stated that those participating in CF owned larger landholdings, more assets, were better educated and more likely to be a member of a producer organisation. A more optimistic interpretation of smallholders' participation in CF is offered by researchers from the ADB. They have demonstrated that although smallholders are likely to be excluded in dualistic agrarian economies, there are numerous exceptions to this pattern [Readon et al. 2009]. Of the 35 successful cases on CF assessed by Prowse [2012] in his study, 54% were with smallholders, and 26% were with a combination of both small and large farms.

What drives the development of CF?

Corporations' participation in agriculture in the form of CF may result in the transfer of technology, standards, and skills, as well as better access to credit and markets. All these effects improve the productivity of the industry, including the farming of staple

foods. Moreover, TNCs' contribution to food security is not just about food supply; it also includes enhanced food safety and affordability [UNCTAD 2009].

Generally, in Sub-Saharan Africa there have been five main drivers behind the rise of CF in the last decades. First, international corporations as well as domestic and foreign industrial firms want to develop cheaper and less risky alternatives to plantations. Second, there is political and economic support from governments to increase exports and establish modern peasantry in their rural development plans. Third, we can find support for CF among donors from developed countries. Four, African agriculture is still underdeveloped and in stagnation. Five, we have observed significant changes in international supply chains [Smalley 2013].

In Sub-Saharan Africa, many CF promoters (for instance, NGOs, foreign aid agencies) have seen in these schemes an alternative measurement of welfare improvement and poverty alleviation in rural areas. Involving government is a very popular solution in CF, because this multipartite scheme ensures that poverty alleviation or rural development goals will be realised. Unlike socially motivated CF, contract schemes for profit are not limited to crops produced under alternative agriculture systems. As such, while this type of CF can potentially help improve farmers' incomes, its non-income dimensions of poverty, such as issues of health and environmental sustainability, are still open to discussion. The second stream of CF focuses on commercial orientation. Many private companies use CF schemes for the production of non-traditional, usually high-value agricultural products for export. In many cases, access to credit proved to be a very important motive for smallholders.

While devising the company strategy, the national context is important. In the case from Nigeria, the nature of firm–farm linkages can be understood within the context of Nigerian economy. Obviously, the primary role of agriculture is the supply of raw materials to the manufacturing sector. It explains the popularity of direct purchase from farmers or producers, use of out-growers or CF, and own production where firms set up their own farm enterprises [Rotteger 2004]. In the case of Mozambique, sugar companies had plentiful land but faced substantial costs of rehabilitating state-owned sugar factories, an imperative that led them to contract with large commercial farms that would not need credit and could quickly produce large yields [Marini 2001].

CONCLUSIONS

The dynamic changes in agricultural value chains, the development of CF schemes, the rapid rise of large multinational retailers and global agro-exporters are the phenomena of contemporary agriculture. Similarly to the "green revolution", CF has affected agriculture in developing countries in varying degrees. Some regions benefit from this wave; some of them are omitted by this scheme. Many empirical studies of the effect of CF participation have struggled to establish causality. Nevertheless, there is a number of cases which indicate that national context and domestic condition determine the success or failure of CF[4]. Most of the studies suggest that in stable institutional surroundings

[4]The empirical surveys of CF display mixed results. Prowes provides a synthetic view of this evidence. He compared 44 cases of CF where 35 cases were evaluated as 'successful' and 9 as 'failed'.

participation in CF may lead to higher levels of welfare and poverty reduction. Unfortunately, many poorer countries in Africa cannot establish stable institutional environment and cannot ensure for the smallholders positive results from CF schemes. Much more remains to be explored, because we still know little about the role of the state in promoting CF, the role of informal contracts in increasing welfare, or the importance of social conditions in positive results of CF. Contract farming continues to be perceived as a phenomenon which occurs in selected regions rather than a tendency in agriculture. The available data concern individual products or regions rather than countries or even continents as a whole.

This article has synthesised the findings from CF agreements in Sub-Saharan African countries to form a conceptual framework of the determinants and dynamics of farmers' participation in CF agreements. General conclusions suggest that there is a serious lack of data essential for conducting a complex comparison of the states of developing Africa. This analysis does not provide a comprehensive picture of the phenomenon of CF in this region. However, this survey can be treated as an introduction to a complex comparative study of the Sub-Saharan African CF schemes and may spur further integrative analysis of the transformation in agriculture in developing countries.

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Among the successful cases, 14 were from Africa (Kenya: 3 cases, Burkina Faso and Senegal: 2 cases per country, and a case per country in Egypt, Ethiopia, Ghana, Madagascar, South Africa, Tanzania, Uganda, and West Africa) [Prowse 2012].

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UMOWY STOSOWANE W ROLNICTWIE KRAJÓW ROZWIJAJĄCYCH SIĘ: KONTRAKTOWANIE W AFRYCE SUBSAHARYJSKIEJ

Streszczenie. Małorolni producenci w regionie Afryki Subsaharyjskiej mają szanse włączenie się do globalnych łańcuchów dostaw przez kontraktacje. Celami opracowania są: przedstawienie typologii kontraktowania w rolnictwie i charakterystyka umów kontraktowych stosowanych w Afryce Subsaharyjskiej. Artykuł jest syntezą literatury dotyczącej rolnictwa kontraktowego w Afryce Subsaharyjskiej i tworzy ramy koncepcyjne dla dalszych rozważań dotyczących kontraktowania na badanym obszarze. Opracowanie można traktować jako wprowadzenie do kompleksowego badania porównawczego różnych rodzajów kontraktowania w Afryce Subsaharyjskiej i systemów umów stosowanych w rolnictwie krajów rozwijających się.

Słowa kluczowe: kontraktowanie w rolnictwie, Afryka Subsaharyjska, rolnictwo

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CONSIDERATIONS ON A LAND INTRINSIC PRODUCTIVITY AND ITS DETERMINANTS IN A SUSTAINABLE AGRICULTURE

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Abstract. The paper reviews the concept of sustainable development, indicating its various dimensions. Natural environment in developed countries became almost entirely anthropogenic. Under such conditions, the way of using natural resources has to change as well. It is forced by the new needs and priorities described above, i.e. a demand for an assurance concerning renewability of natural resources as well as pro-social and pro-environmental criteria of the resources allocation. The fundamental objective of the paper is an attempt at elaboration of the new land rent concept and find the answer to the question: Does a land need capital stimulus to be productive in a sustainable development? Authors formulated the hypothesis: the reason for the land rent to occur are intrinsic land utilities which in the commodity money economy cause the expected productivity of capital factor in agriculture to be higher than in its market environment. Therefore, the value of land rent is determined by a positive difference between the expected productivity of capital in agriculture and in its market environment.

Key words: sustainable development, new land rent concept, agriculture land

INTRODUCTION

Since the beginning of human civilization, the land has been creating certain utilities which satisfy human needs. They are created without the participation of other production factors and thus are an undeniable gift of nature. In the encyclical "Caritas in Veritate", His Holiness Pope Benedict XVI describes them as "a miraculous fruit which a man can

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use responsibly to satisfy his legitimate needs – material and non-material – respecting internal balance".

In tribal (natural) economies, when agricultural land in modern meaning did not exist, examples of the above utilities were forest fruits, hunted animals, access to water or firewood. The creative role of the land factor in providnig them was dominant over labour and capital resources [Czyżewski, Matuszczak 2012]. Therefore, we can state that a major part of land utilities came into existence spontaneously. With the beginning of land cultivation and domestication of animals, the part attributed to nature diminished insignificantly in favour of the causal force of a man. However, still the increases of plants and animals mass, building materials or living area were mostly acquired without the participation of outlays. In the feudal system, we may recognize so-called servitudes, as a kind of legitimization of intrinsic utilities of land, if we treat them as the right to use the natural utilities of the master's land (in the form of brushwood, fruit, clay or fish).

With the development of the commodity-money economy this part of the land factor utility which came into existence without the participation of capital and labour, transformed into "intrinsic productivity" (from the money perspective). It is expressed e.g. in the 19th-century concept of the pure product presented by the physiocrats. According to the theory, a financial surplus over incurred outlays (capital and labour) can only remain in agriculture – precisely as a result of the causal force of nature. Therefore, the pure product in F. Quesnay's "economic table" is the first attempt at valorizing the intrinsic productivity of land. According to physiocrats, the pure product could not come into existence in any other branch of economy since all the remaining production factors (apart from land) "demanded" remuneration, which in the conditions of market competence was equal to the value of their product. However, the pure product was intercepted in total by the land owners as the lease fee which conveys the nature of the land rent.

Thus in the peasant economy, a part of the utility attributed to the exclusive effect of the forces of nature was relatively big and partially expressed in the financial productivity of a farm (since it created a part of the product without the participation of outlays). Its significance started to decrease under the conditions of industrialization of agriculture and activation of the law of diminishing marginal utility. In the industrial agriculture, the intrinsic participation of land in the creation of utilities decreased in favour of capital and hired labour. Moreover, the intrinsic financial productivity of land declined to a considerable degree. With time, however, productive functions of agricultural land, subject to the microeconomic optimization and its obligation to satisfy existential needs, became competitive towards each other. It gave rise to a need to search for a new concept of economic development, i.e. the sustainable development paradigm.

METHOD OF RESEARCH

The aim of the article is to answer the question: Does a land need capital stimulus to be productive in a sustainable development? Authors formulated the following hypothesis: the reason for the land rent to occur are intrinsic land utilities which in the commodity money economy cause the expected productivity of capital factor in agriculture to be higher than in its market environment. Therefore, the value of land rent is determined

by a positive difference between the expected productivity of capital in agriculture and in its market environment. The following research methods were employed in the present research: the monographic and descriptive methods, analysis and synthesis, induction and deduction.

RESULTS OF RESEARCH

The idea of sustainabe development

The concept "sustainable development" is defined as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [The Brundtland Commission 1987]. The sustainable development is a chance for the society to see a long-term vision. The activities that are directed to satisfy present needs may be provided for a short-term, but they should include a long-term perspective as an addition [Brelik 2009]. The sustainable development is an integrated concept that includes all people activities to the local level and promotes the following actions: try to improve the quality of life for existing generation and next generations by protecting and preserving the Earth power to ensure life in all its diversity at the same time:

- to repose on democracy, rule of law, and respect;
- to human rights and freedom, including equal possibilities and culture diversity;
- to promote high level of employment formation;
- in economies whose force is based on education, innovations, social and economic cohesion, and protection of human health and environment [Haite 2010].

According to Rogall [2010], the economics of sustainable development should base on 10 key theses, namely:

- strong sustainability – economy as a sub-system of nature and most natural resources do not subject to substitution;
- pluralistic approach – recognition of certain achievements of traditional economics and environmental economics;
- further development of traditional and ecological economics toward the sustainable development;
- change in paradigm, growth rate versus exploitation rate of resources, intra- and inter--generation justice etc.;
- ethical principles based on individual responsibility;
- transdisciplinary approach;
- necessary changes in framework conditions with the use of political and legal instruments, sustainable production and consumption, price standards and specific approach to substantive goods;
- sustainable (social and ecological) market economy;
- global responsibility.

Sustainable development should serve to improve living standards of people who should manage ecosystems in a matter which will not exceed the capacity and survival ability of determined ecosystems [Czyżewski, Brelik 2014]. The important fact is that capacity of the environment and its survival ability are different and may be modified

by technological changes. Therefore, notions of so-called weak and strong sustainability appear. The first indicates that the natural environmental capital may be potentially, at least to a certain degree replaced by the man-made capital, the other states that the environmental capital and man-made capital cannot be substituted so they cannot replace each other. It seems that when no empirical proofs exist to justify either of the two approaches, support for any of them results only from the recognized values [Bryden, Shucksmith 2000, Marks-Bielska 2011]. The sustainable development is the only possibility of solving problems of today's world. It has been treated as a concept so far but nowadays it is a new paradigm of economics that considers the integrated order with regard to the social, economic, and environmental aspects [Brelik 2012]. Sustainable agriculture development offers an opportunity to stop environment degradation. That model of agriculture requires implementing programmes and solutions of comprehensive character extending beyond the field of agricultural production and referring to rural areas. As a consequence, only the agriculture that performs various tasks will have the future. Production tasks are one group of those tasks. They concern production of sufficient volumes of high value food satisfying ecological criteria [Kisiel 2001].

Intrinsic utility versus productivity of agricultural land

A question arises, to what extent the thesis about the occurrence of "intrinsic land utilities" in the context of the sustainable development paradigm is true. One of the premises of the development of this paradigm is the fact that the natural environment in highly developed countries became almost entirely anthropogenic. Under such conditions, the way of using natural resources has to change as well. It is forced by the new needs and priorities described above, i.e. a demand for an assurance concerning renewability of natural resources as well as pro-social and pro-environmental criteria of the resources allocation. They discover anew the land factor "utilities" which are marginal for the industrial agriculture and give them the nature of public goods which should be paid for by the entire society. It cannot, however, be the same intrinsic utility of agricultural land as in the 18th century since, at least in the highly developed countries, the natural environment was diametrically changed by a man. Once again, a bigger and bigger part of the land utility comes into existence intrinsically, however, in the conditions of advanced and irreversible accumulation of capital in the well-being of natural resources. Therefore, it can be stated that in the sustainable agriculture many new utilities of the land come into existence intrinsically, i.e. without additional capital and labour outlays (but not without their causal force in general), and in some cases without increasing the total amount of capital and labour outlays. Since they have the nature of public goods, they are paid from taxes in great measure (in the EU through the CAP programmes)[1], and this payment goes to the owners of the land resource which created them. Therefore, an intrinsic land utility takes a form of a financial product and can be called intrinsic productivity, which increases the financial productivity of the production structure.

Therefore, an important assumption for the modern concept of land rent were derived: occurrence of intrinsic agricultural land utilities under conditions of sustainable develop-

[1]With the right level of social awareness these utilities can be paid through prices of products and services.

ment (which in the market economy are transformed into a financial product). The above assumption entitles to adopt the following hypothesis: the reason for the land rent to occur are intrinsic land utilities which in the commodity money economy cause the expected productivity of capital factor in agriculture to be higher than in its market environment. Therefore, the value of land rent is determined by a positive difference between the expected productivity of capital in agriculture and in its market environment.

For example, extensification of cultivating, e.g. grasslands within the agriculture-environmental programmes, enables lowering capital as well as labour outlays, and the payment of the economic rent within the CAP. The rent is sometimes misinterpreted as compensation for a fall in productivity. However, we need to take into consideration the fact that even if it scarcely compensates the lost productivity, as far as the value is concerned, it happens in the conditions of lower capital (current assets and depreciation) and labour outlays. Therefore, the financial productivity of production factors (understood as the relation between a financial product and outlays) de facto grows. The increase can be attributed to the causal force of nature (land), since lower intensity of management activates its natural utilities regarded as natural goods. In the quoted example of extensive cultivation of grasslands, it will be e.g. bigger biodiversity, landscape and recreational values and more "ecological" material (hay).

Another example is ecological farming. In this case, a decrease of capital outlay is substituted with the increase of the labour outlay, which is a condition that has to be met to receive the above-mentioned economic rent from the CAP. With the right level of social consciousness a fall in efficiency may be compensated by the increase of prices of ecological products. On the other hand, the rent received from the CAP remunerates the new land utilities and similarly to the above increases financial productivity of production factors. Analogical reasoning can be adopted in case of other subsidies within the CAP. In my opinion, the CAP programmes are an attempt to valorize the intrinsic land utilities of public goods character. A rent on this account is received by the owner of resource or its user. However, they have to enable (or not hamper) the land to create these utilities that is only possible in the conditions of the "primitive" accumulation of capital.

The "primitive accumulation" should be understood in a broad sense. It concerns technological progress, advancement of urbanization processes, infrastructure development, as well as living standards and already reached level of spatial development, agricultural conditions and agricultural land cultivation. Referring to the example of grasslands, we cannot squander the fact that for many years of cultivation, these grasslands (in today's understanding) were created at all and we cannot allow for a secondary succession of plants (shrublands and woodlots) since in this instance, the essence of land utilities is the ecosystem of grasslands; unless the secondary succession was a conscious choice which would be made to enable the land to create other utilities – e.g. nonfeasance of land cultivation in the national park buffer zone.

Scarceness of land and the obligation of consumption of its broadly understood products reveal new needs of consumers. It is impossible to stay indifferent to such a thesis and it is necessary to justify where the new needs that translate into demand come from. If we assume that the Maslov's pyramid of needs is not a universal model of consumer's preferences, and that satisfying basic needs is linked with the necessity of simultaneous response to those from higher levels, there must exist resources that satisfy these needs.

Up to a certain point in economic development, these resources are free goods and thus they do not have a price and they do not provide utilities in the meaning of financial product. Therefore, many needs are satisfied imperceptibly which determines their economic non-existence. (Nota bene, perhaps this is where the confidence in the versatility of the Maslov's pyramid of needs stems from). The needs are: the taste and health aspects of food, rural landscape, biodiversity of ecosystems, recreation, access to raw materials and other elements of the well-being of rural areas.

On the other hand, the increasing scarceness of land relative to other production factors exacts increase of efficiency of this factor in food production, or in general terms of goods "burdened" with the obligation of consumption. It is possible owing to technical progress which is the key condition for the development of the "industrial model of agriculture". However, technical development still raises the boundaries of the increase of efficiency. Under the market conditions, this process is subject to, i.a., the criterion of microeconomic efficiency which does not take into consideration the goods of public character. Therefore, consumers get deprived of utilities that previously were free and did not have a price. In this sense, the higher the scarceness of land factor, the more new needs appear, or rather a consumer becomes aware of the existence of needs and utilities which previously were widely accessible.

Land may spontaneously satisfy a significant part of the new needs, i.e. without increasing capital and labour outlays, although the "price" of produced utilities should be returned to the owner (or holder) of the resource in the form of a land rent so that he could "invest it in land", in the sense of the socially desired way of using it.

Land utility[2] is an increasing function of its resource scarceness. From the point of view of the conducted discussion, this regularity is very important since it concerns only the land factor and singles it out at the backdrop of other factors [Czyżewski, Brelik 2013]. In practice, it means that the bigger "land pressure" in a given area, the more real benefits it provides – the fact of increasing scarceness of land reveals new and/or larger needs in the economic sense (previously they were satisfied by free goods).

It is worth to examine this problem more thoroughly. The development of the market economy is inevitably associated with the following processes: technical progress, industrialization, urbanization and globalization understood as increasing mobility of resources and broadly understood polarization of structures. These processes occur with various intensity, in various places and time. Nonetheless, they have one common feature – they move the land factor to applications outside agriculture and therefore reveal the following consumers' needs, adding the economic dimension to them:

- environmental, in the sense of searching non-degraded natural environment (the more non-degraded areas surround us, the more we need them);
- alimentary, in the meaning of increasing demand for food with health-related, taste and energetic values (additionally, there appears a problem of social cost of health damages caused by "unsafe" food;

[2]It is a certain mental shortcut since according to the neoclassical economics, a utility is a feature of a product and not of a resource, on the basis of which the demand function is developed. Therefore, it rather concerns the total utility of the land factor products.

- recreational, in the sense of managing free time and recuperation of the labour factor (progressing fall of land share in the production factor resources extorts faster circulation of labour and capital to keep a current rate of growth; thus globalization processes precipitate the pace of life simultaneously revealing the need for recuperation of the labour factor on an unprecedented scale);
- alternative sources of energy[3];
- localization, in the meaning of broadly understood life space;
- cultivation of tradition and "cultural heritage";
- behavioral, in the sense of realization of needs of broadly understood freedom.

The issue of the "institutional change" as a condition for the sustainable development is not new in the economics and has already been largely operationalized by modern institutional economics within E. Ostrom's theory of managing common property and M. Olson's economic theory of collective action. Many institutions have already implemented basic premises of these concepts, and the question of building institutions supporting sustainable development is not any longer only an enigmatic creation of academic discussions. An example can be the "Protection of Man and the Environment Commission" operating in the German Bundestag, which already in the 1990's defined a basic strategy for creating effective structures governing well-being of the natural environment in agriculture. It assumes, i.a., such solutions as [Hagedorn et al. 2002]:

- establishing markets enabling the external effects trade e.g. for marketable pollutant emission quotas;
- effective allocation of property rights to common resources e.g. in favour of social organizations [McKean 1993, p. 5, Żylicz 1995, pp. 10–11];
- creating so-called hierarchical structures of governing agricultural productions and environmental resources, in which the role of a coordinator is taken up by e.g. a governing body;
- propagating contractual integration of e.g. farms management contracts;
- supporting non-market horizontal linkages (e.g. groups of producers and cooperatives);
- building information systems and networks;
- developing methods and infrastructures for measuring and monitoring negative and positive external effects related to the well-being of the natural environment;
- developing procedures for resolving conflicts, dividing costs and benefits, and responsibility for the negative external effects, e.g. through introduction of the "ecological tax" [Żylicz 1995, p. 5];
- supporting pro-ecological innovation and education.

Detailed guidelines concerning the above points can be found in the OECD reports [OECD 1998].

CONCLUSIONS

To sum up, agricultural land spontaneously creates a part of utilities which are subject to the market or institutional valorization, as long as intensity of the agricultural

[3]Some alternative sources of energy cause negative external effects. Therefore, using them has to be a conscious choice of the society.

economics is limited to some extent. The level determines the society's (consumers') demand for given utilities that are subject to evolution in time. Therefore, it is a vague border and every arbitrary attempt at setting it becomes outdated with time. It is, however, conditioned by a specific level of the "primitive" accumulation of capital due to which the economy is at such a stage of evolution where the society declares a demand for the above-mentioned utilities.

The proposed heuristic model of creating the land rent is positive in nature. Therefore an attempt at falsification should be taken. Moreover, also normative premises advocate for it from the point of view of the sustainable development. If a part of the agricultural surplus is a land rent connected with higher productivity of capital, and the remaining part remunerates the own labour of a farmer, a "fund" for the development of agrarian structures is generated in the sense of land concentration and rehabilitation of the well--being of rural areas. In other words, financial resources for so called "concern for land" are accumulated in agriculture. Of course provided that a part of the surplus constituting the remuneration for own labour is fair. Does "fair" mean guaranteeing parity labour cost regarding average remunerations in economy? It is hard to say. Certainly, it is a remuneration allowing farmers to take part in the essential processes of the society development. If the farmer's labour cost is too low, the farmer also consumes the land rent, thus limiting the possibilities of the sustainable development of the farm.

The sustainable development paradigm seems to be supported by societies of the European Union and by most of the highly developed countries. However, the concepts formulated above are disputable. In an appalling way a Canadian economist, T. Weiss diagnoses mechanisms of the food economy development at a global scale: "with untiring striving for broadening markets and increasing profits, big supranational corporations make farmers more and more dependent on components, and standardize more and more the agricultural production. They contribute to more and more brutal treatment of the increasing population of farm animals and to polluting soil and water, they externalize environmental costs, change dietetic habits, break local links between production and consumption, and lower the value of labour replacing it with technology" [Weis 2011, p. 162]. Above all, this vision concerns the emerging markets, but it is far from stipulations of the sustainable development. In my opinion, these processes can be stopped only by grassroots consumers pressure, and to a small extent by the rhetoric of international institutions. The researches show that the life cycle of food products is relatively the longest and due to that it may resist the unification resulting from globalization processes [Szymański 2001, p. 58]. However, the life cycle of utilities of the natural environment well-being (the land factor) may turn out even more resistant, in the sense that the needs connected with it are difficult to be created "artificially" and/or distorted by broadly understood marketing. Simply speaking, as numerous tests concerning pro-environmental technologies show, it is not cost-effective. The global society has to realize that these needs exist and only this way can it "keep a tight rein" on supranational corporations. This moment, however, still remains ahead of us.

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ROZWAŻANIA WOKÓŁ SAMOISTNEJ PRODUKTYWNOŚCI ZIEMI I JEJ UWARUNKOWAŃ W ROLNICTWIE ZRÓWNOWAŻONYM

Streszczenie. W artykule przedstawiono koncepcję zrównoważonego rozwoju, wskazując jego różne wymiary. Środowisko naturalne w krajach rozwiniętych stało się niemal całkowicie antropogeniczne. W takich warunkach sposób wykorzystania zasobów naturalnych powinien także się zmienić. Związane jest to z nowymi potrzebami i priorytetami opisanymi w artykule, czyli zapotrzebowaniem na zapewnienie dotyczące odnawialności zasobów

naturalnych, jak również prospołecznymi i proekologicznymi kryteriami alokacji zasobów. Podstawowym celem artykułu była próba opracowania nowej koncepcji renty gruntowej oraz odpowiedź na pytanie, czy ziemia potrzebuje dodatkowych nakładów kapitału w formie bodźca, aby utrzymać produktywność pieniężną w warunkach zrównoważonego rozwoju. Autorzy sformułowali hipotezy: powodem występowania renty ziemi są samoistne użyteczności czynnika ziemi, które w gospodarce towarowo-pieniężnej powodują, że oczekiwana produktywność kapitału w rolnictwie jest większa niż w jego otoczeniu rynkowym. W związku z tym, wartość renty gruntowej jest zdeterminowana pozytywną różnicą między oczekiwaną produktywnością kapitału w rolnictwie i jego otoczeniu rynkowym.

Słowa kluczowe: zrównoważony rozwój, nowa koncepcja renty gruntowej, ziemia rolna

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DETERMINATION OF CITY TOURISM COMPETITIVENESS CUMULATIVE INDEX BASED ON A CASE STUDY OF ŚWINOUJŚCIE AND OHRID

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Abstract. Competitiveness of a city can be seen from different points of view, including tourism attractiveness. Then it is understood as an ability to compete effectively in the area of tourism with other cities. The purpose of this article is to establish determinants of urban competitiveness through its decomposition into elements related to the tourism industry. This topic seems to be important because cities influence the functioning and development of whole regions. Moreover, depending on the nature of the city and its location, it can fulfill a variety of functions, which are essential for citizens' standard of living. While searching for determinants of competitiveness, one has to assume that certain factors will affect the competitiveness positively, while others will be a limitation. The first group includes accommodation and tourism services, as well as city resources, such as architectural attractions, nature and availability of transport. The competitiveness can be restricted by polluted natural environment and crime rate.

Key words: index of competitiveness, functions of a city, tourism, competition

INTRODUCTION

At the end of the 19th century, one of American publications claimed that anger, envy, focus on money, dissatisfaction, competition and rivalry, ambition, high social status, power of fame – in small doses – are not a negative phenomena. On the contrary – they are features of positive morality that create competitiveness [The Bow's review 1867]. In the same period, there were other publications about competitiveness in terms of business activity. It was argued that conditions for enterprise competition should be created [State

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of the U.S. textile industry, 1885], and national economies were being compared. Therefore, one can see that competition has long been related to many spheres of life: human personality, business activities and even conditions of countries. The latter encompasses competitiveness of regions and cities [Łaźniewska, Gorynia 2012], focused on economic growth, which is the subject of this article.

Every market entity operates in a given sector, which is understood as a group of companies generating products which are substitutes, and its structure impacts behavior of competitors. Undoubtedly, it is challenging to determine which products are substitutes and where geographical borders of the market are. It is especially true in case of tourism sector, which is geographically open and includes a great number of elements [Tuntev 2005]. In each sector there is rivalry between competitors, which is aimed at gaining better position with higher-quality products, lower prices, better advertising and availability – in short: providing higher added value. Moreover, situation of tourism industry is determined by activity of other institutions – public, non-governmental and other creating policy of the sector [Drejerska 2005]. Tourism is recognized as one of the key industries of development in all countries and a major source of income, jobs and wealth creation, therefore matter of being competitive in tourism industry is a base of future prosperity and well-being of a society. Existing publications on competitiveness in tourism discuss such variables as planning and management, overall destination competitiveness, competitiveness and transport and competitiveness and the environment. Very rarely, however, these publications refer city competitiveness from tourism point of view; articles discussing this problem were published in China mainly, for example Ding Lei et al. [2006], or Jian-Qiang and Gang-Min [2008]. Therefore a problem of city competitiveness seems to be not fully recognized theme.

METHODOLOGY AND SCIENTIFIC PROBLEM

This article analyzes the issue of urban competitiveness in the tourism industry; competitiveness is here understood as an ability of a city to impact an income of entrepreneurs and citizens [Łaźniewska, Gorynia 2012]. The scientific problem discussed here concerns lack of methodology for determining tourism competitiveness, therefore the main purpose of the article is to establish a methodology for calculating the tourism competitiveness index. The aim can be called postulative, because it proposes a new method.

To build a cumulative index of competitiveness of a city, two European cities were selected: Ohrid in Macedonia and Świnoujście in Poland. Selected cities are similar in their nature (tourist destination), have a similar number of inhabitants, both are located by the water. Despite the fact that they also are characterized by significant differences, like dissimilar history and culture, it should be noticed that there is no possibility of taking two or more identical localities. Creating calculation of the competitiveness index, one should collect a maximum number of determinants and associated data. In this study, data of following areas for both cities were gathered: transport infrastructure in a city, number of bus lines and taxis, types of hotel facilities and number of beds, number of travel agencies and tourist guides, cultural events organized throughout a year, natural attractions, climatic conditions, architectural landmarks, food service, health care system,

crimes rate, level of pollution, number of tourists visiting the city and length of stay, as well as local government's instruments supporting the city tourism; then were supplemented with more detailed data. In case of a number of tourists visiting the city it should be explained that although it may be considered as an effect, not a cause of competitiveness, this number also influences income of a city budget as well as income of residents, and then it affects further investment possibilities, therefore it should be considered as a determinant. It was assumed that all these elements must be located in an administrative area of a city, and their location automatically means that they will determine city's competitiveness. The procedure for determining the validity of particular elements covered allocation of a weight of 1 to 15 points. Number of awarded points was based on an analysis of previously published publications, and experience one of the authors, who is an expert in tourism development, and operates as a tourist services provider.

It seems that this original methodology of creating an index will enable comparison of cities from the tourism development point of view; it will also help in better governance in the tourism sector, which is very important in economies of many countries [Basińska-Zych, Lubowiecki-Vikuk 2010]. But it must be emphasized that the index has been developed for destinations chosen for summer holidays. Surely it must be modified for winter tourism for example.

THE ESSENCE OF COMPETITIVENESS

Competitiveness is usually described as an ability to effectively compete (be better) within particular structures, at a particular time. The term is usually related to enterprises, where it means ability to stay on the market. In relation to a country, region or city, competitiveness means an ability to build and maintain increasingly high quality of life of citizens. Such competitiveness is based on measureable effects of competition, which are determined by quantitative metrics, such as GDP per head, level of employment/unemployment and real income [Łaźniewska, Gorynia 2012]. It must be, however, noted that some causes and effects of competitiveness are tangible, while others are not (e.g. quality of human capital) [Turok 2004].

In terms of future of a particular area, competitive abilities are relevant (i.e. ability to develop in years to come). That is why cities (and other territorial units) build their positions by attracting and keeping capital, labor force (citizens), business centers and tourists. Interestingly, unsuccessful company disappears from the market, while cities and regions remain – along with their citizens [Niezgoda 2010, Łaźniewska, Gorynia 2012]. This is why growth policies which ensure improvement of life quality and long-term competitiveness, are a key issue. To describe the competitiveness model, a number of methods are used: competitiveness pyramid (used most often), competitiveness hat, competitiveness tree and Porter's model. Determinants are easily visible in the tree concept (this method for formulating and assessing competitiveness policies was developed in 2004 by a Dutch consulting company, Ecorys). Similarly to an actual tree, the model has roots, which stand for factors that drive competitiveness; there is a trunk and branches, which illustrate the shape of economy and its productiveness; finally, there are fruit of competitiveness, understood as well-being and stability of growth.

Factors (determinants) that drive or limit competitiveness may be analyzed in various ways, thus a complete list is difficult to establish. One may, however, point to factors which are foundations of competitiveness: investment in research and development, positive employment structure, low labor costs, human capital (employee skills, innovation-friendly culture), effectiveness of resource usage, which results from local and national socio-economic politics. Clearly, barriers will have the opposite effect. Competitive position always results from clash of various forces and elements. Research conducted thus far has determined that economic growth creates competitiveness, while barriers include: lack of investment in education, strict religiousness of the society and conservatism [Łaźniewska, Gorynia 2012].

TOURISM INDUSTRY

Direction of tourism development to 2015 is a governmental declaration accepted by the Council of Ministers on 26 September 2008 – voices an opinion that the service sector will grow quicker than the overall economy, and tourism will be one of the fastest growing segments of this sector. It should be, therefore, understood, that there is no tourism sector – it is merely a segment in the service sector. However, in literature one can often find opinions that sector is a cluster of institutions or enterprises producing goods or services for similar applications [Gierszewska, Romanowska 1994], or in other words: a group of enterprises co-creating similar value chains, using similar techniques and technologies [Fornalczyk 2007]. Therefore one may assume that the tourism sector in fact exists and it encompasses: hospitality (hotels and other accommodation), tour operators and tourism services providers, gastronomy (food providers), transport and supporting services. These elements serve as a basis to list determinants of tourism attractiveness of a city, but – because cultural and natural aspects play an important role as well – this set of determinants will be enriched with a number of additional elements, which will be discussed later in the article.

Tourism industry is open in terms of geography, related to and dependant on other economy sectors, but it also stimulates their growth (e.g. air transport). Openness of tourism is not limited to one region or continent, therefore tendencies on both local and international markets are relevant. It is estimated that in European countries the increase in tourism will be rather slight (4% per year), but it is a upward tendency. It results from better airplane connections, increase in wealth of societies, better health of 60+ citizens, which leads to more interest in pro-health and urban tourism. Increase in supply of services for better-off young people is also foreseen (participation in cultural events, demand for active tourism). At the same time, more attention will be given to overall higher quality of services and provision of additional services [Tuntev 2005]. It is therefore obvious that tourism industry not only needs accommodation, but also events animators. Transport availability of a location also plays a major role, as well as its trade attractiveness (ability to purchase souvenirs or necessities during stay).

Competitiveness in the tourism sector can be observed on various levels if one assumes that the main focus of the rivalry will be the time of potential guests and their financial resources. Thus hotels will compete with B&Bs, railway transport with air trans-

port, restaurants with bistros, ABC city with XYZ city. Cities can complete in terms of investments leading to employment, attracting new citizens, tourists and activity of educational institutions, such as university branches. The aim of business activity of entities in tourism industry is to provide various tourist services which – according to the Tourism Services Act – are understood as guiding services, accommodation provision and other services provided for tourists and guests. As in any sector, tourism faces entry and exit barriers, but in case of tourism those barriers are experienced rather by tourism companies operating within the city that the city itself. Among barriers to enter the sector, one can list the cost of providing services and economy of scale (understood as ability to generate certain number of services due to cooperation of a group of companies, specializations and differentiation of goods, capital needs, ability to distribute information, costs of changing suppliers, as well as general circumstances (local and national politics). Among barriers to exit (factors which make companies keep competing with one another) one can list specialized resources, strategic codependences (cooperation with other companies), conservative policy of the owner (emotional causes), as well as economic and social restrictions.

TOURISM COMPETITIVENESS OF A CITY

A city used to be defined as a settlement with local government (self-government) with its own urban rights [Szpak 1997]. Architectural layout of the settlement was also an important factor: there needed to be a square, marketplace, public offices, defense walls. Nowadays, a city is defined as a agglomeration of people (as opposed to rural areas), characterized by high density of buildings and a varied social structure of citizens who make a living from non-agricultural occupation – trade, crafts, industry and services [Encyclopedia PWN]. Economists believe that a city is a spatially determined system which connects labor force, productions measures and the world of "non-work" [Błaszczyk 2013]. As results of *EU Regional Competitiveness Index 2013* (http://ec.europa.eu) show, many cities (such as Prague, Berlin, Amsterdam) integrate with the region, therefore their condition will stimulate socio-economical conditions of their surroundings. Similar dependencies may surely be discovered for many other cities and regions [Wiatrak 2010]. It is worth of noting that economic and cultural conditions of many regions are changing, that supports formation of new tourism destinations [Studzienicki, Kurjata 2010]. This trend also applies to cities, which will be discussed later in the article.

Having presented assumptions for urban competitiveness and functions, one should determine, what is understood as urban tourism competitiveness? It can be perceived as an ability to effectively contend in this discipline with other cities. As mentioned before, tourism industry encompasses of a few elements, i.e. hotels and other accommodation, tour operators and tourist services providers, gastronomy, transport and supporting services [the latter includes all elements, depending on the point of view, therefore in this analysis it will be omitted]. All above-mentioned elements must operate within the administrative limits of the city, and their location automatically determines city's competitiveness. Thus, main determinants of touristic competitiveness of a city include: offer of hotels and other accommodation providers, tour operators offer and gastronomic

providers. What matters is not only their number, but also quality, which is understood as an ability to satisfy client needs (Fig. 1).

Fig. 1. Direct determinants of tourism competitiveness of a city
Source: Own evaluation.

As mentioned, main elements of tourism industry (hotels, tour operators, gastronomy and transport) are accompanied by other elements that define tourist competitiveness of a location, such as: natural attractions, which may be located within city limits, cultural landmarks (deeply connected with the city, which results from city function), architectural attractions, as well as public institutions which support tourism (e.g. tourism information offices). Availability of the city plays an increasingly significant role, therefore quality and means of public transport within the city, as well as ability to reach the city from various locations, are absolutely vital. Secondary to the above-mentioned determinants are other issues, such as ability to promote tourism offer provided by particular entities, as well as promoting the city itself. One should remember not only about traditional media, such as paper folders and maps, but also social media [Lemanowicz, Puciata 2010]. While searching for determinants of competitiveness, one has to assume that certain factors will affect the competitiveness positively, while others will be a limitation. Competitive position of the city will therefore be a result of both groups of determinants. First of all, determinants related to city history and its resources must be mentioned, as well as current growth strategy [Würzl 1980]. Secondly, there are determinants related to regional or national socio-economic policies and internationalization of particular areas.

The history of the city determines its infrastructure: buildings, monuments and roads. On the other hand, there are also natural resources, such as water bodies, forests and parks and configuration of terrain. Tourist attractiveness is also conditioned by climate – a significant number of rainy or freezing days decreases willingness of potential guests to visit the destination. It also limits interest of potential investors. Structure of enterprises operating in the city and its surroundings is an internal determinant; if there is a chance to create a network of cooperation (e.g. travel agent–hotel laundry–food outlets–service outlets–culture animators–business people allowing tours of industrial objects) which leads to higher added value of provided services than in other cities, one may name it competitive advantage. It seems that specialization of tourism entities may serve as a positive im-

pulse, e.g. focus on active and education-related holiday, or specialized spa and wellness services give competitive advantage. It must, however, be supported by adequate promotion initiated by entrepreneurs, but in cooperation with city self-government; therefore, the abovementioned network of cooperation must include public institutions. They may support competitiveness of the city by image building strategy which included tourism. They may also participate in city promotion events (e.g. Festival for Promotion of Cities and Regions), or take part in contests such as the European Capital of Culture (www.outdoordlamiast.pl), [Europejska Stolica Kultury 2016].

It should be added that certain established relations and structures may limit growth and competitiveness. This is true when market expects changes, while entrepreneurs cannot meet those expectations due to economic relations (signed contracts), their own plans and reluctance to change, lack of capital (high cost of bank loans, lack of support from local government). In such circumstances, city will lose its competitiveness, understood as ability of businesses to offer appropriate services of adequate quality and price at the right time [Olczyk 2008]. Negative elements that determine tourist attractiveness of a city may also be related to the condition of natural environment within city limits (rubbish, polluted air), amount of garbage or untreated sewage [Bąk, Wawrzyniak 2012]. Depending on the circumstances, the following factors can be of importance: crime rate, waiting time for doctor's appointments, although these are secondary factors.

TOURISM COMPETITIVENESS – ŚWINOUJŚCIE VERSUS OHRID

To develop a cumulative index of competitiveness of a city, two European cities were chosen: Ohrid in Macedonia and Świnoujście in Poland. They are similar in terms of several key areas: both are well-known tourist summer destinations (Table 1), both are

Table 1. Number of tourists coming to Ohrid and Świnoujście between 2005–2013

Year	Number of tourists	
	Świnoujście	Ohrid
2005	117 744	165 965
2006	111 600	167 394
2007	122 000	181 310
2008	127 600	199 486
2009	118 729	189 699
2010	115 700	165 109
2011	123 220	178 277
2012	166 958	183 335
2013	210 486	192 746
Average	134 893	180 369

Source: Own work prepared by using statistical data from: Republicki zavod za statistika (2014): Statisticki godisnik na Republika Makedonija, Skopje (www.stat.gov.mk); data from the city hall of Ohrid, data from GUS, Bank Danych Lokalnych, http://szczecin.stat.gov.pl/bdl/app/samorzad_m.dims, and data obtained from the city hall of Świnoujście (accessed: 26.04.2015).

located by water, have similar demographic potential, as well as a similar accommodation capability. However, selected cities also differ in terms of several aspects: Ohrid is located near mountains and is proud of several thousand years of existence (which enhances its tourism potential). Świnoujście, in turn, is situated by sea and offers many open-air activities, which affects an average length of tourists' stay. These and other differences should be taken into account when using the methodology presented here.

Based on literature and available data, as well as experience of the authors of the article as tour guides and researchers, a weight to particular categories was assigned, and that was a foundation of the cumulative index of competitiveness calculations (Table 2). In case of transport infrastructure, this category includes all types of roads within the city limits (in km), as well as rail, sea and air connections. In case of Ohrid, for example, there were 6 bus lines and a local airport, and in case of Świnoujście: 8 bus lines, urban and sea ferries, railway line and local airport Heringsdorf/Świnoujście. As a result of this element calculations, the city of Ohrid obtained value of 3.14; Świnoujście of 6.34. After taking into account availability of private transport (taxis), the indicator for Ohrid has been changed to 3.3; for Świnoujście to 6.63. Transport accessibility of destinations is certainly important, but accommodation and cultural, architectural, natural landmarks are more important. Weather conditions are also crucial. So, calculating availability of beds potential of a city, it was assumed that the total number of available beds (regardless of a type of accommodation) will be added and divided by 1,000. In 2014, Ohrid offered 12,214 beds, Świnoujście – 10,132. After adding beds on camping and campsites, the value calculated for Ohrid came to 12.81, and for Świnoujście to 12.36. A key element attracting tourists may be cultural attractions – in this methodology, 1 point was allocated to each event, with a maximum in this category defined as 5. Both cities received here the value of 5, which means that in both of them events that significantly attract tourists are held. In Ohrid, for example, it would be a popular music festival held in August, in Świnoujście – organ evenings organized from June to September. The exact results of calculations are presented in Table 2.

The attractiveness of a city can be built by its architecture. As already mentioned, Ohrid boasts buildings even from the fourth century, which cannot be found in a fairly modern Świnoujście. Therefore, in this category, the result for Ohrid is much higher – 15 points versus 3 for Świnoujście. It is worth noting that the calculation takes into account not only the number of buildings, but also their age (every century was assigned with 1 point), and the maximum value established to this category is 15 points. As mentioned before, the index also takes into account weather conditions – it turns out that, although an average summer temperature is similar: 19.6°C in Ohrid, in Świnoujście – 19°C the number of hours of sunshine is very different: in Ohrid 2,300 hours per year, in Świnoujście – 1,540 (in this case 33% less). At the same time in Świnoujście there are 167 days of rain recorded, while in Ohrid only 121 (46 less). Thus it is evident that the climate is more conducive to development of tourism in Ohrid. In total, 15 determinants of tourism competitiveness in discussed methodology are included. In the calculations only the question of environmental pollution is omitted, since in both analyzed cities there are no significant problems.

As shown in Table 2, architectural and natural attractions should be recognized as the most important elements of competitiveness, then climate (sunny days) and the number

Table 2. The cumulative index of tourism competitiveness of a city

No	Specification	Evaluation formula	Ohrid	Świnoujście
1	public transport – types, number of lines	every kind of transportation – 1 point	2	4
2	public roads – in km	every kind of roads separately – number of km divided by 100 number of registered taxis divided by 1,000	3.3	6.63
3	accommodation – number of beds in hotels, guesthouses, hostels, campsites	number of beds divided by 1,000, every campsite – 0.1 point	12.81	12.36
4	tour operators – the number of travel agencies based in the city	every agency – 0.3 point	7.8	4.8
5	number tourist guides	every guide 0.1 point / max 5 points	5	4
6	cultural landmarks – everything that happened during the year	every event = 1 point, max 5 points	5	5
7	gastronomy and other services connected with tourism	developed services – 1 point	1	1
8	natural landmarks – what attracts tourists?	every element = 0.3 max 5 points if a lake/sea exists together with mountains – then this index is doubled	3.0 × 2 = 6	2.4
9	natural conditions – temperature, rainfall sunny days	annual average temp. + insolation hours divided by 100	34	23.3
10	architectural landmarks	every element 0.3 + 0.1 points for every 100 years of existence of given object; max 15 points	15,0	3,5
12	criminality – identified crimes in last year	number of crimes divided by 1,000, with minus	–2.05	–1.12
	pollution, environmental problems	–	–	–
13	supporting public tools and institutions – tourist information centers, website/s with info about attractions of the city	every language a website is available = 0.3 tourist info offices = 0.1 each	0.5	1.0
14	healthcare system/services	every entity = 1 = all added units divided by (number of citizens divided by 10,000)	1.42	2.44 + 0.1
15	number of tourists coming every year – data from the last year	number of tourists from the last year divided by 10,000 plus number of nights divided by 1 mln and next all divided by 2.5	8.02	8.97 0.1 spa
		CUMULATED INDEX	97.8	74.38

Source: Own work prepared by using statistical data from: Republicki zavod za statistika (2014): Statisticki godisnik na Republika Makedonija, Skopje (www.stat.gov.mk); data from the city hall of Ohrid, data from GUS, Bank Danych Lokalnych, http://szczecin.stat.gov.pl/bdl/app/samorzad_m.dims, and data obtained from the city hall of Świnoujście (accessed: 26.04.2015).

of beds and availability of transport destinations. The attractiveness of a place also affects the number of incoming tourists, because on one hand, they create the atmosphere of the place, and on the other – using tourist services affects its development and living standards. It is worth noting that yearly in Ohrid almost 800,000 nights are provided, while in Świnoujście – more than 1,400,000.

The methodology presented here enables comparison of different cities (under certain assumptions). It can also assist in formulating policies for tourism development. For example, Figure 2 shows that the city of Ohrid has excellent weather conditions, as well as unique architectural attractions. However, with the same potential for beds, last year saw fewer tourists than Świnoujście, and less of offered nights. It should be considered how one might increase the length of tourist stay. The existing tourist offer is based mainly on exploring churches and other historic buildings – is it possible to offer something else?

The advantage of Świnoujście is a good base for accommodation and good transport accessibility of the city. But, is it possible to modify the tourist offer, so that tourists remained in spite of unfavorable weather conditions (as shown by statistics, 46% of days in the year are rainy). Currently tourism services provided in indoor facilities are a solution, but maybe the city could invest in an object (building, structure), which by its uniqueness would attract tourists, especially outside the high season. Moreover, the city could boast

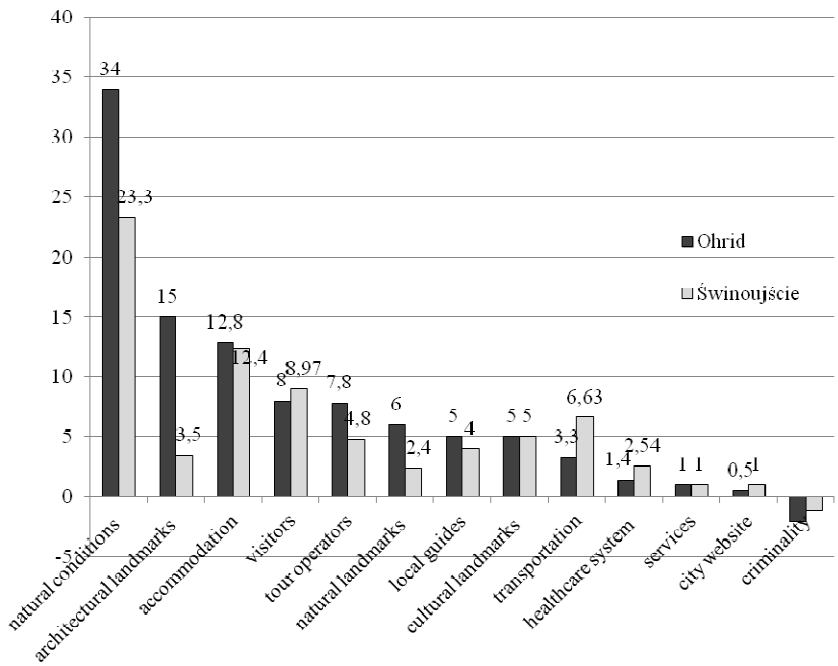

Fig. 2. Elements of competitiveness of cities Ohrid and Świnoujście comparison (with points gained for each element)

Source: Own work prepared by using statistical data from: Republicki zavod za statistika (2014): Statisticki godisnik na Republika Makedonija, Skopje (www.stat.gov.mk); data from the city hall of Ohrid, data from GUS, Bank Danych Lokalnych, http://szczecin.stat.gov.pl/bdl/app/samorzad_m.dims, and data obtained from the city hall of Świnoujście (accessed: 26.04.2015).

(promote itself) as a place of relatively low crime and high security in terms of theft of cars (in 2013 only two car thefts were recorded).

Policy of tourism development in the city should be based, on one hand, on its resources, on the other – needs of tourists, with an emphasis on the latter. An analysis of collected data shows the fact that, despite unfavorable weather conditions in Świnoujście, more tourists than began to arrive and they spend more time here than in Ohrid. Analysis of competitiveness elements could give an answer to the question why the number of tourists coming to Ohrid is not increasing. The first conclusions which stem from the analysis of the data say, that the problem is the communication (transport) availability, but also weak promotional support from the city government (website only in Macedonian language), and also higher crime rate than in Świnoujście. However, one should take into account also political situation in the region, its economic development and the overall image. So, here one can repeat that tourism sector, open to the influence of many factors, is difficult to investigate and manage. However, the index of competitiveness to some extent may give an answer to the question about a cause of problems and source of success of a city. This will help meet the needs of tourists better and create a proper offer of tourist services.

CONCLUSIONS

Competitiveness of a city can be seen from different points of view, including tourism attractiveness. The aim of this study was to construct a cumulative index of city tourism competitiveness, mainly for destinations visited by tourists in the summer. Proposed solution is based on a model of competitiveness tree and Porter's model, however, was adapted to tourism industry and contains much more elements. To develop the index two European cities were selected: Ohrid in Macedonia and Świnoujście in Poland. Methodology described in this article is designed for the first time, and probably will be modified, but even this underdone version (that does not cover problem of prices for example) allows to evaluate elements influencing success of destinations significantly, and ones that still need corrections. Thus, the index can support comparisons of cities in terms of their tourism potential, over and above it can be used for development policies formulation. Urban, as well as regional competitiveness, assumes cooperation of many stakeholders, which lead to an increase in wealth and standard of living of city's inhabitants. Competitiveness of the city in a particular domain is easier to determine than competitiveness of a region or a country. It must be, however, noted that competitiveness should be assessed in comparison to another entity – in this case, it should be compared to other, similar tourist destinations.

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WYZNACZANIE INDEKSU TURYSTYCZNEJ KONKURENCYJNOŚCI MIASTA NA PRZYKŁADZIE MIAST ŚWINOUJŚCIE I OHRID

Streszczenie. Konkurencyjność miasta ocenić można pod różnym kątem, w tym z punktu widzenia atrakcyjności turystycznej. Celem niniejszego artykułu jest określenie determinantów konkurencyjności turystycznej miast poprzez analizę elementów budujących ich pozycję w sektorze turystyki oraz zbudowanie wskaźnika, który pozwoli porównywać między sobą różne miejsca. Podjęty temat wydaje się być ważny, ponieważ miasta wpływają na funkcjonowanie i rozwój całych regionów. Poszukując determinantów konkurencyjności, trzeba założyć, że pewne czynniki wpłyną na konkurencyjność pozytywnie, podczas gdy inne będą ją ograniczać. Pierwsza grupa obejmuje na przykład usługi związane z zakwaterowaniem, a także takie zasoby, jak architektoniczne atrakcje miasta albo też charakter i dostępności infrastruktury transportowej. Konkurencyjność może być natomiast ograniczona przez zanieczyszczone środowisko naturalne i przestępczość.

Słowa kluczowe: indeks (wskaźnik) konkurencyjności, funkcje miasta, turystyka, konkurencja

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COMPETITIVE POSITION OF THE FOOD INDUSTRY OF THE EUROPEAN UNION ON THE GLOBAL MARKET

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Abstract. The conducted research is consistent with commercial trend of the research on competitiveness. The main goal was to assess the competitive position of the food industry of the European Union (EU) on the global market in the period 2000–2013. Used indicators are based on the results achieved in foreign trade: global market share, trade coverage ratio and revealed comparative advantage ratio. The food industry was defined on the basis of the aggregation of the departments 01–09, 11, 4 SITC Rev. 3. According to the research, the EU and the USA were the world's largest exporters of the food industry products. Their importance in the world export decreases slightly in favour of such countries, as China and Brazil. A surplus in food trade achieved by the EU was small, especially as compared to Argentina. The conducted analysis demonstrates that the EU as a whole did not have comparative advantages in trade of food products over the countries not belonging to the Community.

Key words: competitive position, food industry, international trade, the European Union

INTRODUCTION

The food industry is one of the most important and most rapidly developing sectors in the EU. In 2013 it comprised 286,000 companies, which was 13% of all production companies. In respect of the value of turnover it is the largest sector of industrial production, reaching annual turnover of EUR 1,048 billion. The food industry is also one of the main employers in the EU. Employment in this sector amounted in the discussed year to 4.2 million people which constituted 15.5% of all the employees in the production sector [Data & Trends... 2014]. Food is a strategic product, therefore the EU aims at maintaining and improving the competitiveness of its own food production. The growth in competitiveness on the international markets is particularly important in conditions of growing liberalisation of trade and globalisation and integration of the economies. Although the

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term of competitiveness is now commonly used both in the theory and in practice of economics, competitiveness is still not a clearly specified term [Siudek, Zawojska 2014]. It stems, e.g. from the fact that it resulted from at least three economic theories: theory of economic growth, international exchange and microeconomics [Wziątek-Kubiak 2003]. Currently the most popular and most developed direction of the competitiveness research is a commercial trend of research, roots of which date back to the classic theories of international trade – Smith theory of absolute advantage, Ricardo theory of comparative advantage, neoclassical theories (Heckscher–Ohlin–Samuelson theory of abundance of the resources), as well as the contemporary theories such as Vernon product life cycle theory, Linder theory of overlapping demands, Krugman theory of benefits of the scale [Pawlak 2013]. Within this trend, the competitiveness is treated as an ability to "achieve and maintain the market share, on the domestic and/or foreign market" [Martin et al. 1991, Pitts and Lagnevik 1997, Fisher and Schornberg 2007]. Such recognition indicates the international resulting competitiveness, referred to as a competitive position. It allows to refer the importance of a given trade, sector or country to the world's economy. Bearing in mind the importance of the food industry in the European economy the research was conducted in order to assess the competitive position of this industry on the global market.

MATERIAL AND METHODS

The study adopted definition of competitiveness presented by the aforementioned authors, centred on the competitive position reached on the foreign markets. From among the measures used to evaluate the level of so understood competitiveness, we distinguish commercial indicators based on the results obtained in international trade. A set of carefully selected indicators was used to assess the competitive position of the EU on the global market, namely export market share (*EMC*), trade coverage (*TC*) and revealed comparative advantage (*RCA*). The global market share is one of the most widely applied competitiveness meters. It has been calculated according to the following formula [Olczyk 2008]:

$$EMS = E_{Fi}/E_{FW}$$

where: E_{Fi} – export of food products of the entity *i*;
E_{FW} – world export of food products.

Trade coverage ratio is used for research of the relations of export and import of a given sector and is defined as follows [Verdoorn 1960]:

$$TC = E_{Fi}/I_{Fi}$$

where: I_{Fi} – import of food products of the entity *i*.

Ratio above 1 means that the country generates a surplus in trade and has relative advantage over partners. Ratio below 1 means a commercial deficit and lack of such advantage.

Revealed comparative advantage ratio determines the share of the food industry in the entity's total export with regard to share of that sector in total global export. It has been calculated in accordance with the formula [Balassa 1965]:

$$RCA = (E_{Fi}/E_i)/(E_{FW}/E_W)$$

where: E_i – total export of the entity i;
E_{FW} – world export of food products;
E_W – total world export.

Ratio above 1 indicates that entity has a comparative advantage in trade of food products. Ratio below 1 means, on the other hand, that entity does not demonstrate this advantage. Hinloopen and Marrwijk [2001] suggested division of the value of RCA ratio into four classes:

- Class a: $0 < RCA \leq 1$ no comparative advantage of the sector;
- Class b: $1 < RCA \leq 2$ poor comparative advantage of the sector;
- Class c: $2 < RCA \leq 4$ average comparative advantage of the sector;
- Class d: $RCA > 4$ strong comparative advantage of the sector.

The food industry was defined on the basis of the aggregation of the following sections of the Standard International Trade Classification (SITC) Rev. 3: 01 – meat and meat preparations; 02 – dairy products and birds' eggs; 03 – fish, crustaceans, molluscs and aquatic invertebrates, and their preparations; 04 – cereals and cereal preparations; 05 – vegetables and fruit; 06 – sugars, sugar preparations and honey; 07 – coffee, tea, cocoa, spices and their manufactures; 08 – feeding stuff for animals; 09 – miscellaneous edible products and preparations; 11 – beverages, 12 – animal and vegetable oils, fats and axes. The UN Comtrade base was the source of data (http://comtrade.un.org/).

RESULTS OF RESEARCH AND DISCUSSION

The importance of the results of foreign trade in the assessment of competitive advantage of the industry on the international markets is emphasised in works of many authors [Hinloopen and Marrewijk 2008, Haar 2010, Vasta 2010, Vanitha et al. 2014, Vassileva et al. 2014]. The starting point of these deliberations is share of a given country (groups of countries) in the global value of export and import. In the years 2000–2013 the largest exporters of food products in the world, were the USA and the EU (Fig. 1). The value of export of all the member states beyond the Community market increased in this period from USD 41.68 billion in 2000 to 131.35 billion in 2013, namely over three times. From among the factors determining the development of export of food products from the EU, Pawlak [2013] identifies: growth in prices of agricultural products on the global markets (caused by a greater dynamics of growth in the global demand than in the global supply), formation of mutual exchange rate of euro to United States dollars, reduction in internal price support and the rates of export refunding and customs tariffs in third countries, modulations and introduction of decoupled payment, departure from the requirement of mandatory set-aside of the arable lands and increase in access to the European Single Market for the countries less developed. However, it should be emphasised that in spite of systematic growth in export of food products, the EU global market share of this industry

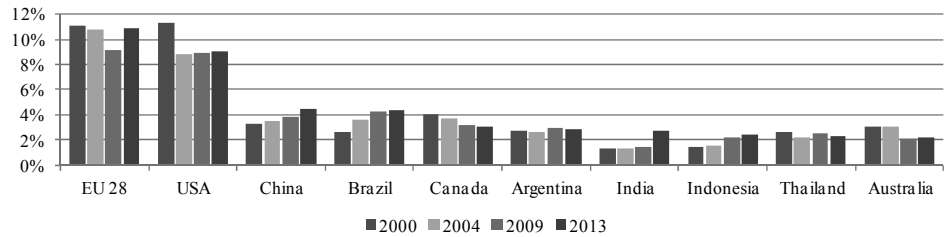

Fig. 1. The global market share of the largest exporters of the food industry
Source: Own study based on UN Comtrade (accessed: 17.01.2015).

decreased in the years 2000–2013 from 11.13 to 10.83%. At the same time, the USA recorded almost a triple increase in export (from USD 42.39 billion to 114.84 billion) and, at the same time, the reduction in global market share from the level of 11.32 to 9.08%. As a result, in 2013 the Community's global market share exceeded the share of the USA by 1.31%. Subsequent position in the ranking of the largest food exporters in the world was occupied in 2013 by China and Brazil which role on the international food market was substantially increasing since 2000. The value of China's export of the food industry increased from USD 12.46 billion in 2000 to 57.06 billion in 2013, namely more than 4.5 times and the share in export increased from 3.32 to 4.51%. On the other hand, Brazil recorded increase in export from USD 9.77 billion to 55.13 billion (more than 5.5 times) and increase in the share in the world export from 2.61 to 4.36%. Despite these favourable changes the share of the food industry within the structure of export was, however, approximately twice smaller than of the EU and the USA. The group of the world's largest food exporters includes also subsequently: Canada, Argentina, India, Indonesia, Thailand and Australia. Their global market share was, however, definitely smaller (from 3.04 to 2.20%). Among these countries the greatest growth in the importance on the international arena was recorded in India where export of food products in the period 2000–2013 increased from USD 5.02 billion to 34.92 billion, almost seven times. The share of India in the global food export increased at the same time from 1.34 to 2.76%. Increase in this ratio was also recorded in Indonesia (by 1.04%) and Argentina (by 0.12%). On the other hand, in Canada, Thailand and Australia the reduction of global market share was observed by 1.02, 0.32 and 0.92%, respectively. The presented changes indicate relatively geographically sustainable structure of the world's export of the food industry. It results from the following premises. Countries characterised by a small market share of the food industry achieved a high growth rate but still remains at the position of "the small exporters". Insignificant reduction of growth rate in export of the large exporters does not affect their dominant competitive position. Similar conclusions resulted from the research conducted before [Wijnands et al. 2008].

Export of the EU countries was directed to the different geographic markets. The largest recipients of the EU food products include: USA, Russia, Switzerland, Norway and Brazil, which together absorbed 40% of the total EU export directed from to the third state markets (Table 1). Beverages were dominant within the material structure of the export being exported primarily to the USA, Russia, Switzerland, Singapore and Canada. The second position included cereals and cereal products that have been exported prima-

Table 1. Material structure of the export of food industry products outside the EU, as well as main directions of the export in 2013.

Industry/Sector	Sector share in industry (%)	The main directions of export
In total	100.00	USA, Russia, Switzerland, Norway, Brazil
Meat and meat preparations	8.47	Russia, Japan, China, Switzerland, USA
Dairy products and birds' eggs	9.85	Russia, USA, China, Switzerland, Saudi Arabia
Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	3.89	USA, Switzerland, China, Japan, Russia
Cereals and cereal preparations	14.06	Saudi Arabia, Algeria, USA, Switzerland, Iran
Vegetables and fruit	11.06	Russia, Switzerland, USA, Norway, Japan
Sugars, sugar preparations and honey	2.03	USA, Switzerland, Norway, Israel, Russia
Coffee, tea, cocoa, spices, and manufactures thereof	6.66	USA, Russia, Switzerland, Australia, Canada
Feeding stuff for animals (not including unmilled cereals)	4.28	Russia, Norway, Suriname, Trinidad and Tobago, Tunisia
Miscellaneous edible products and preparations	10.77	Russia, China, USA, Saudi Arabia, Switzerland
Beverages	24.13	USA, Russia, Switzerland, Singapore, Canada
Animal and vegetable oils, fats and waxes	4.80	USA, China, Russia, Norway, Brazil

Source: Own study based on UN Comtrade (accessed: 17.01.2015).

rily to Saudi Arabia, Algeria, the USA, Switzerland and Iran. Another important export item comprised vegetables and fruit which were transported mostly to Russia, Switzerland, the USA, Norway and Japan. The lowest importance in the EU export to third party countries was attributed to sugars, sugar products and honey, fish, crustaceans, molluscs and water invertebrates and their products, food for animals and animal and vegetable oils, fats and waxes.

Import is as important basic category as export when assessing the competitive position of the sector. A surplus of export over import proves export specialisation and relative advantage over the competitors. The value of food products imported to the EU in 2013 amounted to USD 132.57 billion, almost three times more than in 2000 (USD 48.26 billion). The major import partners include: Brazil, the USA, Argentina, Norway and Indonesia (Table 2). The imported goods were dominated by vegetables and fruit which constituted nearly 25% of total expenses under import. They came mostly from Turkey, the USA, Brazil, South Africa and China. Second, in terms of value, place in the structure of the EU import of the food products was occupied by fish, crustaceans, molluscs, water invertebrates and their products, which value of import corresponded to 19.27% of total EU import expenses in 2013. In the case of this product group the most important partners include: Norway, China, Ecuador, Iceland, Morocco. An important assortment position

Table 2. Material structure of the EU import of food industry products from outside the EU market, as well as main directions of import in 2013

Industry/Sector	Sector share in industry (%)	The main import destinations
In total	100.00	Brazil, USA, Argentina, Norway, Indonesia
Meat and meat preparations	5.14	Brazil, New Zealand, Thailand, Argentina, Uruguay
Dairy products and birds' eggs	0.72	Switzerland, New Zealand, USA, Norway, Australia
Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	19.27	Norway, China, Ecuador, Iceland, Morocco
Cereals and cereal preparations	5.64	Ukraine, Brazil, Canada, USA, India
Vegetables and fruit	24.03	Turkey, USA, Brazil, South Africa, China
Sugars, sugar preparations and honey	3.40	Brazil, Mauritius, Swaziland, China, Cuba
Coffee, tea, cocoa, spices, and manufactures thereof	14.20	Brazil, Switzerland, Ivory Coast, Vietnam, Ghana
Feeding stuff for animals (not including unmilled cereals)	10.48	Brazil, Argentina, USA, Russia, Ukraine
Miscellaneous edible products and preparations	2.70	USA, Switzerland, China, Thailand, Turkey
Beverages	4.93	USA, Chile, Switzerland, South Africa, Australia
Animal and vegetable oils, fats and waxes	9.48	Brazil, USA, Argentina, Norway, Indonesia

Source: Own study based on UN Comtrade (accessed: 17.01.2015).

in import from outside of the Community was also: coffee, tea, cocoa, spices and their products, which were imported mostly from Brazil and then Switzerland, Ivory Coast, Vietnam and Ghana. The lowest importance in the material structure of import was attributed dairy products and birds' eggs.

When analysing the relations of export to import, it was observed that the beginning years of the analysis was a period of a negative balance in the EU exchange of food products with third countries. Commercial deficit in 2000 amounted to USD 6.58 billion and trade coverage ratio was 0.86 (Fig. 2). It means that income from the export of food products covered the expenses for the import in 86%. In the next years, as a result of greater increase in import than in export, commercial deficit increased both in the absolute and relative perspective. In 2004, the TC ratio amounted to 0.80 and deficit amounted to USD 15.17 billion. In 2009, as a result of the worldwide economic crisis, commercial deficit increased to the level of USD 28.34 billion and the TC ratio decreased to 0.74. In subsequent years the improvement of commercial balance was observed. As a result, in 2013 the export value of the food industry exceeded the import value by 3% (TC = 1.03).

When analysing particular sectors of food industry, the highest relative surplus of the EU export in 2013 was observed in the case of dairy products and birds' eggs section (TC = = 14.09). A favourable ratio of export to import was also recorded in trade of beverages (TC = 5.06), cereals and cereal products (TC = 2.57), meat and meat products (TC = 1.70)

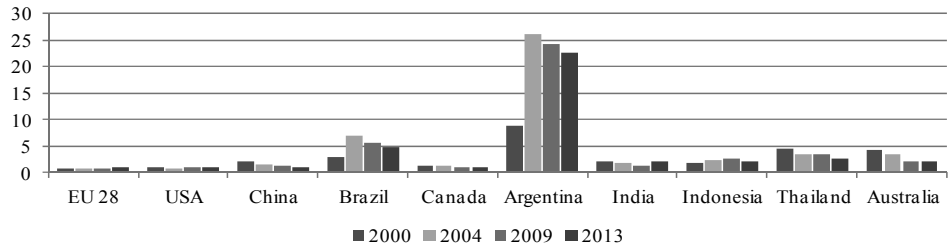

Fig. 2. Trade coverage ratio in the food industry in EU 28 and selected countries
Source: Own study based on UN Comtrade (accessed: 17.01.2015).

and in the case of different food products and preparations section (4.12). On the other hand, trade coverage ratio below 1 was observed in 2013 in the following product groups: fish, crustaceans, molluscs and water invertebrates and their products (TC = 0.21), food for animals (TC = 0.42), vegetables and fruit (TC = 0.48), coffee, tea, cocoa, spices and their products (TC = 0.48), animal and vegetable oils, fats and waxes (TC = 0.52), sugars, sugar products and honey (TC = 0.62).

USA was a net importer of the food in all analysed years. In 2000, the TC ratio amounted to 0.89, which means that income from the export of food products covered the expenses on account of import in 89%. In subsequent years decrease of this ratio took place and then its increase. In 2013 the ratio was 0.99. Other analysed countries belonged to the net exporters of food. Definitely the greatest relative surplus of export over import was recorded in Argentina. In 2013, the TC ratio amounted to 22.63, which means that the export value exceeded the import value of food nearly 23 times. It suggests a specialisation of Argentina with regard to food processing and allows concluding that the manufacturers from this country have relative dominance over partners from other states. The largest relative advantage was achieved by Argentina in trade of cereals and cereal products and food for animals. A significant relative surplus of export over import of the food was also recorded in Brazil, in which export in 2013 exceeded import almost five times. It is also worth mentioning that from among the analysed entities Brazil achieved in 2013 the greatest surplus of export over import in the absolute perspective (EUR 43.66 billion). The TC ratio above 2 was observed in 2013 in India, Indonesia, Thailand and Australia and ratio above 1 in Canada and China. From among the net exporters of the food increase in TC ratio in the years 2000–2013 occurred in Argentina (159%), Brazil (71%) and Indonesia (16%). On the other hand, a decrease of this ratio occurred in China (by 52%), Australia (by 46%), Thailand (by 42%), Canada (by 13%) and in India (by 4%).

Research on foreign trade often analyses a comparative advantages, especially in the context of evaluation of trade structure [Ischukova, Smutka 2014]. The concept of revealed comparative advantage, on the basis of Ricardo comparative advantage theory [1817], assumes identification of the product groups particularly important to the export of a given country. The conducted research implies that the EU as a whole did not have comparative advantages in trade of food products over countries not belonging to the Community (Fig. 3). In the analysed years, RCA ratio was variable and ranged from 0.7 to 0.9. This means that the participation of the food industry in the whole EU export was

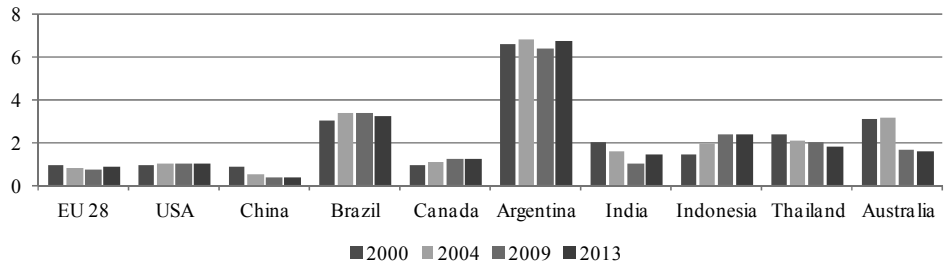

Fig. 3. RCA ratio in the food industry in EU 28 and selected countries
Source: Own study based on UN Comtrade (accessed: 17.01.2015).

lower than the world's average. Different was the situation in the case of the particular groups of food products. The EU achieved in 2013 comparative advantages in the case of the following departments: beverages (RCA = 2.50), dairy products and birds' eggs (RCA = 1.11) and other food products (RCA = 1.47). The lowest RCA ratio was recorded on the other hand in trade of fish, crustaceans, molluscs and water invertebrates and their products (RCA = 0.32). From the analysed countries, also China did not achieve any comparative advantage in food trade. Level of RCA was systematically decreasing in this country. It means that importance of this industry in the whole export of the country was smaller and smaller. RCA ratio in the USA was close to 1, and in 2009 and 2013 slightly exceeded this value. It indicates achievement of poor comparative advantages. In other countries comparative advantages in trade of food products were present in all the years analysed. Strong comparative advantages over other countries were achieved only by Argentina (RCA from 6.39 up to 6.89). Brazil and Indonesia achieved average comparative advantages and Canada, India, Thailand and Australia – poor. From among the mentioned countries the greatest increase in comparative advantages was observed in Canada (by 23%), and the biggest decrease in Australia (by 97%), India (by 36%) and Thailand (by 33%).

Comparative advantages of the industry result from having relative abundance of some resources and their use in process of international work division. However, presented results suggest a limited usefulness of this measure in the assessment of the competitive position of the food industry on the international market. The entities with a high market share, namely the EU and USA, are characterised by low or poor comparative advantages. A similar tendency was recorded in China. It indicates smaller share of the food industry in the economic structure of these associations/countries, but does not mean lower competitive position on the international market. Comparative advantages, observed especially in the case of Argentina, Brazil and Australia, suggest that the articles of the food industry are important products in export market of these countries, but they do not translate into a significant share of these countries in the international trade.

CONCLUSIONS

Globalisation and internationalisation processes occurring in the world's economy result in need for evaluation of competitiveness analysis on international markets at all its levels. The conducted research indicates that in the years 2000–2013 the EU and the

USA were the largest exporters of the food industry products. In 2013 the EU became a leader of the ranking, surpassing the USA ranked on the second place. The EU exported mainly beverages, cereals and cereal products, as well as vegetables and fruit, while the most important partners include: the USA, Russia, Switzerland, Norway and Brazil. The group of the largest food exporters included also subsequently: China, Brazil, Canada, Argentina, India, Indonesia, Thailand and Australia. In spite of systematic growth in export value, the share of the EU (and USA) in the global export was decreasing for the benefit of smaller exporters, such as: China, Brazil, India and Indonesia. It did not cause, however, a significant change in the geographical structure of export of the food products. In the studied period the EU evolved from a net importer into the net exporter. Achieved relative trade surplus was, however, small, especially in comparison with such countries, as Argentina and Brazil. The conducted research implies also that the EU as a whole did not have comparative advantages in trade of food products over countries not belonging to the Community. All the other countries recorded such advantage, except for China. In spite of increasing meaning of the food industry of China in the global food export, its share in the country's total export was low as compared to the world's average and was decreasing in the analysed years. The strongest comparative advantages was observed in Argentina which, combined with the greatest relative trade surplus, indicates on high specialisation of Argentina with regard to food processing. Maintenance of and growth in the competitive position of the European food industry on the global markets will undoubtedly constitute a serious challenge in the future, especially in the context of good results achieved in foreign trade by the third party countries such as China, Brazil, and Argentina.

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POZYCJA KONKURENCYJNA PRZEMYSŁU SPOŻYWCZEGO UNII EUROPEJSKIEJ NA RYNKU ŚWIATOWYM

Streszczenie. Przeprowadzone badania wpisują się w handlowy nurt badań nad konkurencyjnością. Celem głównym była ocena pozycji konkurencyjnej przemysłu spożywczego Unii Europejskiej (UE) na rynku światowym w latach 2000–2013. Zastosowano wskaźniki bazujące na wynikach osiąganych w handlu zagranicznym: udział w światowym eksporcie, wskaźnik pokrycia importu eksportem oraz wskaźnik ujawnionych przewag komparatywnych. Przemysł spożywczy został zdefiniowany na podstawie agregacji działów 01–09, 11, 4 SITC Rev. 3. Z badań wynika, że UE i USA były największymi eksporterami produktów przemysłu spożywczego na świecie. Ich znaczenie w światowym eksporcie maleje nieznacznie na korzyść takich krajów, jak Chiny i Brazylia. Uzyskiwana przez UE nadwyżka w handlu żywnością była niewielka, zwłaszcza w porównaniu do Argentyny. Przeprowadzona analiza wskazuje ponadto, że UE jako całość nie posiadała przewag komparatywnych w handlu artykułami spożywczymi nad krajami nienależącymi do Wspólnoty.

Słowa kluczowe: pozycja konkurencyjna, przemysł spożywczy, handel międzynarodowy, Unia Europejska

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FACTORS DETERMINING THE DECISION TO RETIRE

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Abstract. In the recent years, regarding to changing socio-economic ad demographic conditions, the professional activity of the older persons is particularly underlined. The measures directed towards increase of share of 50+ group in labour market have been undertaken. In order to achieve this goal, the reasons for limiting the activity of people in age around retirement should be first identified. The aim of the paper is to identify factors influencing decision on retirement. The conducted inquiry research proves that responders relatively earlier exercised their right to benefits. Responders' average retirement age amounted to 58.6 years. The majority of factors determining the decision on retirement are directly related to the pension system, and first, with the entitlement rules and calculation of benefit level. As a main reason for retirement the responders indicated reaching the retirement age, and then favourable financial conditions.

Key words: retirement decision, retirement age, professional activity, pensioner

INTRODUCTION

For many years, the labour market policy has been aimed at addressing the unemployment of young people unsuccessfully looking for work. In recent years, due to changing demographic, economic and social conditions, attention is also drawn to the economic activity of the elderly. In many countries, including Poland, there are taken steps to increase the participation of older people in the labour market. For these activities to produce the desired results, there should be first identified the reasons for limiting the activities of people approaching the retirement age. It is understood that one of the main barriers to improving professional activity of older people are incentives for professional deactivation created by the pension schemes. In most OECD countries, pension systems are reformed. In order to achieve this goal, efforts are aimed at reducing the attractiveness of pensions by reducing the amount of pension benefits, remuneration of pensioners for longer working life by the use of higher pension rates and lower pension benefits for early

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retirement and raising the retirement age [OECD 2006]. In Poland in 1999, there was also a pension reform carried out which would lead to a longer professional activity. However, in recent years, the actual age of withdrawal from the labour market differs from the nominal retirement age.

The purpose of the paper is to identify the factors affecting the retirement decision. The paper also presents the relations between the type of the pension benefits (pension, early retirement) and selected demographic variables.

MATERIAL AND RESEARCH METHODS

In 2009–2010, a survey was conducted in the Wielkopolskie region on 350 people receiving pension benefits. The main aim of the research was to identify the beneficiaries' opinion on the factors influencing the decision to retire and to determine its differentiation according to selected demographic variables, such as gender and education. The group was chosen in purposeful selection. The research included only retirees receiving benefits from the public pension system.

The research tool used for analysing the empirical data is a test of independence. In each case under consideration, which was subjected to statistical verification of the level of significance $\alpha = 0.05$ was adopted. Calculations were performed in the R statistical package using the statistical function chisq.test (). The decision to reject the hypothesis of independence of the studied traits in favour of the alternative hypothesis stating that there is an existing relationship, was taken on the basis of comparison of the adopted level of significance $\alpha = 0.05$ with the so-called p-value given by the program[1]. Therefore the values of the test statistic, degrees of freedom and the critical value are not specified in the description of the verified issues, only the p-values are given. This uniquely allows to decide to reject the hypothesis of independence or lack of grounds for its rejection.

THE TEST RESULTS

About 60% of the respondents were women, which is due to the feminization of the population in older age groups. Over 32% of the surveyed had a vocational education and 36% – secondary education. Nearly one in seven respondents had primary education, and one in six had a university degree.

Respondents relatively early exercised their right to benefits. The average age of the respondent's retirement was 58.6 years old. The study shows that the right to early retirement exercised over 40% of respondents. On the basis of a test of independence, it was found that there is a material relationship in the statistical sense between the type of the benefit (pension, early retirement) and education (Table 1).

The early retirement took mainly people with a university (39%) and secondary education (37%). Respondents with higher education accounted for a relatively small percentage, i.e. 18%. People with lower education level earlier withdraw from the working life than those with higher education, performing intellectual work [OECD 2011]. Longer

[1]p-value – the smallest significance level at which the tested hypothesis should be rejected.

Table 1. The dependence between the type of the obtained benefit and selected demographic variables (gender, education)

Specification	Gender	Education
The type of the received benefit	0.327	0.001

Source: Authors' own research.

working lives of people with higher education are due to several reasons. Higher education contributes to the stability of employment, is associated with high professional standing and prestige, protects against volatility of income, and provides a higher income than the pension [Sztanderska 2008].

Early retirement exercised 43% of male respondents and 38% females. Longer working lives of men are due to the traditional role of the man in the family, who is responsible for the security of existence to its members. This is also connected with the terms of the entitlement to benefits, particularly the statutory retirement age and contributory and non-contributory periods. Early withdrawal from the labour market of women is due to their function in society which contributes to a worse situation on the labour market due to employment gaps resulting from raising children. Women are less mobile and flexible than men. As a rule, they will seek a less absorbing job, which is located closer to home [Klimkiwicz 2009].

Retiring soon after becoming entitled to benefits is dictated by many factors. The decision on the professional deactivation requires considering the situation on the labour market, individual financial, family and health situation. Those approaching retirement age have pre-defined plans for the time after resigning from the working life. CSO studies on retirement age show that 12.2% respondents[2] declare that it will be between 60 and 64 years old (11.2% men, 13.5% women), and 12.1% at 65 years old or later (18.7% of men, 2.7% women). Nearly 33% of respondents plan to work as long as possible (33.3% men, 32.2% women). Over 21% indicate precisely the age at which they intend to complete the professional activity (19.1% male, 24% women). Only 8.6% of respondents do not have specified plans for the retirement from professional activity (3.6% of men, 15.5% women).

The conducted survey shows that retirees waited until they were entitled to retirement. When asked: "What made you to retire?", over 58% of the respondents answered: "fulfilling the conditions to obtain the benefits", including "being at the retirement age" (Fig. 1). The reason is pointed out in particular by women (63%), who willingly retire early, since they face higher alternative costs of professional activity than men. This decision is also dictated by external factors, which include particularly the situation on the labour market, especially the level of unemployment and the tendencies of its changes. Those who feel concerned about the loss of employment or volatility of income are likely to take early retirement, which guarantees a constant, though usually lower income [Sztanderska 2008].

Due to becoming of the retirement age the entitlement to benefits exercised respondents who are holders of secondary education (36%) and vocational education (31%) – Figure 2. It can therefore be concluded that for the better educated the mere acquisition

[2]People aged 50–69 years old, who worked in the reference week.

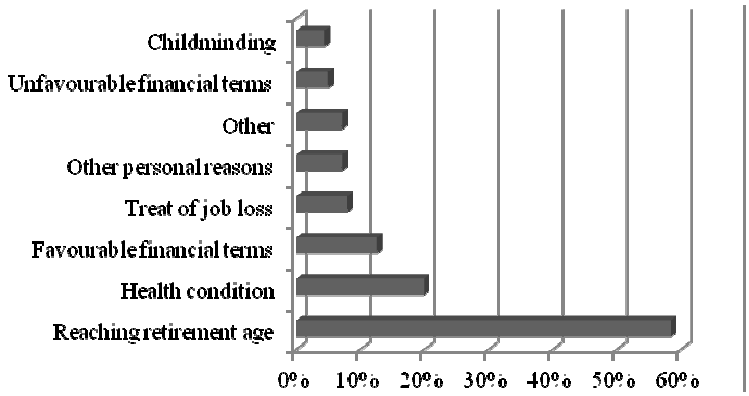

Fig. 1. Reasons for exercising the right to benefits
Source: Authors' own research.

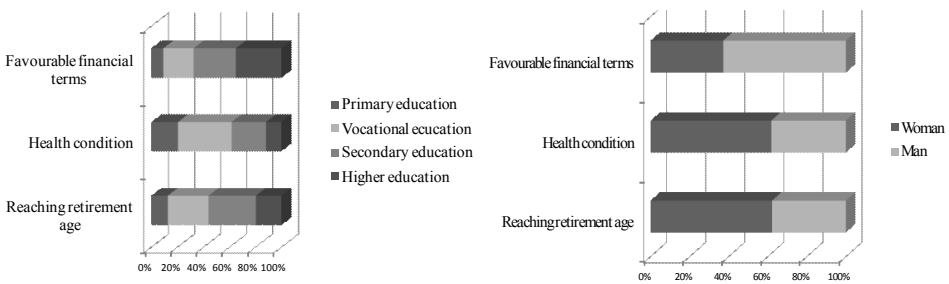

Fig. 2. The reasons for exercising the right to benefits and selected demographic variables (gender and level of education)
Source: Authors' own research.

of pension rights is less important than other factors, such as favourable retirement conditions. The decision to retire immediately after obtaining the entitlement may be due to favourable relation of the pension level to work income. This applies in particular to those with lower education levels and women, who during their working lives are paid less. Respondents with secondary and vocational education primarily assessed their salary as average. They retire in order to improve their financial position. On one hand they want to receive a relatively higher income from the benefits and on the other to combine that with work income. People with lower education levels are at greater risk of losing their jobs due to reduced adaptability to the labour market. Uncertainty may also result from low self-esteem, which increases with age due to declining physical and mental condition. These people may be fearful of the growing market qualification requirements associated with high dynamics of technological change. This phenomenon is reinforced by patterns and stereotypes about older employees' work. Fear of job loss can also be associated with the risk of losing a stable financial condition of the company.

According to the respondents, the dominant contributors to exercise their pension right were also poor health, favourable financial conditions of the retirement and the threat of job loss. Due to ill health retired nearly 20% of respondents. CSO studies show that in

recent years the health of Poles has improved significantly. In 1996, more than 46% of Poles evaluated their health as below good, in 2004, less than 39%, in 2009 – 34%. The respondents pointed to the poor health condition basing on their subjective judgments, which did not always coincide with the facts. Women assess their health condition worse than men. In 2009, almost 63% of women rated their health as very good (21.5%) and good (41.2%), and 12% as poor (10%) and very poor (2.3%). However, among men the proportion was higher in the evaluation of very good (26%) and good (43%) and lower in the case of poor ratings (7.5%) and very poor (1.7%) [GUS 2006b, GUS 2011b]. However, it should be noted that the assessment of health is very difficult and brings a lot of problems. Health condition is associated with aging, with the development of multiillnesses. Also other non-medical factors affect, which include: education, income level, lifestyle and access to medical services [Tobiasz-Adamczyk 2000, Molesztak 2008]. The study shows that poor health led to the retirement of primarily women (61.8%) and respondents with vocational education (41%) and secondary (27%). This is due to the type of work. People with lower levels of education work physically, which adversely affects their health. The positive relationship between the state of health and level of education shows that education reduces the impact of health on professional activity [Kotowska 2008].

Although there is no concrete evidence to connect the exceeding of 50 years of age with a reduction of somatic and mental capacity to work, it is widely believed that health deterioration occurs with age. Stereotypes about the health condition of older people are reflected in their evaluation by employers, who do not want to hire older workers and prefer to hire young people instead. Therefore, the retirement of older employees is to their advantage, since the very employee helps them to "get rid of" the less efficient staff. Employers should, however, strive to improve working conditions, to provide medical care for both older workers and members of their families [Makowiec-Dąbrowska 2002, Dudek, Pabich-Zrobek 2002, Szukalski 2006a,b, Zaidi, Fuchs 2006].

Favourable financial conditions contributed to the retirement of every eighth respondent, the vast majority of whom were men evaluating their pay as mediocre. These individuals during their working lives receive lower wages, and upon retirement the replacement rate is relatively high. This provides an incentive to exercise their right to a pension, which is greater in the case of combining work with receiving benefits. According to OECD data, in 2008 for men reaching an average salary (median) net replacement rate[3] among European countries was the lowest in Ireland (40.8%) and the UK (48%), and the highest in Iceland (111.7%), Greece (110.3%) and the Netherlands (103.3%). The Polish pension system guarantees relatively high benefits. Net replacement rate for men was 68.2%, exceeding the rate in Sweden (53.3%), Finland (64.8%), Germany (58.4%) and France (60.8%). The lower net replacement rate for women is in Poland (50.7%) and Italy (63%) [OECD 2011].

Favourable conditions for retirement were most often mentioned by respondents with higher (35%) and secondary education (32%). This, on the one hand, results from the fear

[3]Net replacement rate – an indicator showing the relationship between the amount of pension and salary levels at the end of professional activity after deduction of taxes and social security contributions.

of changing regulations on pension rights, on the other hand, the desire to obtain more revenue. Having a university degree and obtaining a higher income during the working life contribute to the accumulation of savings, which constitute income security in old age. Obtaining even a relatively high income for part of the period of professional activity causes an increase in benefits. Especially in the case of people acquiring the right to a pension under the old system, in which when calculating the level of pension there is a possibility to choose the most favourable working years in terms of remuneration. This is an encouragement to retire [OECD 2011]. Moreover, higher education and additional skills foster working at the time of retirement, and thus obtain a higher income. Favourable conditions for retirement are associated with adverse financial conditions during the working period. Unfavourable financial conditions contributed to the resignations from work of 5% of the respondents. These individuals during their working lives obtained lower wages, and at the time of retirement the replacement rate is relatively high. This group is dominated by people who with secondary and vocational education (70%). Unfavourable financial conditions at work contributed to retirement of primarily respondents assessing their salary as average and low. More than 46% of respondents rated the pay they received during their working lives as average and 19% as low. Respondents having a different level of education obtained different wages, and thus differently assessed their remuneration. Between level of education and gender and retirees opinion on the level of income achieved during their working lives there is an important statistical correlation, which is confirmed by the independence test (Table 2).

Table 2. p-values in the independence test χ^2 – the evaluation of the pay level in the period of professional activity and selected demographic variables

Specification	Gender	Education
The evaluation of the pay level in the period of professional activity	0.000	0.000

Source: Authors' own research.

The vast majority of women were satisfied with the level of income received. Almost half of the women (49.5%) assessed it as average and 24.3% as low (Fig. 3). For men, it was respectively 42 and 10%.

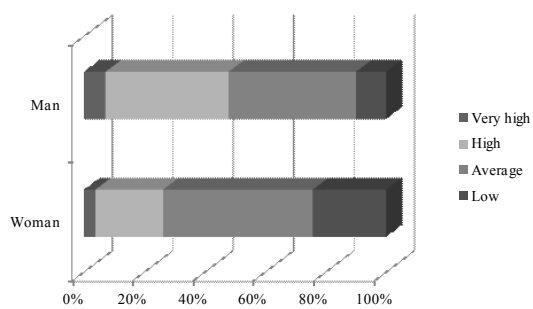

Fig. 3. The assessment of the level of remuneration by respondents
Source: Authors' own research.

Differentiated remuneration evaluation by gender results from the far more inferior position of women on the labour market. This is manifested inter alia in the relation of wages of women and men. Women, although on average better educated, are still paid less than men [Kołaczek 2009].

Qualifications, as well as a learned profession and current occupation are one of the main factors of differentiation in pay [Jacukowicz 2007]. The respondents had varying levels of education, and thus obtained different pay as reflected in its assessment. Respondents who hold a university degree most preferably assessed the income levels, nearly 19% said that it was very high, with over 40% – high (Fig. 4).

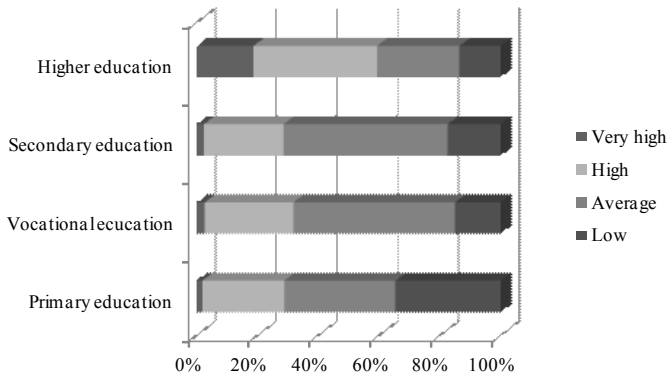

Fig. 4. The assessment of the level of income and education of the inquired
Source: Authors' own research.

People with a primary education assessed their remuneration worse. Almost 2% of the respondents with primary education said that the pay was very high, 27% – high, almost 37% – average and 35% – low. The level of education is therefore an important factor in determining the amount of income derived. Each additional year of school education increases the achieved revenue by 6.5% and in markets with less regulation by 9%. In turn, further training allows to achieve a 5% higher revenue [De la Fuente, Ciccione 2003, Jodkowska 2009].

One of the reasons for exercising the right to pension benefits was also the care over the grandchildren or other family members. The reason was mentioned by relatively few respondents (5%), who were mostly women (60%). A small number of people who resign from work due to care over family members shows that this is not a competitive activity to professional activity. Ensuring the care results from individual culturally conditioned preferences when needed to. Looking after children or adults acts as a substitute for professional external care, and hence limits the demand for this type of care [Kotowska 2008]. It may also result from a limited number of places in institutions providing care (crèches, kindergartens, nursing homes). The AZER study shows that the need for care of people of working age is in every third household. Care requires one in five people aged 18 to 64 years old in the household. Among people who need care outweigh children up to 14 years old (three quarters of all household members in need of care), mostly children under six years of age, and those aged 65 and over (almost one in ten people in need of

care). It can therefore be concluded that the need for care in households is a widespread phenomenon [Wóycicka 2009]. However, it should be noted that caring for grandchildren or other members is multidimensional. Studies have shown that older people heavily involved [Mendes de Leon, Berkman 2003, Kilian 2007], as well as maintaining close relationships with family members [Giles et al. 2004, Kilian 2007] have a lower disability. However, social productivity of older people is not only performing paid work, but also the actions. They (are not paid and included in GDP) cause an increase in the well-being of individuals and communities. This is among others an activity manifested in the family. It is based mainly on assisting in raising grandchildren, owing to which children can perform paid work, but these can also be other services provided to family members, which improve their welfare and well-being [Szukalski 2006].

CONCLUSIONS

The conducted study shows that the respondents exercised their right to retirement before reaching the retirement age, and the average age of respondents' retirement was 58.6 years old. Most of the factors influencing the decision to exercise the right to a pension are directly related to the pension system, and above all with the principles of acquiring the rights and calculation of the level of benefits. Respondents as the main reason for the decision to retire pointed to the retirement age, because they had long periods of contribution payment. The fulfilment of the condition to obtain a right to a pension in a way forces this decision for fear of changing legislation in this area. Other decisive factors were favourable financial conditions of retirement. Among the retired respondents, the decision to retire was determined primarily by the general structure of the pension system, in particular its generosity, which is reflected in the relatively low retirement age. Early retirement confirms the economic ineffectiveness of insurance obligation, which promotes anti-stimulogenic activities. People who are in the pre-retirement phase of the life cycle in the situation of favourable rate of substitution willingly "escape" from the pension system by reducing their professional activity. This results in a decrease of economically active people who contribute to the system and the extension of the period of retirement.

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CZYNNIKI DETERMINUJĄCE DECYZJĘ O PRZEJŚCIU NA EMERYTURĘ

Streszczenie. W ostatnich latach ze względu na zmieniające się warunki społeczno-gospodarcze i demograficzne zwraca się szczególną uwagę na aktywność zawodową osób starszych. Podejmowane są działania zmierzające do zwiększenia udziału grupy 50+ w rynku pracy, aby działania te przyniosły oczekiwane rezultaty, należy najpierw zidentyfikować przyczyny ograniczające aktywność osób w wieku okołoemerytalnym. Celem publikacji jest identyfikacja czynników wpływających na podjęcie decyzji emerytalnej. Z przeprowadzonych badań ankietowych wynika, że respondenci stosunkowo wcześniej korzystali z prawa do świadczeń. Średni wiek przejścia respondenta na emeryturę wyniósł 58,6 lat. Większość czynników wpływających na decyzję o skorzystaniu z prawa do emerytury bezpośrednio związana jest z systemem emerytalnym, a w szczególności z zasadami nabywania uprawnień i obliczania poziomu świadczeń. Respondenci jako główną przyczynę przejścia na emeryturę wskazali osiągnięcie wieku emerytalnego, następnie korzystne warunki finansowe.

Słowa kluczowe: decyzja emerytalna, wiek emerytalny, aktywność zawodowa, emeryt

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ENTREPRENEURSHIP OF RURAL RESIDENTS IN POLAND

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Abstract. The transformations that occur in rural areas are intended to increase the diversity of the countryside by extending the previously performed functions, both economic and social. This increases the importance of entrepreneurship among rural residents to cope with quite difficult facts, which had an undeniable impact on the quality of life. The aim of the study is to evaluate the entrepreneurship of the rural residents in comparison with living in cities. We have taken into account as the entrepreneurial attitudes as entrepreneurial actions. The important area of the analysis was the assessment of the relationship between these two aspects of entrepreneurship. The conducted studies have shown, that the entrepreneurial potential of the rural population in Poland is relatively high. In these terms, from the point of view of both the entrepreneurial attitudes and actions, residents of the rural areas are not falling behind the residents of cities. At the same time, entrepreneurial activities undertaken by them, remain in relation to their entrepreneurial attitude.

Key words: entrepreneurial attitudes, entrepreneurial actions, rural areas, Poland, synthetic indicator

INTRODUCTION

Entrepreneurship, as a multidimensional construct, is defined in the publications on this topic, in various aspects. This concept is closely connected with the term entrepreneur and can then be treated as an economic category. However, entrepreneurship is also a specific attitude towards the world and other people, which is expressed in the creative and active desire to improve the existing state of things, readiness to take on new or expand existing operations in order to improve working conditions and the quality of life [Wiatrak 2003, Marks-Bielska et al. 2014]. Entrepreneurship expresses the willingness and the ability to take up and creatively solve new problems, the ability to exploit arising

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opportunities and the flexibility to adapt to the variable operating conditions. In the colloquial meaning, entrepreneurship spells ingenuity, effort, resourcefulness [Griffin 2002]. It's "taking something ahead", that is, the implementation of new and challenging tasks, or, entrepreneurship is a property of the individual expressed in the ability and willingness to initiate and undertake new activities. These are the activities that go beyond the clichés and limitations.

Entrepreneurship is, first and foremost, an attitude towards life. Commonly identified with the slogan "take matters into your own hands", this attitude is characterized by taking the initiative, dynamism, creativity, and is widely regarded as the key to the economic development. The entrepreneurial attitude expresses itself best in conducting economical activities. According to many sociologists, an entrepreneur becomes a key player in the creation of the global economy, because he forms the basis of a healthy national economy. Entrepreneurship is a driving force of the market economy and an effective mechanism for efficient allocation of resources [Nawojczyk 2009]. Initiative, the ability to persuade others, moderate rather than high risk-taking, flexibility, creativity, independence/autonomy, the ability to solve problems, need for achievement, imagination, high conviction that one can control their own destiny, leadership, ability to work hard are listed among the features, that shape entrepreneurial attitudes [Gibb 1993].

According to W. Dobrołowicz [1995], features that both facilitate and hinder entrepreneurial activity exist. As part of the individual elements, constitutive for entrepreneurship, he mentions more than thirty features that facilitate entrepreneurial activities, and among them the desire for ownership and autonomy, hopes to achieve success and power, the ability to overcome anxiety, depression and various dangers, resolution and consistency, making decisions that bear risk, high threshold of stress and frustration, ingenuity and creativity, extroversion, confidence, optimism and activity, high energy and sustainability.

As noted by W. Pomykało [1995], the characteristic traits of entrepreneurial people can manifest themselves in everybody, but the degree to which they show is different. Some people are more creative, have a greater tendency to be independent, are able and willing to take risks, and solve difficult problems. It is, to a large extent, dependent on individual characteristics, as well as the function in a particular social environment. Whether a person objectifies their disposition, or becomes entrepreneurial, where, in what social, political, economic areas they fulfil their orders, depends surely on many social factors. On the type of the civilization and degree of its development, on political and economic infrastructure, on the country's level of development, on the starting point – the allocation of an individual in the social structure etc. [Jerschina 1998]. Favourable conditions can cause people to acquire certain attitudes, in this case entrepreneurial attitudes.

Because the entrepreneurship can refer to specific characteristics of individuals, that enable the taking and implementation of difficult tasks, achieving success, dealing with the present-day changes, it becomes a very useful and, at the same time, desired trait. It may have an impact on many areas of social life. Undoubtedly, the entrepreneurial attitude is needed in the economic area, since it allows to meet the economic transformations and brings tangible benefits in terms of an improving economic situation. It is, therefore, understandable that nowadays, even more so than in the past, the importance of the entrepreneurship in economic development is emphasized. The modern economy requires

efficient and motivated people who can clearly recognize their role in the labour market, as well as in other areas of social life. Even though, the changes taking place affect a lot of social groups, the residents of rural areas, who struggle with the consequences of present-day transformations, deserve, without a doubt, special attention.

Transformations taking place in rural areas rely, mainly, on departing from the existing way of rural development, which was strongly associated with the development of agriculture that provided employment and upkeep for the majority of the rural population, for the benefit of the development of rural areas. The undertaken actions aim to increase the diversity of the countryside by extending the previously performed functions, both economic and social [Sikorska-Wolak and Krzyżanowska 2010]. This has obvious implications. Population previously associated with agriculture is forced to take action to diversify their sources of income. In the context of these challenges, entrepreneurship is not so much needed, as desired. It allows creative problem solving and flexible movement in the contemporary changing reality, because it allows the individual to actively participate in the socio-economic life. The special perks of having an entrepreneurial orientation undoubtedly reveal themselves in the economic areas, which is especially important among the rural population. According to the assumption, that the entrepreneurs are more likely to succeed professionally and are much better at running their own business, promoting the idea of entrepreneurship in rural areas may lead to proper development of these areas. Entrepreneurship is the foundation for social transformation and a basic factor that actuates growth and structural transformation. Therefore, diagnosing the entrepreneurial potential seems to be incredibly necessary. Even more so, as the entrepreneurship has proven well in conditions of extreme uncertainty, which was, as in the case of Poland, the first stage of the transformation. All those who have taken an active stance to shape their own destiny, were able to cope with quite difficult facts, which had an undeniable impact on the quality of life.

The aim of the study, is to evaluate the entrepreneurship of the rural residents in comparison with living in cities. We have taken into account as the entrepreneurial attitudes as entrepreneurial actions. The important area of the analysis was the assessment of the relationship between these two aspects of entrepreneurship. The analysis refers to Poland.

This paper attempts to verify the following hypotheses:

1) rural residents are less entrepreneurial than city inhabitants;
2) rural residents with higher entrepreneurial attitudes are more inclined to entrepreneurial activities.

MATERIAL AND METHODS

The empirical basis for the analysis is the author's nationwide survey which was conducted under the University of Lodz grant for young scientists entitled: *The entrepreneurship among Poles – social and spatial aspects.* The questions about entrepreneurship were included in the omnibus survey (carried out by the Public Opinion Research Center – Ośrodek Badania Opinii Publicznej, TNS OBOP), with using the computer-assisted questionnaire interview (CAPI), on a representative sample of adult Polish citizens (n = 1,061). Structure of the sample has been aligned with the structure of the population

through the use of weights [also taking into account the following criteria: gender, age, place of residence (the city/village and province) and level of education].

The study included a few examples of activities, which are entrepreneurial in nature. The J. Jerschina's [2000] scale was used as a tool to evaluate the entrepreneurial attitudes. The scale consists of the following sub-indicators[1]:

- V1. I would rather be self-employed than be someone else's employee.
- V2. I like tasks, that are slightly risky, but bring positive benefits.
- V3. I often think about the future and plan various projects.
- V4. I have enough strength and skill to meet the challenges that I set for myself.
- V5. I like difficult problems and feel joy when I am able to overcome them.
- V6. The life for our children will be better than it was for us.

On its basis, an entrepreneurial attitudes index (IPP) was created, which concisely measures this multidimensional phenomenon[2]. This index ranges from 6 to 30 points, where the higher the number, the stronger the entrepreneurial attitude.

The statistical analysis was performed using basic descriptive statistics and appropriate statistical tests. The calculations were made using IBM SPSS Statistics 22.0.

RESULTS

The study brings positive results, in relation to the entrepreneurship of rural residents. Among all the indicators of the examined dimensions of entrepreneurship, positive reviews outweigh the negative ones. This means that the vast majority of the examined population demonstrated a positive entrepreneurial attitude (Table 1).

It is worth noting, that more than three quarters of the adult population of the countryside believe in their own abilities and skills necessary to meet the challenges which they set for themselves. This conviction is extremely important when undertaking entrepreneurial actions. Self-confidence, appreciating one's skills, determination, are one of the most important features of an entrepreneurial person. "The sense of your own worth closely is connected with predicting your own capabilities. It is extremely essential when taking actions, especially in new, unknown, hard to manage situations because a person always takes into account their own capabilities when commencing any kind of activities" [Chodkiewicz 2011]. Besides that confidence, high self-evaluation play an important role in dealing with stress, which is an inseparable element of entrepreneurial actions. While planning manifold activities for inhabitants of rural areas activising them outside agriculture, it must be taken into account that their faith in themselves, despite being relatively high is substantially – in a statistical sense – lower than that of inhabitants of cities ($p < 0.001$) – Table 1. That signifies the necessity of including a broader psychological packet (consulting and advising) in case of programs supporting business activity outside agriculture in the country. From the point of view of the entrepreneurial attitude it is also essential to convince individuals that they would rather work for themselves than being someone's employees. Close to 65% of country inhabitants agree with

[1]Each of the sub-indices was expressed on Likert's five-point scale.

[2]Due to the use of a ready-scale, its evaluation of Cronbach's alpha coefficient was omitted. However, also in this study, its reliability is satisfactory (Cronbach's alpha = 0.685).

Table 1. The elements of the entrepreneurial attitude of rural residents in relation to city dwellers' (%)

Entrepreneurial attitudes index (IPP)	Type of habitual residence	I agree	I partially agree and disagree	I disagree	Hard to say	p (V)
V1. I would rather be self-employed than be someone else's employee	village (n = 408)	64.6	9.7	19.5	6.2	0.025*
	city (n = 658)	57.8	14.2	22.7	5.4	(0.086)
V2. I like tasks that are slightly risky, but bring positive benefits	village (n = 408)	58.1	16.3	22.2	3.4	0.081
	city (n = 658)	65.1	13.7	18.6	2.7	(0.070)
V3. I often think about the future and plan various projects	village (n = 408)	53.8	17.7	24.5	4.0	0.097
	city (n = 658)	60.8	16.4	20.0	2.8	(0.067)
V4. I have enough strength and skill to meet the challenges that I set for myself	village (n = 408)	69.4	13.9	13.2	3.5	<0.001*
	city (n = 658)	81.0	9.6	7.3	2.3	(0.133)
V5. I like difficult problems and feel joy when I am able to overcome them	village (n = 408)	64.4	15.8	16.7	3.0	0.399
	city (n = 658)	69.3	14.5	14.7	1.5	(0.042)
V6. The life for our children will be better than it was for us	village (n = 408)	37.4	21.8	30.2	10.5	0.781
	city (n = 658)	40.3	21.7	29.2	8.7	(0.023)

p – the probability in the chi-square test (after omitting the answer: "Hard to say"; * – the differences statistically significant ($\alpha = 0.05$); V – the Cramer's V coefficient.
Source: Own calculations.

that opinion against 58% of city inhabitants (those differences are statistically important, p = 0.025) – Table 1. Interpreting the acquired results in socio-economic categories, it can be assumed that a large part of country inhabitants thinks positively about conducting their own business activity and working on your own is better perceived than being employed by someone. Such score is quite obvious if we take into account the fact that a significant part of this populace works on their own account on their respective farmland.

Another important element of entrepreneurship is the will to take risks. Close to 60% of country inhabitants (Table 1) claims to like tasks that are somewhat risky but allow for positive effects. Taking into account the fact that willingness to take risks is an inseparable characteristic of an enterprising person, the acquired is quite optimistic. More so because similar results were acquired from city inhabitants (p = 0.081). The tendency for taking risk is an immanent feature of enterprising actions. It is connected with the measurable activity, which is undertaken with the hope that a positive result will overweight the financial and personal [Trembaczowski 2008]. Therefore a positive attitude towards the undertaken actions is an important element of entrepreneurial attitude.

Optimism is another important characteristic of entrepreneurship. In case of the presented research, optimistic attitude which is measured through the assessment of the future of the children of the researched is typical for almost 40% of Poles, analogically for the inhabitants of the country and the city (Table 1). On the basis of the acquired results it

can be deduced that those people have positive expectation for the results of their actions. This has essential meaning for human activity. The power of positive thinking lies in the fact that if an individual believes that their actions will bring desired results than they take effort to realize them even if it costs them a lot of hardships and effort. "Optimism is understood as a constant tendency to perceive the world through the spectrum of the positive sides of the occurring phenomena and optimists are considered to be people tending to have positive expectations for their" [Chodkiewicz 2011]. Optimism perceived in such a way plays an essential part in dealing with difficult and stressful situations which are an inevitable element of enterprising actions. It has to be stressed that it is a spectrum of entrepreneurial attitude least useful when compared to others and in this respect rural areas inhabitants as well as those from the cities are similar.

Perspective thinking and planning your actions play an important part for entrepreneurship. In this case similar to the rest of the spectrums of the enterprising attitude, the rural areas inhabitants (as well as cities) are characterized by a relatively high intensity of this quality. Over half of the researched populace often thinks about their future and plans different endeavours (Table 1).

Thus the results of the conducted research quite clearly indicate that on a lip service level a high potential for undertaking enterprising actions can be observed in the rural areas inhabitants. This conclusion is also confirmed by the analysis conducted with the syntenthical IPP indicator – with the maximum at 30 points, the average value of the IPP indicator for inhabitants of rural areas reaches M = 21.43 points (STD = 4.39) and it is a value only slightly lower than for the people living in the cities (M = 21.98, STD = 4.27).

The verification of the actual state of events, that is undertaking of exemplary business activities slightly weakens the optimistic evaluation presented up to this point, nevertheless the further discussed indicators are on a relatively good level (Table 2). Those are compared with the data concerning the diagnosis of enterprising actions undertaken by inhabitants of cities as well as the general populace of Poles. The dominating enterprising action of the rural area inhabitants is the ability to resolve difficult situations. The question: "Did you experience a difficult situation over the last four years that you were able to resolve?", was positively answered by 60% of the subjects. In case of the three remaining actions a dominance of "no" answers over the "yes" ones can be observed.

When analysing the activities of an entrepreneurial character it has to be underlined however that seeking work or better quality of employment is on a relatively high level (42.1%). Worth noting is also the fact that over 16% of the research subjects conducted their own business activity in the last 4 years. Those results are especially meaningful in the context of actions aimed at inciting entrepreneurship in rural areas. Conducting of business activity or in other words self-employment is very often equated with entrepreneurship in a popular meaning of the word and treated as an indicator of economic potential. More and more often it is also perceived as one of the "forms of effective counteracting unemployment, raising the level of vocational activity level and also stimulating the economic and social growth of regions" [Szepelska 2013]. Profits of self-employment have an essential meaning in case of rural areas, which because of the undergoing changes struggle mainly with problems of an economic nature. The activity of rural areas inhabitants in the sense of conducting business activity is thus treated as an opportunity to deal

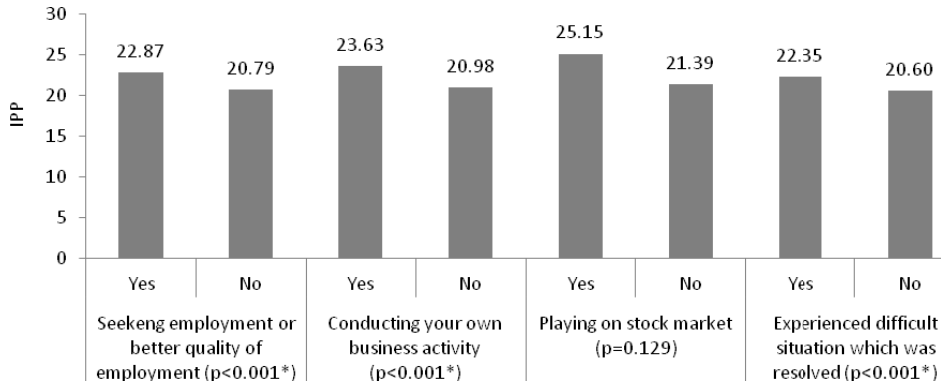
Table 2. Examples of entrepreneurial activities of rural and urban area residents (%)

Entrepreneurial activities	Rural area (n = 408)		Urban area (n = 658)		p (V)
	yes	no	yes	no	
Searching for a job or better conditions of employment	30.4	69.6	39.8	60.2	0.002 (0.095)
Conducted own buisness activity	16.5	83.5	11.8	88.2	0.034 (0.065)
Playing on the stock market	0.8	99.2	5.1	94.9	<0.001 (0.115)
Experienced difficulties, which were solved	47.1	52.9	60.3	39.7	<0.001 (0.129)

Source: Own calculations.

with unemployment as well as enhance the quality of life. That is why displays of this type of entrepreneurship are intensively supported since many years. And even though the results acquired in the presented research do not reach a high level, surely they indicate the changes which the rural areas undergo. They show that rural areas inhabitants are looking for alternative sources of employment. And what's more, the research shows that they undertake such activity significantly more frequently than inhabitants of cities. Lets add that for each of the discussed entrepreneurial actions the differences between the inhabitants of rural areas and of cities are statistically important (Table 2). In case of city inhabitants almost 12% of the populace conducted their own business activities in the last 4 years, that is lower than rural area inhabitants by 4 percentage points. Hence it is a kind of proof for the efficacy of the actions promoting and supporting entrepreneurship in rural areas and it instils optimism. More so even, since in other researched examples of enterprising actions, rural areas inhabitants do not differ from city inhabitants. Resolving difficult financial situations and stock market activity are on a similar level. A slight difference can be noticed when it comes to seeking employment or better quality of employment. Research shows that rural areas inhabitants take such initiatives more often than inhabitants of cities. This is, among other things, a consequence of changes taking place in rural areas. Drifting away from the typical agricultural activity forces the rural community to look for additional or even different source of income but the possibilities of employment are restricted because of the significantly smaller number of offered work places. Undertaking business activity outside of agriculture increases the chance of invigorating development in rural areas. That is why every sign of entrepreneurship deserves attention and recognition. More so because rural area inhabitants still have a lot of work before them to be able to deal with the constant transformations that are taking place. Thus it is important to continue to undertake actions promoting entrepreneurship and encourage self-employment. This conditions the entrepreneurial activity but above all else "enriches the job market through the possibility of working outside the traditional contract of employment. This affects the adaptability scale of the job market perceived as an efficient reaction to the variations on the job market" [Szepelska 2013].

Assessment of relations between enterprising attitude (measured synthetically, with the IPP indicator) and entrepreneurial activities of rural areas inhabitants, confirms their mutual dependence (Fig. 1).



p – probability in t-Student test; * – differences statistically significant (α = 0.05).

Fig. 1. Enterprising attitudes (median IPP) and entrepreneurial activities of rural areas inhabitants

Source: Own calculations.

People who conducted business activity in the last 4 years were also characterized by a higher enterprising attitude. Similar conclusions apply to seeking employment or better quality of employment as well as the fact of dealing with a difficult situation they experienced. Significant differences were not observed only in the case of playing on the stock market (p = 0.129), still even in this case it can be deduced that such actions were more often taken by people with higher enterprising attitudes.

DISCUSSION

The awareness of the benefits of being enterprising is reflected in taking initiative in shaping entrepreneurial orientation. The goal of the undertaken action is to stimulate and develop the spirit of entrepreneurship. Everything is done in order to do better in life which is accompanied by numerous changes that require initiative and creativity from people. Enterprising people are individuals who are active, they realize their goals without waiting for outside help. They become responsible for their lives and thus make them better. In other words undertaking entrepreneurial actions can condition the quality of a person's life because they allow one to achieve much more both financially and not financially. Study on enterprising potential is thus important. The diagnosis of the level of entrepreneurship should include not only the entrepreneurial attitudes analysis but also explore entrepreneurial behaviours. Empirical inquiries conducted in that spectrum indicate that attitudes are often discordant with the behaviour of an individual. The research of A. Wicker [1969] indicate that it is much more probable that the attitudes are unrelated or weakly related with external behaviour than that attitudes are closely related to behaviour.

The results of the enterprising potential of rural areas inhabitants are undoubtedly surprising. This confirms the thesis that entrepreneurial promotion and education affects the social mentality. It would be good if this could translate to an increase in business activi-

ties which from the point of view of the rural areas inhabitants circumstances could result in improvement of their economic situation. In economy based on knowledge "the role of traditional factors of development such as resources, raw materials, land is reduced in favour of human quality, educational preparation and also equipping his personality structure with entrepreneurial attitude" [Zioło and Rachwał 2009].

In accordance with the assumption that an enterprising individual reacts accordingly to changes and uses them as an opportunity to reach his goals [Huczek 2009], rural inhabitants are expected to take actions which will help them deal with the consequences of undergoing changes. The decline in profit of production in small farms causes an increase in the rural inhabitants activity when it comes to seeking alternative sources of profit, including the development of small rural entrepreneurship. "Enterprising initiative – as written in *Report on entrepreneurship* – is the key condition for development, (…) innovation and creation of new work places" [Raport o przedsiębiorczości 2004]. In this context the acquired results concerning the entrepreneurial potential of rural areas inhabitants inspire optimism. A relatively large percentage of the discussed researched group undertakes enterprising actions. This especially applies to people with higher entrepreneurial attitude. The activity in the sphere of conducting business activities deserves special attention. The only thing left is to believe that this will reflect in social life and help to improve the quality of life of rural areas inhabitants. Since the research shows that entrepreneurial attitude positively affects the subjective as well as objective dimension of the quality of life [Mularska-Kucharek 2013]. And thus being entrepreneurial conditions the general satisfaction with life and quality of life. Actions aimed at creating entrepreneurial attitudes in rural areas are thus worth taking. In order to efficiently realize the undertaken actions one must have awareness of the conditions of enterprising actions. Those initiatives depend on socialising, upbringing and also institutions which can shape human entrepreneurship [Jerschina 2000].

FINAL REMARKS

The article assesses the entrepreneurship of rural areas inhabitants. The undertaken research was concerned with the diagnosis of the enterprising potential encompassing the attitudes and selected examples of enterprising actions. Both the first and second aspect of the analysis is especially justified in case of entrepreneurship of local rural communities. The literature of the subject as well as observation of social life quite clearly indicate the gravity of entrepreneurship in the modern world. Surely it is the foundation for social transformations and the basic factor accelerating growth and structural changes. Thus the utilising the entrepreneurial potential of rural areas inhabitants can be a remedy for the socio-economic problems of rural areas. The promotion of entrepreneurship and the preparation for work on your own are showing more often as a solution for the effects of the changes that are taking place. More so because entrepreneurship is something more than a form of self-employment. The broad context of this term is well conveyed in the colloquial understanding of entrepreneurship, described as "taking matters into your own hands". In the modern world such attitude is not only advisable but necessary. Thus knowledge about enterprising potential can have significant meaning.

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PRZEDSIĘBIORCZOŚĆ MIESZKAŃCÓW WSI W POLSCE

Streszczenie. Przekształcenia zachodzące na obszarach wiejskich zmierzają do zwiększania różnorodności terenów wiejskich poprzez rozszerzenie dotychczas pełnionych funkcji, zarówno gospodarczych, jak i społecznych. Zwiększa to znaczenie przedsiębiorczości mieszkańców wsi. Jako cel pracy przyjęto ocenę przedsiębiorczości mieszkańców wsi w porównaniu z mieszkającymi w miastach. Uwzględniono przy tym zarówno postawy, jak i działania przedsiębiorcze. Istotny obszar analizy stanowiła ocena relacji między obo-ma aspektami przedsiębiorczości. Przeprowadzone badania wykazały, że potencjał przed-

siębiorczy mieszkańców wsi w Polsce jest relatywnie duży. Zarówno z punktu widzenia postaw, jak i działań przedsiębiorczych mieszkańcy wsi nie pozostają przy tym w tyle za mieszkańcami miast. Jednocześnie, podejmowane przez nich działania przedsiębiorcze pozostają w związku z ich postawą przedsiębiorczą.

Słowa kluczowe: postawy przedsiębiorcze, działania przedsiębiorcze, obszary wiejskie, Polska, wskaźnik syntetyczny

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DYNAMICAL CLUSTERING OF STREAMING DATA WITH A GROWING NEURAL GAS NETWORK

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Abstract. One of characteristic feature of contemporary data bases is their growing dynamics. The number of registered entities as well as their group structure tends to dynamically grow. In order to effectively determine the rapidly changing number and structure of clusters, appropriate methods of cluster analysis have to be applied. The paper presents the results of simulation research concerning the possibility of applying self-learning GNG neural networks in clustering data from data streams.

Key words: cluster analysis, data streams clustering, Growing Neural Gas network

INTRODUCTION

A characteristic feature of the developing economies of many countries is a constant increase in demand for information. The globalization of world markets and increasing competition forces companies to use the information accurate, precise, comparable, reliable and current. In addition to other features of the information, the increasing role of its topicality. Increasingly, it is no longer about information simply to date, but on information from the "last minute". Must contain the description of the phenomenon studied, the real "now".

Examples of such information may be recording data on financial transactions on stock exchanges worldwide. Active investor makes decisions based on what is happening in the market at the moment. A similar situation exists in the company responsible for the security of transactions on credit cards. Every day in the world there is a lot of millions of transactions using credit cards. However, some may be ineligible. When the owner of the card for many years. He made her small payments, and suddenly the system records a sample of transactions on a significant amount, perhaps a card has been stolen. Reaction institution supervising transactions must be taken immediately. Approve the transaction

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or block? Every day, retailers are visited by hundreds of thousands of customers with different shopping preferences. The development of technology has made these institutions have extensive data sets on the individual customer purchase transactions. Such registration is carried out by electronic readers that automatically reads the barcode information on the purchased products. It is possible to automate this process searchable collections to find information about your preferences and shopping habits of customers, identification of combinations of products purchased together by customers. With even greater intensity stream of data we are dealing in computer systems that support the Internet. Every minute of users post on YouTube 48-hours movies. On Facebook at this time appears 684,478 new materials. Google search logs 2,000,000 questions from Internet users per second. Which Web pages open Internet users, how often, and in what order pass between successive links, which the advertisement was displayed at this point how much time the user spent on the site? The answer to these questions is essential in developing an optimal strategy for the promotion of the product, in the assessment of its costs and the expected results. This assessment is not easy. The number of existing web pages is huge and still growing dynamically.

One of the problems connected with the analysis of data contained in the contemporary data bases is high volatility of their content. New observations may be registered many times within a second, dynamically changing the image of the observed population. Not only the number of units may dynamically change, but also their group structure. In line with the flow of time and inflow of new data, the known and well defined clusters may lose their importance or be dissolved in other clusters. Clusters, which contain rare species, the clusters which are poorly defined (blurry) may become more numerous, better defined or even dominant. Completely new clusters may also emerge. It is also possible, that data have limited validity periods assigned to them, after which they lose their significance and their influence on the current structure of the population. In consequence it may lead to the disappearance of the existing clusters. To properly observe the studied population cluster structure change process it is necessary to continuously group particular objects and make corrections in the description of clusters – in line with the inflow of new data. It is indispensable to apply the clustering method which would be capable to react to each new information and to automatically make indispensable corrections in the description of the existing group structure. This description should be available at any time.

RELATED WORK

Since early 1990s a rapid growth in the number of data bases and their content could be observed. In many cases the inflow of new data is very fast and practically unlimited. A good example may be the registration of data about financial transactions at the world stock exchanges, recording of: financial transactions made with credit cards, transactions in Internet shops, credit applications in the headquarters of a bank, phone calls by a telecommunication company, log-ins in Internet services etc. Data of this kind are called data streams. They differ from typical, static data with several features. First of all the content of the data base changes in dynamic way, sometimes several hundred times per

second and its size is unlimited. Secondly, the cluster structure of recorded objects may rapidly change. The number of clusters can also change. In the analysis of data streams the crucial role is played by the limitations of time and memory resources, leading to the equally unfavourable phenomenon of underfitting of classification models [Domingos and Hulten 2000]. The data stream may be so rapid and made of such a great number of objects, that there will be no possibility for it current analysis.

To group objects coming out of data streams it is necessary to apply special algorithms. They may be divided into four basic groups. The first group is made of the incremental or online classifiers. These are such algorithms as the Very Fast Decision Tree algorithm (VFDT) [Domingos and Hulten 2000] and its extension: Concept Drift Very Fast Decision Tree algorithm (CVFDT) [Hulten et al. 2001]. The second group is made of the multimodel algorithms such as Ensemble Classifiers (EC) [Kolter and Maloof 2003, Wang et al. 2003]. The third group of algorithms contains the low granularity Rule Based Classifier proposed by Wang et al. [2007]. This group contains as well the methods based on genetic algorithms – GA [Vivekanandan and Nedunchezhian 2011]. The fourth group of stream data analysis methods are Anytime algorithms. They were discussed for the first time by Dean and Boddy in 1988 [Dean and Boddy 1988]. In cluster analysis their applications were studied among others by Vlachos et al. [2003], as well as by Kranen et al. [2011, 2012].

In the study presented below, the data grouping algorithm based on the self-learning of neural network of the Growing Neural Gas (GNG) type will be presented. Compared to the classical Fritzke algorithm [Fritzke 1994] it has been substantially modified. A variable step of winning neuron learning and neurons connected to it was introduced. Learning step size was also made dependent on the rate of inflow of new information, distinguishing static and dynamic phase of the self-learning process. These changes significantly increase the speed of learning and quality of clustering network for streaming data. In the version described below it may be assigned as unsupervised version of the third and fourth group of data stream clustering algorithms.

CONSTRUCTION AND SELF-LEARNING ALGORITHM OF GNG NETWORK

A classic algorithm of construction and self-learning of GNG networks was proposed by Fritzke in 1994 [Fritzke 1994]. His idea reduced the typical problems with self-learning networks of the Self Organizing Map (SOM) type [Kohonen 1995]. Such networks have an *a priori* assumed structure, which does not change in the self-learning process. An optimal structure is, however, not known in advance. Another practical problem with the SOM network is the objective determination of the number and borders between clusters [Migdał-Najman and Najman 2008]. The GNG network was assumed to dynamically change its structure, adopting it to the real needs. It should also divide the existing clusters by itself. The self-learning algorithm of the GNG network, with appropriate modifications could be used to search for dynamically changing group structure of the observed objects (cases of database). Its essence may be presented in the following way:

Let D be an M-element of the set of objects in an n-dimensional space:

$$D = \{\xi_1, ..., \xi_M\}, \xi_i \in \Re^n \tag{1}$$

Each object $\xi \in D$ is described by n-element of set of data vectors (data vectors).

Let A be a k-element, n-dimensional set of neurons:

$$A = \{c_1, ..., c_k\}, c_i \in \Re^n \tag{2}$$

To each neuron $c \in A$ is connected a reference vector (w_c), which can be considered as vector of neuron coordinates in input space (input space).

The initial set of neurons is composed of two elements, $k = 2$. The self-learning process starts with the initiation of c_1 and c_2 neurons with random weights (co-ordinates in the space of analysed objects):

$$A = \{c_1, c_2\} \tag{3}$$

The connection between them and the age of the connection is set to 0.

From the set D is randomly selected one object ξ (data vector). Among the existing neurons the following ones are looked for: the neuron closest to the selected object and the second closest one:

$$s_1 = \arg\min_{c \in A} \|\xi - w_c\|, \; s_2 = \arg\min_{c \in A \setminus \{s_1\}} \|\xi - w_c\| \tag{4}$$

The s_1 neuron is called the winning neuron. As a measure of the distance of objects from neurons (data vectors and reference vectors) it is necessary to adopt the appropriate metrics, corresponding to the measurement scales used in the study. If these neurons are not connected, such connection should be created and its age set to 0. The age of connection is the number of consecutive iterations in which the neuron is not the winning neuron. Then a learning stage of the s_1 and s_2 neurons is initiated. In the first step a local measure of the network error for the s_1 neuron is determined:

$$\Delta E_{s_1} = \left\|\xi - w_{s_1}\right\|^2 \tag{5}$$

It is a classical quantisation error. Then all neurons connected with the s_1 neuron are looked for and their coordinates are updated:

$$\Delta w_{s_1} = \varepsilon_b \left(\xi - w_{s_1}\right), \; \Delta w_i = \varepsilon_n \left(\xi - w_i\right), \; \left(\forall i \in N_{s_1}\right) \tag{6}$$

where: i means the i-th neuron connected with the winning one [Jirayusakul and Auwatanamongkol 2007]. The speed of learning of the winning neuron (moving of neuron s_1 and s_2 toward object ξ) is determined by ε_b and other connected neurons by ε_n. The age of connections between all neurons, whose coordinates have been updated is increased by 1. Then all connections between neurons older than the maximum seaget (age_{max}) are removed. It is then checked, whether the s_1 neuron remained to be connected with any other neuron. If it lost all connections, it is removed.

The above procedure is repeated for successive drawn objects ξ. If the number of random objects so far is equal to a multiple parameter λ, the procedure for inserting a new neuron begins. If the connections existed, the procedure for inserting a new neuron is initiated. The neuron with the maximum quantisation error q is looked for and the neuron f closest to it. The new neuron r is placed between the q and f neurons, creating its coordinates by interpolation of coordinates of the q and f neurons:

$$A = A \cup \{r\}, \quad w_r = \left(w_q + w_f\right)/2 \tag{7}$$

At the same time the connections between neurons are modified by removal of the connection between q and f, and then linking the neuron q with r and the neuron f with r. The age of those connections is set at 0. The quantisation error for the new neuron is also determined:

$$E_r = \left(E_q + E_f\right)/2 \tag{8}$$

where:

$$E_q = \left\|\xi - w_q\right\|^2, \quad E_f = \left\|\xi - w_f\right\|^2 \tag{9}$$

This is the last stage of the algorithm, when the stop conditions are tested, as follows: achieving the assumed maximum number of iterations – $it_{\max}$, achieving a minimum assumed learning error of networks – $MQE_{\min}$ (Mean Quantisation Error) and reaching maximum assumed number of neurons – $k_{\max}$. The fulfillment of any condition ends the algorithm.

Among the drawbacks of the algorithm it is possible to identify a number of parameters, which have to be determined *a priori*.These are: maximum number of iterations, maximum number of neurons and the maximum age of connections, minimum network error and the frequency of new neuron λ iteration. These parameters are difficult to determine *a priori* because of the lack of simple formal dependencies between them and the quality of cluster reconstruction. In the process of dynamic clustering the problem becomes somewhat simpler. Since the self-learning process must have a continuous character, it is easier to determine the key values of parameters. If $k_{\max} > 2M$, $it_{\max} = Inf$, $MQE_{\min} < 0$, the self-learning process of the GNG network will not be automatically interrupted.

Further modifications result from the possibility of the change in the existing group structure in time. The algorithm should behave differently, when the structure is not subject to change, and when it changes. To attain the adaptability of the self-learning process of the GNG networks it is necessary to correct λ the size of learning step ε_b and ε_n [Najman 2011a, 2011b]. The change in the learning step can be accomplished either discretionally (one value of the learning step for the static phase and one for the dynamic phase) or functionally (one value of the learning step for the static phase and e.g. a linear function of change of the learning step for the dynamic phase). To additionally accelerate the process of recognition of new clusters it is possible to increase the frequency of insertion of new neurons. The distinction of phases may proceed on the basis of the measurement

of the quality of the achieved group structure. One of the many known indices may be used to that end, such as e.g. Silhouette Coefficient [Kaufman and Rousseeuw 1990] or others. If the value of the index is subject to a discretional change, it is usually connected with the appearance of a new cluster or division of an existing cluster into parts. In both cases changes of group structure may be significant and the network should switch to the dynamic phase.

AN EXPERIMENTAL STUDY: DATA SETS

In the empirical research artificial datasets were used. Altogether 3,235 dynamic data bases were generated. Each base consisted of 20,000 objects with random group structure (spherical and separable focus) consisting of 2 to 20 clusters, 2- to 40-dimensional. For each database was separately build a new GNG network. Clustering started with 100 randomly selected objects from the database. After each iteration of network learning, new objects were added to the database at the same time removing those that have been longest inside. Number of added and deleted objects in each case was determined randomly (add max 40 objects, remove max 15 objects) in such a way that the current size of the database was gradually increased. The initial database is treated as a population, and its passage, clustered at the moment, as a test. In this way, the appropriate changes of the number of objects and the structure of the cluster in time were provided. During all experiments, the maximum number of clusters existing at the same time was 15, and the maximum number of objects grouped at the same time was 1,345.

In the process of clustering was observed, in each iteration, compatibility of the achieved group structure with the known, established *a priori* model, measured with corrected ratio Rand (Rand Adjusted Statistic) [Rand 1971] the achieved group structure measured with the Silhouette Coefficient, the time of single learning iteration measured in seconds (values given in seconds refer to a typical personal (PC) computer equipped with an Intel(R) Core(TM) i5-2434M CPU 2.4 GHz processor), the current number of neurons and objects in the database. Because it is believed that when the SC value is less than 0.7, a set of objects has a difficulties to identify the structure of the cluster [Kaufman and Rousseeuw 1990], the switching from the static to the dynamic phase was effected when the value of the Silhouette Coefficient fell below 0.7. In the static phase the learning step was adopted at the level $\varepsilon_b = 0.02$ and $\varepsilon_n = 0.004$, while in the dynamic phase $\varepsilon_b = 0.06$ and $\varepsilon_n = 0.001$. New neuron was inserted into the network every 200 iterations ($\lambda = 200$). These parameters were determined experimentally, taking into account the extreme values of object features.

EXPERIMENTAL RESULTS

Summing up the results of experiments, it can be said, that the compatibility of grouping with the known model was very high (Table 1). The average value of the Rand Adjusted Statistic was higher than 0.95. Lower values were received only for clusters 2, 3 and 14, 15. However, these were only exceptional and temporary situations, at low number

Table 1. Quality and speed of learning of the GNG network in relation to the number of existing clusters

Clusters	2	3	4	5	6	7	8
Mean Adjusted Rand Index	0.751	0.918	0.969	0.983	0.988	0.988	0.990
Mean Silhouette Coefficient	0.502	0.736	0.860	0.911	0.933	0.935	0.944
Mean Time 1 Iteration	4.1 E-04	4.2 E-04	4.3 E-04	4.3 E-04	4.4 E-04	4.3 E-04	4.3 E-04
Clusters	9	10	11	12	13	14	15
Mean Adjusted Rand Index	0.987	0.989	0.985	0.976	0.959	0.928	0.831
Mean Silhouette Coefficient	0.945	0.939	0.930	0.923	0.885	0.816	0.758
Mean Time 1 Iteration	4.3 E-04	4.3 E-04	4.3 E-04	4.4 E-04	4.4 E-04	4.5 E-04	4.5 E-04

Source: Own research.

of clusters they were connected with their excessive division while at a high number of clusters they were connected with their excessive connection.

The achieved group structure may be considered as a good one. The Silhouette Coefficient has attained an average value of more than 0.85. The values lower than 0.8 were attained rarely and temporarily in identical situations as was the case with lower values of the Rand Adjusted Statistic. The switch of the network to the dynamic phase resulted in a radical improvement of the group structure after several learning iterations.

The average time of learning in a single iteration amounted to about 0.00042 seconds. It has slightly increased in line with the increase in the number of clusters. This growth was, however, not directly connected with the existing number of clusters. At a high number of clusters the group structure was subject to more frequent change. It entailed a more frequent switching of the self-learning process from the static phase into a dynamic phase. In the dynamic phase the neurons are inserted and removed more often and this process is responsible for the increase in the time of learning. In the static phase the learning time in a single iteration does not depend on the number of clusters.

The compatibility of classification with the model depends to a certain degree on the number of dimensions of the space (Table 2). The value of the Rand Adjusted Statistic remains at a level higher than 0.9, apart from two-dimensional sets. In two-dimensional sets, the network identified local changes in the object density and has excessively divided the existing clusters independently from the number of clusters. Similarly, the cluster structure, independently from the number of dimensions, has been relatively well recognised. The average value of the Silhouette Coefficient amounted to over 0.75.

The time of one learning iteration of the network depends barely on the dimension of the data. It is related to the time of computing the distance between the object and the neuron. The learning time-related to the dimension of data attained approximately the following values:

$$time = -1.3E-007 \times dimension^2 + 5.2E-006 \times dimension + 0.00039 \quad (10)$$

Table 2. Quality and speed of learning of the GNG network depending on the number of dimensions

Dimensions	2	4	6	8	10	12	16
Mean Adjusted Rand Index	0.83	0.90	0.91	0.91	0.93	0.91	0.91
Mean Silhouette Coefficient	0.57	0.72	0.75	0.77	0.78	0.78	0.79
Mean Time 1 Iteration	3.9 E-04	4.0 E-04	4.1 E-04	4.1 E-04	4.2 E-04	4.1 E-04	4.2 E-04
Dimensions	20	24	28	32	36	40	
Mean Adjusted Rand Index	0.91	0.92	0.91	0.90	0.92	0.93	
Mean Silhouette Coefficient	0.80	0.81	0.81	0.80	0.82	0.83	
Mean Time 1 Iteration	4.3 E-04	4.3 E-04	4.4 E-04	4.4 E-04	4.4 E-04	4.4 E-04	

Source: Own research.

The time of a single iteration of learning of the network depends on the number of objects in the data base. This relationship has a linear character:

$$time = 5E-008 \times objects + 0.00043 \tag{11}$$

For 10,000 cases it would amount to some 9.3E-4 seconds, for 100,000 cases some 0.0054 seconds and for 1,000,000 cases about 0.504 seconds. Then, may by assumed, that the network is learning relatively quickly.

The time of single learning iteration of the network depends linearly on the number of neurons in that network (Table 3). This relationship is clearly discernible, since the Pearson's Correlation Coefficient amounts to 0.8. This is not a problem for the GNG network since the number of neurons does not depend on the number of objects but only on the number of clusters only and the level of complication of the cluster structure. For this reason, in the experiment, the average number of neurons depends in a small extent on the number of grouped objects. Averaging the number of neurons on the number of

Table 3. Learning speed of the GNG networks and the number of neurons related to the number of cases

Number of cases	300	350	400	450	500	550	1,000
Mean Time 1 Iteration	4.7 E-04	5.0 E-04	4.8 E-04	5.2 E-04	4.9 E-04	4.8 E-04	4.3 E-04
Mean number of Neurons	30.1	33	27	35.7	33.5	32.5	22
Number of cases	1050	1100	1150	1200	1250	1300	1350
Mean Time 1 Iteration	4.4 E-04	4.9 E-04	4.6 E-04	4.7 E-04	4.2 E-04	5.4 E-04	5.2 E-04
Mean number of Neurons	28.5	33	32.5	31.5	28	25	34

Source: Own research.

dimensions and the number of existing clusters from 300 to 1,350 the number of objects very similar values were obtained. In all simulations, the minimum number of neurons was 5 and the maximum – 47.

CONCLUSIONS

The experiment allows us to think, that the self-learning networks of the GNG type may be an effective instrument for objects dynamic clustering. In the overwhelming majority of cases, a high compatibility of clustering with the model and the achieved group structure was being achieved throughout the time of operation of the network. The network has confirmed its economical character. It is difficult to assess the frequency of insertion of neurons (λ).

The main problem of GNG network construction remains to determine the parameters of its construction. Some parameters controlling the operation of algorithm in dynamic clustering loses its relevance ($it_{\max}$, $MQE_{\min}$, $k_{\max}$). Other parameters may be subject to self-regulation (ε_b and ε_n). It is also difficult to determine the threshold value at which the network should switch from the dynamic into the static phase. All the received results concern as well the data which do not contain any meaningful noise and concern only separable clusters. The above mentioned problems will be subject of further research.

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GRUPOWANIE DYNAMICZNE STRUMIENI DANYCH Z ZASTOSOWANIEM SIECI TYPU GROWING NEURAL GAS

Streszczenie. Jedną z charakterystycznych cech współczesnych zbiorów danych jest ich dynamika. Liczba zarejestrowanych obiektów, jak również ich struktura grupowa potrafi zmienić się wielokrotnie w ciągu sekund. W celu skutecznego wykrycia liczby skupień i struktury grupowej rejestrowanych obiektów konieczne staje się zastosowanie specjalnych metod analitycznych. W artykule przedstawiono wyniki badań symulacyjnych w zakresie możliwości zastosowania samouczących się sztucznych sieci neuronowych typu GNG w grupowaniu strumieni danych.

Słowa kluczowe: analiza skupień, grupowanie strumieni danych, sieci typu Growing Neural Gas

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THE CHANGES IN PRODUCTIVITY OF PRODUCTION FACTORS IN COMMERCIAL FARMS IN POLAND IN 2004 AND 2012

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Abstract. The aim of the paper is an assessment of changes in production factors productivity in commercial farms in 2012 in comparison to 2004. An analysis concerns the flexibility of relations among production factors like: arable lands areas in hectares, human labor input in man-hours, total cost in Polish zloty in 2004 and 2012 and the effects resulted from using above mentioned factors expressed in production value. It allowed to make an assessment of changes in rural farms' economic effectiveness within eight years after Poland's accession to the European Union. In surveyed period average labor effectiveness increased of 86.5%, and land effectiveness of 29.7%. Average capital productivity decreased just like labor and land margin productivity.

Key words: agriculture, commercial farms, productivity, Cobb-Douglas production function

INTRODUCTION

Productivity is defined as the capacity of production factors for creating the effect in the form of production [Latruffe 2010]. Productivity and efficiency are often used to evaluate the competitiveness, and the European Commission considers productivity to be the most reliable indicator of competitiveness in the long term [European Commission 2008]. Analysis of productivity is a key issue in terms of the assessment and the possibility of improving the competitiveness of the company and it creates a very useful management tool at every level of economic development [Domańska et al. 2014]. Productivity, defined as the ratio between the obtained effects and the expenses, is a measure of the efficiency of the management [Floriańczyk and Rembisz 2012].

Productivity can be calculated cumulatively for all the factors involved in the production (multifactor productivity) or individually for each factor of production (partial

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productivity). Multifactor productivity of resources takes into account the impact of all factors, representing combined contribution in a given production. In turn, the partial productivity shows the impact of individual types of resources (e.g. capital, labor) on the size of the production volume and can be used for measurement in specific sectors of the national economy [Boghean and State 2013].

The foundation of productivity growth is the use of new production technologies, as well as increase in the scale of production [Floriańczyk and Rembisz 2012]. The consequence of productivity growth is, however, an increase in remuneration for ownership of capital used in agricultural production and farm management skills [Floriańczyk and Rembisz 2012]. The significance of productivity growth in Polish agriculture stems from the fact that it presents low productivity of production factors, especially labor and land [Gradziuk and Kłyż 2011, Siekierski 2014]. Taking action to improve the productivity of the production power in agriculture is also a response to the directions of agriculture development identified in the strategic documents of the European Union and Poland. With the approval of the Lisbon Strategy aimed at enhancing competitiveness, improving productivity became one of the main parameters of assessing the progress of the EU economy development [Floriańczyk et al. 2013].

The Polish agriculture, with the accession to the European Union, noted significant changes, including both structural transformations, as well as the efficiency of the use of its existing production potential, including the profitability of farms. These changes were largely the result of including the agriculture and rural areas in the EU support system. Before the integration the primary source of funding of the changes in agriculture were the owners' own resources and funds originating from the state budget. In the first period after EU accession SAPARD program was implemented until 2006, which aimed to improve the competitiveness of the food economy and sustainable development of agriculture and rural areas. However, since 2007, mechanisms of the Common Agricultural Policy (CAP) became effective, meaning new funding program for agriculture and rural areas. Then the participation in the European single market area resulted in new profitable opportunities for agriculture resulting from the higher level of demand, prices and the implementation of economic support resulting from the rules of the Common Agricultural Policy, as well as external tariff protection [Jóźwiak 2012, Wigler 2014]. Numerous studies on the impact of Polish accession to the European Union confirm the positive changes in the condition of agricultural farms after Poland joined the European Union [Poczta et al. 2012, Spicka 2013].

The aim of the study is to assess the changes that have occurred in the production factors productivity in the agricultural farms in 2012 compared to 2004. We analyzed the flexibility of the correlation between total production in Polish zloty and production factors, i.e. the area of agricultural land in hectares, expenditure of labor in man-hours and total costs in Polish zloty in 2004 and 2012. This allowed the evaluation of the changes in economic efficiency of farms during eight years after the Polish accession to the European Union.

MATERIAL AND METHODS

The study was conducted on the basis of accounting data from commercial farms participating in the Polish FADN (Farm Accountancy Data Network) from 2004 and 2012. It is a database in which data is collected according to uniform rules, and the farms form a statistically representative sample of commercial agricultural farms operating across the EU. The number of farms accepted for analysis in the examined period amounted to 10,992 in 2004 and 9,931 in 2012.

The relationship between the expenditures of factors of production incurred in the production process and the amount or value of the manufactured product is determined as a function of production [Gruszczyński and Podgórska 2000], where the term expenditure is sometimes narrowed down to living and objectified labor. In determining the variables for the production functions two approaches are used. One of them is the recognition of expenses in the form of resources, the second in turn consists of transferring the attention from resource aspects of the functioning of enterprises (employment and value of fixed assets) into categories having the character of streams [Kalinowski 2002]. A function with three variables was used in the study. It takes into account labor, capital and land factor. This is due to the fact that the land as a factor of production constitutes the essence of process management in agriculture [Tomczak 1983, Bezat and Rembisz 2011]. To complete the adopted aim of research, the Cobb-Douglas (C-D) type of function method was used, which is the theoretical basis for explaining the majority of the regularities of efficiency in agricultural economics [Bezat and Rembisz 2011]. The Cobb-Douglas function of production is widely used in econometric studies [Aggelopoulos et al. 2006, Ionita and Andrei 2010, Yuan 2011, Kotulič and Pavelková 2014]. It adopted the following form:

$$Y = aX_1^{\alpha} X_2^{\beta} X_3^{\delta} d$$

where: a – constant (total factor productivity);
Y – total output in Polish zloty (according to FADN-SE131)[1];
X_1 – labor input in hours (SE011)[2];
X_2 – total utilised agricultural area in hectares (SE025)[3];
X_3 – total inputs in Polish zloty[4] (SE270);
α, β, δ – the regression parameters;
d – random factor.

The calculations were performed using the software GRETL[5].

[1]Total output of crops and crop products, livestock and livestock products and of other output.
[2]Time worked in hours by total labor input on holding.
[3]Total utilised agricultural area of holding.
[4]Total inputs are the sum of specific costs, overheads, depreciation and external factors. Costs linked to the agricultural activity of the holder and relating to the output of the accounting year.
[5]ang. GNU Regression Econometrics Time-Series Library, which is a program by Allina Cottrell from Wake Forest University in North Carolina in the United States.

RESULTS AND DISCUSSION

Table 1 shows the statistical description of the variables included in the study, involving expenses on factors of production expressed as a stream (of agricultural area in hectares, workload in working hours, total costs in Polish zloty) and the effect of production expressed as total production value in Polish zloty.

Table 1. Statistical characteristics of analyzed variables in commercial farms within 2004 and 2012

Feature name	Features according Poland FADN	Symbol Variables	Measure unit	Arithmetical mean	Variability coefficient
		Year 2004			
Total production	SE131	Y	PLN	173 029.0	1.84
Total work time	SE011	X_1	h	4 614.5	0.78
Arable lands area	SE025	X_2	ha	30.8	1.54
Total cost	SE270	X_3	PLN	128 664.0	2.00
		Year 2012			
Total production	SE131	Y	PLN	351 786.0	2.65
Total work time	SE011	X_1	h	5 064.4	1.31
Arable lands area	SE025	X_2	ha	48.6	2.43
Total cost	SE270	X_3	PLN	275 012.0	3.08

Source: Own elaboration basing upon unit empirical data from Polish FADN.

The analysis in Table 1 shows that the volatility of characteristics of commercial farms admitted to this study was significantly higher in 2012 than in 2004, for all examined variables. Both in 2012 and in 2004 the highest variability can be observed in the factor of total costs, while the least diverse factor was the total work time. This is due to a family nature of Polish farms, where human labor expenses remain relatively constant due to the fact that they are determined by the number of family members.

In order to determine the productivity of land, labor and capital function models of Cobb-Douglas (CD) type were formed for small commercial farms in Poland for 2004 and 2012. The approximated models of this function express the relationship between total production in Polish zloty (Y) as the dependent variable and the labor in man-hours (X_1), expenditure of land in hectares (X_2) and the flow of capital in Polish zloty (X_3) as independent variables. In 2004 and 2012, they took the form of the following equations:

- $2004: Y = 0.8938 X_1^{0.0846} X_2^{0.0360} X_3^{0.9639}; R^2_{1.3,4} = 0.9358;$
- $2012: Y = 1.1419 X_1^{0.0420} X_2^{0.0206} X_3^{0.9750}; R^2_{1.3,4} = 0.9423.$

Statistical verification of regression coefficients in these equations was performed by using Student's t-test, assuming the level of significance at p = 0.01. The absolute level

of determination coefficients indicate that fluctuations in the value of production in 93.5–– 94.2% are explained by using three variables: labor, land and capital value expressed in total costs. A statistically significant level of multiple correlation coefficients indicates a good fit of the model function to the coordinates of researched characteristics in the studied years. The presented equations are characterized by a high degree of likelihood of regression coefficients in the test period.

Power function is a function of a constant elasticity (independent of the value of individual variables) of the dependent variable and elasticity of individual variables are equal to calculations of parameters characterizing them [Czekaj 2006]. Table 2 shows the level of total elasticity coefficients of productivity factors in terms of production value, as well as a contribution of each of the analyzed factors in the overall value of the coefficient of elasticity.

Table 2. The level and structure of elasticity coefficients value production (Y) with respect to the independent variables (X_1, X_2, X_3) in the years 2004 and 2012 in Poland

Year	The level of production value's total elasticity coefficient	The share of surveyed production factors in total value of output elasticity coefficient (%)		
		X_1	X_2	X_3
2004	1.0845	7.80	3.32	88.88
2012	1.0376	4.05	1.98	93.97

Source: Own elaboration basing upon unit empirical data from Polish FADN.

The sum of the coefficients of the regression in models of C-D function was above 1 in both 2004 and 2012, which means increasing incomes from the scale. Coefficient of total elasticity measures the impact of changes in factors of production on production scale [Santeramo 2014]. The simultaneous increase in all of the analyzed factors of production by 10% while maintaining the existing proportions between them resulted in the production value increases by approximately 10.8% in 2004 and 10.4% in 2012. The coefficients of production flexibility with regard to individual factors of production indicate that the increase in the production value was shaped the most by the flow of capital. Moreover, the share of this factor in the overall value of the coefficient of elasticity increased between 2004–2012 from 88.88 to almost 94%. Also Niezgoda [2010] indicates in his research such trends in 2004–2007. At least important in total production flexibility proved to be the land factor, its impact on the incomes on the scale decreased in the research period by 1.34 percentage points and in 2012 amounted to less than 2%. Also decreased the impact of labor factor on the increase of production value decreased, with its share in the total elasticity coefficients of productivity was 7.8% in 2004 and 4.05% in 2012.

The next stage of research was to bring the above multiple regression equations to partial regression functions, which allowed to explain the relationship between production and the studied factors, i.e. labor, land and capital flow factor. Total productivity and average studied factors of production were established based on partial regression equation, while the first derivatives of the partial function were used to determine the marginal productivity of land, labor and capital. Partial regression equations in relation to each independent variables are shown below:

- for the factor of human labor

$$2004: Y'' = 85\,078.97 X_1^{0.0846}; R^2 = 0.9358;$$
$$2012: Y'' = 248\,700.67 X_1^{0.0420}; R^2 = 0.9423;$$

- for the factor of land

$$2004: Y'' = 153\,539.22 X_2^{0.0360}; R^2 = 0.9358;$$
$$2012: Y'' = 328\,416.72 X_2^{0.0206}; R^2 = 0.9423;$$

- for the factor of capital

$$2004: Y'' = 2.06 X_3^{0.9639}; R^2 = 0.9358;$$
$$2012: Y'' = 1.77 X_3^{0.9750}; R^2 = 0.9423;$$

Table 3 presents the average indices and marginal productivity of land, labor and capital on farms in 2004 and 2012.

Table 3. Average and extreme productivity of labor (X_1), land (X_2) and capital factor stream (X_3) in surveyed commercial farms in 2004 and 2012

Specification	2004	2012	Dynamics (2004 = 100)
Labor productivity			
Average productivity (PLN·h^{-1})	37.64	70.20	186.50
Extreme productivity (PLN)	3.18	2.90	91.19
Land productivity			
Average productivity (PLN·h^{-1})	5639.71	7316.80	129.74
Extreme productivity (PLN)	203.03	148.90	73.34
Capital productivity			
Average productivity (PLN·PLN)	1.35	1.30	96.30
Extreme productivity (PLN)	1.30	1.30	100.00

Source: Own elaboration basing upon unit empirical data from Polish FADN.

The relationship between the total production and expenditure of examined factors of production are shown in Figures 1–3.

The curves shown in Figure 1 illustrate the relationship between the production value and expenditures of labor in researched commercial farms in 2004 and 2012 in the range of variability of the analyzed factor. Figure 2 shows the relationship between the total production (SE131) and the agricultural land (SE025). Graphical analysis of regression equations confirms the known correctness that with an increase in the area of agricultural land the level of total production increases as well. Figure 3 shows the relationship between the total production (SE131) and the level of capital flow (SE270). Curves in

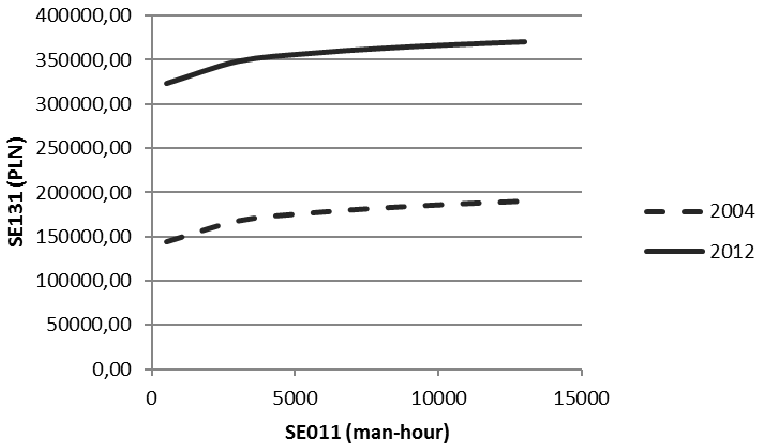

Fig. 1. The dependence between total production SE131 and labor input SE011 in surveyed commercial farms in 2004 and 2012

Source: Own study based on unit empirical data from Polish FADN.

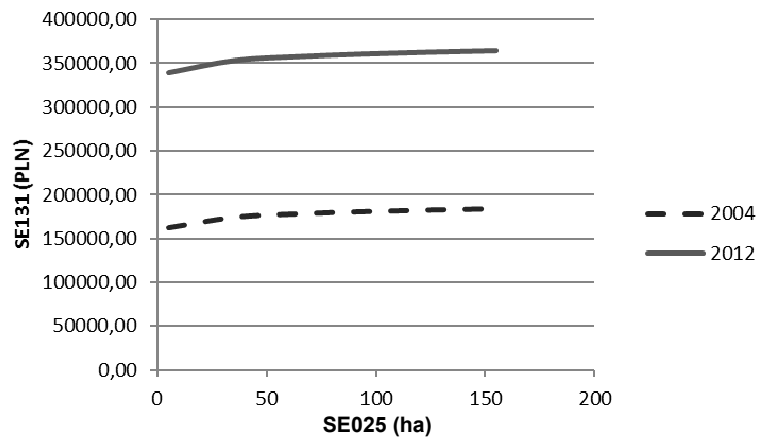

Fig. 2. The dependence between total production SE131 and arable lands area SE025 in surveyed commercial farms in 2004 and 2012

Source: Own study based on unit empirical data from Polish FADN.

Figures 1–3 run similarly to each other, confirming the lack of significant differences in the proportions of production factors in the studied years.

Analyzing the average productivity of examined production factors in two studies years, one may notice growth for both labor and land and a decrease in the case of capital flow. Work is one of the factors of production that affects all economic activities, hence remains a major factor of wealth and development of every community [Boghean and State 2013]. Labor productivity is one of the synthetic indicators of the economic activity in agriculture. The research shows that the value of production per one man-hours of

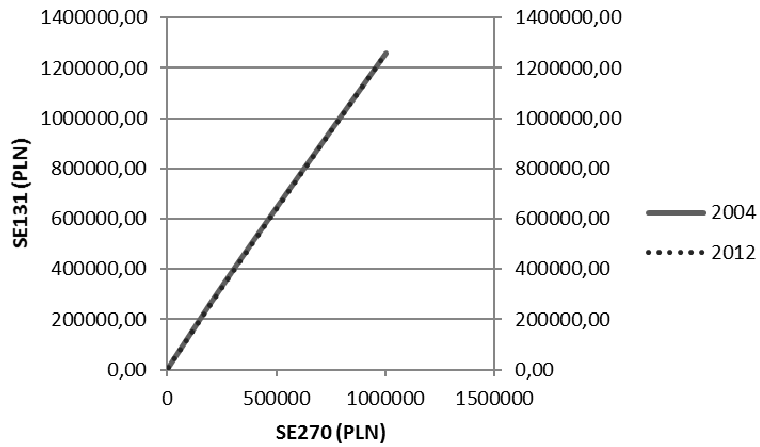

Fig. 3. The dependence between total production SE131 and total costs SE270 in surveyed commercial farms in 2004 and 2012

Source: Own study based on unit empirical data from Polish FADN.

labor in the average farm in 2004 amounted to PLN 37.64, while in 2012 increased by 86.5% reaching a value of PLN 70.20.

Test results by Wójcik and Nowak [2014], covering the period 2004–2009, also indicate the positive trend in the average labor productivity in farms in Poland. They indicate that labor productivity increased by 9.1% during this period and in 2009 reached the value of PLN 40.79 per 1 man-hour. The average productivity of the land means the value of production attributable to 1 ha of agricultural land. Its growth in the studied period was lower than in the case of labor factor and amounted to 29.74%. In 2012, the average commercial farm production value reached the average of PLN 7,316.80 for 1 ha of agricultural land. The negative growth was recorded in the average productivity of capital in the form of total costs. The present rate decreased from PLN 1.35 in 2004 to PLN 1.30 in 2012. This is attributable to a higher rate of growth in costs (213.7%) than the value of production (203.3%) in the researched period.

Analyzing the marginal productivity of specific factors of production one may notice a decrease in its value in relation to the factor of labor and land, while in the case of total costs it remained at the same level in both 2004 and 2012. An increase in the workload of 1 man-hour caused a rise in the value of total production by an average of PLN 3.18 in 2004 and PLN 2.90 in 2012. Assuming that the economic standard of efficiency of human labor expenditure factor was parity rate amounting to PLN 8.33 in 2004 [Skarżyńska et al. 2006] and PLN 12.82 in 2012 [Skarżyńska et al. 2014], it can be concluded that the average farm has not reached its level in tested years. The increase about 1 ha in land contributed to the increase in production value, PLN 203.03 in 2004 and PLN 148.90 in 2012. The coefficient of marginal productivity of capital in the examined period amounted to PLN 1.30 which should be considered a positive trend, indicating that an increase of costs by PLN 1 contributed to the increase in the production of PLN 1.30.

CONCLUSIONS

On the basis of the estimated Cobb-Douglas function it was established that there had been significant changes in the efficiency of production factors in commercial farms in 2012 in comparison to 2004. On the basis of elasticity coefficients reflecting the degree of proportionality of revenue in regard to analyzed factors it can be stated that there were increasing returns from production scale in both studied years. Lower value of flexibility in production in 2012 (1.0845) compared to 2004 (1.0376) indicates that increasing efficiency of combined expenditures was lower in 2012 compared to the base year. The biggest impact on the increase in value of production and the one showing a rising tendency had the capital flow, while the importance of labor and land factors diminished.

The research showed significant changes in the efficiency of management of labor and land factors, and small changes in productivity capital expressed in terms of total costs. Average labor productivity showed a higher growth (86.5%) in the studied years than the productivity of the land (29.7%) and the efficiency in the use of total costs decreased by 3.7%. These changes were accompanied by increased investment in all analyzed factors of production in an average farm. It was economically justified, because the analysis of marginal productivity of factors of production indicates that in 2012 the increase in the workload of 1 man-hour caused a rise in the value of total production by an average of PLN 2.90, an increase of land resources by 1 ha contributed to the increase in production value of PLN 148.90, while the increase in costs by PLN 1 contributed to the increase in the production of PLN 1.30.

Therefore it is highly probable that continued structural changes in Polish agriculture arising from the participation in the European economic area of the single market and the use of economic support mechanisms offered by the Common Agricultural Policy will lead to more efficient use of involved production factors. Among the instruments of Common Agricultural Policy implemented after 2013, which may have a potential impact on improving the efficiency of farms in Poland one can list more opportunities of implementing innovations than ever before, measures promoting the transfer of knowledge, advisory services, investment in physical assets and cooperation.

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ZMIANY PRODUKTYWNOŚCI CZYNNIKÓW PRODUKCJI W TOWAROWYCH GOSPODARSTWACH ROLNYCH W POLSCE W LATACH 2004 I 2012

Streszczenie. Celem opracowania jest ocena zmian, jakie zaszły w produktywności czynników produkcji w towarowych gospodarstwach rolnych w 2012 roku w stosunku do 2004 roku. Analizie poddano elastyczność związków między czynnikami produkcji, tj. powierzchnią użytków rolnych w hektarach, nakładami pracy ludzkiej w roboczogodzinach oraz kosztami ogółem w złotych w latach 2004 i 2012, a uzyskanymi w wyniku ich zastosowania efektami wyrażonymi wartością produkcji. Pozwoliło to na ocenę zmian, jakie zaszły w efektywności gospodarowania towarowych gospodarstw rolnych w ciągu ośmiu lat po akcesji Polski do Unii Europejskiej. W badanym okresie przeciętna produktywność pracy zwiększyła się o 86,5%, a ziemi o 29,7%. Przeciętna produktywność kapitału zmniejszyła się, podobnie jak krańcowa produktywność pracy i ziemi.

Słowa kluczowe: rolnictwo, gospodarstwa rolne, produktywność, funkcja produkcji Cobba-Douglasa

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OPTIMAL DEPOSIT AND LOAN INTEREST RATES SETTING IN CO-OPERATIVE BANKS

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Abstract. This paper tries to solve theoretically the problem of interest rate determination by a co-operative bank in the absence of preferential treatment of its members (owners) against non-members in terms of charged interest rates. The optimisation model considers bank's borrower-, depositor- and neutral-oriented policy as well as purely commercial (profit-oriented) approach. Obtained results indicate that the optimal rates on loans and deposits at a co-operative bank depend mainly on its preference. They are also influenced by market interest rates and bank's balance sheet and income statement elements. The paper contributes to an increased understanding of behaviour of co-operative bank as social economy organisation and adds to the models of optimal interest rates setting in co-operative financial institutions.

Key words: co-operative bank, social economy, optimal interest rates, deposits, loans

INTRODUCTION

Haberler [1937] claims that "The theory of interest has for a long time been a weak spot in the science of economics, and the explanation and the determination of the interest rate still gives rise to more disagreement amongst economists than any other branch of general economic theory". In other words, there is no commonly accepted theory of how an interest rate is determined. Prominent loanable funds theory runs in terms of demand for capital (credits) and supply of savings which both determine interest rates. Taking co-operative bank (CB) as the study object, its members are both demanders for and suppliers of loanable funds and their bank intermediates between them as savers (depositors) and borrowers.

The supporters of monetary theories seek in the theory of interest the problem of value, omitting that of the distribution of welfare gains between lenders and borrowers.

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n out paper, interest rate theory is viewed from the standpoint of social responsibility of CBs which should lie at the heart of the co-operative approach to business.

Several studies have broadly discussed the role of CBs in mobilizing local savings and expanding credit access to households, farmers and SMEs. The bulk of research dealing with interest rate setting by co-operative (not-for-profit) financial entitles addresses mainly credit unions. The most influential contributions include those by: Taylor [1971], Flannery [1974], Brockschmidt [1977], Walker and Chandler [1977], Baltensperger [1980], Murray and White [1980], Black and Dugger [1981], Smith [1981, 1986], Fry et al. [1982], Patin and McNiel [1991], Feinberg and Rahman [2001], Leggett and Strand [2002], McKillop and Wilson [2011], Wheelock and Wilson [2013], and Bressan et al. [2013]. Similar publications on CBs, largely present in the EU and Poland's economies, are to our knowledge rare. In Europe, a model of banking firm was applied by Kasman et al. [2010] who analysed the determinants of net interest margin in the banking systems of EU member and candidate countries.

Theoretical modelling of interest rate behaviour in CB enables to explain formally the nature of cooperative banking idea. In such approach neither typical features of commercial banks nor those of traditional co-operatives can be adopted, at least for two reasons. Firstly, contrary to credit union, not all CB's customers are its members. Secondly, unlike for commercial bank (usually joint-stock company), the profit maximization is not a prime goal of CB's owner-member. Rather, his/her purpose is to exploit own benefits (welfare) from bank's membership. This does not imply, obviously, that CB as a firm is not concerned about profit generation which is related with its solvency and economic survival.

CB's members may be either borrowers (net borrowers) or savers (net savers) with CB. Borrowers prefer reduced loan interest rates while savers – higher deposit rates. The dilemma, then, is how to deal with the actual or potential conflict between them about the benefits distribution. Successful management of interest rates by CB needs balancing the expectations of those both groups. While commercial bank performance is determined by adequate management of the relationship between risk and profitability [Kutan et al. 2012], CB's activity should be guided by adequate management of the relationship between social and business goals. The primary aim of CBs is to raise their members' welfare, so profits are supposed only to serve as means of achieving a broader range of activities. Thus, the models for commercial banks are wholly inadequate to describe CBs, while those for credit unions cannot be generalized to CBs.

With the aim to contribute to the theoretical literature on interest rate determination by CB, this paper, based on the previous studies and Poland's practice, proposes formal model in which CB's customers (members and non-members) are treated equally with respect to interest rates on loans and deposits. The paper is structured as follows. The next section presents a brief description of the CBs in the EU and Poland. Then, the model specification is given. Next, we seek for the optimal interest rates on loans and deposits under a CB's four preference approaches. Finally, the summary and conclusions are provided.

THE EUROPEAN CO-OPERATIVE BANKS

In Europe in 2013 there were 4,000 CBs which operated via 71,000 branches, served 217 million customers and had 56 million members [EACB 2014]. European co-operative banking sector was relatively resistant to the financial crisis of 2007–2009 with only 8% of losses of the entire banking sector [Prieg and Greenham 2012].

In Poland, CBs are numerous but smaller by assets than their commercial counterparts – mostly controlled by foreign investors. In 2014 there were 566 CBs with 4,230 branches. Their number has been steadily shrinking, mainly since 1995, as a result of restructuring process aimed at raising banks' sizes and thus making them more competitive and resilient [Zawojska and Siudek 2005]. Polish CBs serve around 10 million customers, tenfold more than members (1.021 million in 2014) they have. Unfortunately, there is decreasing trend in number of CB's members. A positive fact is that Polish CBs gradually strengthen their position in loan and deposit market. In 2014, their share of entire banking sector was 10% for loans and 8% for deposits held by non-financial entities [KNF 2014]. In the EU, CBs account for about 20% of the bank deposits and loans.

As bank membership is limited to Poland's residents (natural and legal persons), CB's capital is purely domestic in origin. Foreign exchange operations require permission from affiliating bank, so CBs typically do not offer deposits and loans in foreign currencies. Polish CBs are not allowed to participate in interbank market except for transactions with their affiliating bank; their lending is principally funded by local deposit base and, eventually, by loans from affiliating bank. Just like in other countries, formally declared mission of Polish CBs is to support their members and contribute to local (rural) socio-economic development. In practice, however, there is potential conflict between meeting demands of members and focusing on profit (the latter induced by competition and regulatory pressures, e.g. solvency regulations). In Poland, real benefits from the membership in CB seem to be small. Even though members are formally entitled to profit distribution via dividend related to subscribed stakes, dividends actually paid by CBs are rather scarce and, if any, of symbolic amounts. According to Financial Supervision Authority – FSA [2013], in 2009 only 5% of year-end profit was distributed this way and the fraction was expected to shrink to 1.8% in 2013. Moreover, in line with the recent FSA's recommendation on maintaining strong capital base, CBs should not pay out dividends but use their profits to increase capital levels. Besides, Polish CBs do not offer any patronage dividend related to the value/volume of bank services used by members and do not give them any preferences, as compared with non-members, in the pricing of deposits and loans[1].

Although the co-operative traditions, legislation and some features of CBs differ between European countries [Siudek 2011, Martín and Marqués Sevillano 2011], there is common element for whole European co-operative banking sector – the democratic nature of CBs. Owners shape bank policy by voting rights based on the Rochdale principle "one member, one vote", i.e. rights not proportional to size of member's stake in CB. This principle should (at least theoretically) encourage all bank members to take an equal concern in bank management.

[1]In Poland, preferential treatment of CB's members in terms of interest rates constitutes the infringement of Article 79 of the Banking Law Act [Journal of Laws, No 140, Item 939].

THE SPECIFICATION OF FORMAL BEHAVIOURAL MODEL

The proposed model for CB is expected to meet two basic requirements. Firstly, an objective function should reflect the optimization of bank members' benefits arising from transactions with CB (i.e. maximization of their loans and deposits at, respectively, the lowest and highest interest rates). Secondly, within the membership group, borrowers and savers should be treated equally, i.e. without any discrimination. Basing on the reality of Polish CB, the model assumes that its member and non-member customers are treated similarly with respect to loan and deposit interest rates. The model seeks maximum financial gains for borrowers and savers (Equation 1).

Borrowers' gains from loans (*GL*) are defined as the total amount of their loans with CB multiply by a gap between the lowest available market loan interest rate (r_{LM}) and loan interest rate in CB (r_L). Gains on savings (*GS*) are defined as savers' deposits with CB multiply by a gap between interest rate on deposits in CB (r_S) and the highest obtainable market deposit interest rate (r_{SM}). Other benefits from the membership may stem from dividends and CB's societal services, like educational or cultural events, for example. The gains for borrowers and savers are weighted by CB's preference coefficients (γ and σ) reflecting the strength of its orientation towards borrowers (with $\gamma = 1$; $\sigma = 0$ denoting full borrower preference) and savers (with $\gamma = 0$; $\sigma = 1$ denoting full depositor preference). The general objective function is specified in Equation 4.

The ratio of loans repayment is given by φ, while deposits payment – by ω. Amount loaned by CB is then as follows: L in the first year; $(1 - \varphi)\, L$ in the second, and $(1 - \varphi)^n L$ in the n-th year. Correspondingly, the value of deposits raised by CB is: S in the first year; $(1 - \omega)$ S in the second, and $(1 - \omega)^n$ S in the n-th year. After discounting the gains, Equations 9 and 10 are obtained. It is assumed that CB applies a declining balance (geometric) method for loan repayments and deposit payouts. *GL* and *GS* are discounted (Equation 4) using the geometric series summation formula:

$$\frac{1+d}{d+\varphi} \text{ and } \frac{1+d}{d+\omega}$$

Provision of loans by CB depends on interest rates r_{LM} and r_L. If gap between them widens (narrows), the value of loans increases (decreases). Consequently, increase/decrease in $(r_S - r_{SM})$ results in rise/fall of deposits in CB.

Objective function of co-operative bank (general specification):

$$\max f(r_L, r_S) = \gamma\, GL + \sigma\, GS + \pi; \quad \pi \geq 0;\ \gamma = \langle 0;\ 1 \rangle;\ \sigma = \langle 0;\ 1 \rangle \tag{1}$$

Benefits for the *j*-borrower in co-operative bank:

$$GL^j = (r_{LM} - r^j{}_L)\, L^j; \quad r_{LM} > r^j{}_L \tag{2}$$

Benefits for the *j*-saver in co-operative bank:

$$GS^j = (r^j{}_S - r_{SM})\, S^j; \quad r^j{}_S > r_{SM} \tag{3}$$

where: *j* – CB's customer (member or non-member);

rL – interest rate on loans granted by CB its customers;

r_S – interest rate on deposits paid into CB by its customers;
r_{LM} – the best alternatively available (for CB customers) market loan interest rate;
r_{SM} – the best alternatively available (for CB) market deposit interest rate;
L – value of loans made by CB to its customers;
S – value of deposits made with CB by its customers;
γ – coefficient stating the degree of CB's preference towards borrowers;
σ – coefficient stating the degree of CB's preference towards depositors;
GL – gains for borrowers from CB;
GS – gains for savers in CB;
π – financial surplus of CB used to subsidy interest rates on customers' loans and deposits.

Objective function of cooperative bank (extended specification):

$$\max f(r_L, r_S) = \gamma \frac{1+d}{1+\varphi}(r_{LM} - r_L) \times L + \sigma \frac{1+d}{d+\omega}(r_S - r_{SM}) \times S + \pi$$

$\pi \geq 0$; $\gamma = \langle 0; 1 \rangle$; $\sigma = \langle 0; 1 \rangle$

where: d – discount rate;
φ – repaid loans as a percentage of total loans made by CB in a given period;
ω – paid-out deposits as a percentage of total deposits with CB in a given period.

$$GL\sum_{j=1}^{j}(r_{LM} - r_L^j)L^j \text{ – total benefits for co-operative bank borrowers} \quad (5)$$

$$GS\sum_{j=1}^{j}(r_M^j - r_{SM})S^j \text{ – total benefits for co-operative bank savers} \quad (6)$$

where: r^j_L – interest rate on loans granted by CB to the j-th customer;
r^j_S – interest rate on deposits taken by CB from the j-th customer;
L^j – amount of the loan granted to the j-th customer;
S^j – amount of the savings (deposits) of the j-th customer.

The dependence of amount loaned by co-operative bank on interest rates r_{LM} and r_L:

$$\sum_{j=1}^{j} L^j = L\,(r_{LM}, r_L), \quad \frac{\partial L}{\partial r_{LM}} > 0; \quad \frac{\partial L}{\partial r_L} < 0 \quad (7)$$

The dependence of amount deposited in co-operative bank on interest rates r_{SM} and r_S:

$$\sum_{j=1}^{j} S^j = S\,(r_{SM}, r_S), \quad \frac{\partial S}{\partial r_{SM}} < 0; \quad \frac{\partial S}{\partial r_S} > 0 \quad (8)$$

Borrowers' gains – extended formula:

$$GL = (r_{LM} - r_L)L + \frac{(r_{LM} - r_L)(1-\varphi)L}{1+d} + \frac{(r_{LM} - r_L)(1-\varphi)^2 L}{(1+d)^2} + \ldots \quad (9)$$

Savers' gains – extended formula:

$$GS = (r_S - r_{SM})S + \frac{(r_S - r_{SM})(1-\omega)S}{1+d} + \frac{(r_S - r_{SM})(1-\omega)^2}{(1+d)^2} + \ldots \quad (10)$$

To simplify, it is assumed that both customers' loan demand and savings supply are linear functions of interest rate gap. Thus, Equation 15 gives the effect of difference between market interest rate (r_{LM}) and that charged by CB (r_L) on demand for loans. Equation 16 shows how supply of savings depends upon the margin between r_S and r_{SM}. CB's opening and closing balance sheets (Equations 11 and 12) are constraints on the function maximizing gains.

An opening balance sheet of co-operative bank:

$$AT_0 + I_0 + (1 - \varphi)\, L_0 = (1 - \omega)\, S_0 + KW_0 + R_0 + U_0 \quad (11)$$

A closing balance sheet of co-operative bank:

$$AT_0 + AT + I_0 + I + (1 - \varphi)\, L_0 + L = (1 - \omega)\, S_0 + S + KW_0 + KW + R_0 + R + U_1 \quad (12)$$

where: AT_0 – value of fixed assets in CB at the beginning of the reporting year;
AT – increase/decrease in value of CB's fixed assets during the reporting year;
I_0 – value of CB's claims (liabilities) in financial market at the beginning of reporting year;
I – increase/decrease in CB's claims (liabilities) in financial market during reporting year;
L_0 – value of loans granted by CB to customers at the start of the reporting year;
L – value of loans granted by CB to customers during the reporting year;
S_0 – value of customers' savings in CB at the beginning of the reporting year;
S – value of customers' savings in CB during the reporting year;
KW_0 – value of own funds of CB at the beginning of the reporting year;
KW – increment in value of CB own funds during the reporting year;
R_0 – value of CB provisions at the beginning of the reporting year;
R – increase/decrease in CB provisions during the reporting year;
U_0 – profit of CB remaining from a previous period, currently distributed for dividend payment to bank members, own funds, subsidising interest rates on customers' loans and savings;
U_1 – profit of CB retained to be paid out as dividends, to increase own funds, to subsidise interest rates on customers' loans and savings in the next reporting year.

The value of customers' loans and savings in pre- and reporting periods is shown in Equations from 13 to 16. The excess of deposits over loans is located by CB on financial market (Equation 19). Equation 21 presents CB's operating costs while Equation 22 – net

provisions. Bank's financial surplus (Equations 23 and 24) was computed considering not only standard costs and revenues but also costs of social services (K_{un}) provided to members (local community) and retained profit (U_1). The latter, in the next period may contribute to CB's own capital, be partially paid out as dividend or used to subsidize interest rates on loans (to reduce their level) and deposits (to raise their level). The current financial surplus can be enlarged with retained profit from a prior period (U_0) subtracted by paid dividends and accumulated capital.

Demand for loans in CB as a function of interest rates (r_{LM0}; r_{L0}) – pre-reporting year:

$$L_0 = \alpha_0 (r_{LM0} - r_{L0}); \quad \alpha_0 > 0; r_{LM0} > r_{L0} \tag{13}$$

Supply of savings in CB as a function of interest rates (r_{S0}; r_{SM0}) – pre-reporting year:

$$S_0 = \beta_0 (r_{S0} - r_{SM0}); \quad \beta_0 > 0; r_{S0} > r_{SM0} \tag{14}$$

Demand for loans in CB as a function of interest rates (r_{LM}; r_L) – reporting year:

$$L = \alpha (r_{LM} - r_L); \quad \alpha > 0; r_{LM} > r_L \tag{15}$$

Supply of savings in CB as a function of interest rates (r_S; r_{SM}) – reporting year:

$$S = \beta (r_S - r_{SM}); \quad \beta > 0; r_S > r_{SM} \tag{16}$$

Value of financial investments by CB in pre-reporting year:

$$I_0 = (1 - \omega) S_0 - (1 - \varphi) L_0 \quad \text{– general formula} \tag{17}$$

$$I_0 = (1 - \omega) \beta_0 (r_{S0} - r_{SM0}) - (1 - \varphi) \alpha_0 (r_{LM0} - r_{L0}) \quad \text{– extended formula} \tag{18}$$

Value of financial investments by CB in reporting year:

$$I = S - L \quad \text{– general formula} \tag{19}$$

$$I = \beta (r_S - r_{SM}) + \alpha (r_{LM} - r_L) \quad \text{– extended formula} \tag{20}$$

Total operating costs in a CB in reporting year:

$$K_{dz} = C_{L0} L_0 + C_{S0} S_0 + C_L L + C_S S \tag{21}$$

Net provisions in a CB in reporting year:

$$P_{rez} - K_{rez} = \rho_0 L_0 + \rho L = \rho_0 \alpha_0 (r_{LM0} - r_{L0}) + \rho \alpha (r_{LM} - r_L) \tag{22}$$

Financial surplus in a CB – general formula:

$$\begin{aligned} \pi = {} & (1 - \varphi) L_0 \times r_{L0} + L \times r_L - (1 - \omega) S_0 \times r_{S0} - S \times r_S + P_{pr} - K_{pr} + \\ & + I_0 \times r_{IM0} + I \times r_{IM} + P_{RK} - K_{RK} + P_{op} - K_{op} + P_{rez} - K_{rez} - K_{dz} - K_A + \\ & + Z_n - S_n - P_{cit} - K_{un} - U_1 + U_0 (1 - \mu) \end{aligned} \tag{23}$$

Financial surplus in a CB – extended formula:

$$\begin{aligned} \pi = {} & \alpha (r_{LM} - r_L) \times r_L - \beta (r_S - r_{SM}) \times r_S + [\beta (r_S - r_{SM}) - \alpha (r_{LM} - r_L)] \times \\ & \times r_{IM} - \alpha C_L (r_{LM} - r_L) - \beta C_S (r_S - r_{SM}) - \rho \alpha (r_{LM} - r_L) + RFS \end{aligned} \tag{24}$$

Residual financial surplus (RFS) is obtained as:

$$RFS = (1-\varphi)\,\alpha_0\,(r_{LM0} - r_{L0}) \times r_{L0} - (1-\omega)\,\beta_0\,(r_{S0} - r_{SM0}) \times r_{S0} +$$
$$+ [(1-\omega)\,\beta_0\,(r_{S0} - r_{SM0}) - (1-\varphi)\,\alpha_0\,(r_{LM0} - r_{L0})] \times r_{IM0} + [\beta\,(r_S - r_{SM}) -$$
$$- \alpha\,(r_{LM} - r_L)] \times r_{IM} - (1-\varphi)\,\alpha_0\,C_{L0}\,(r_{LM0} - r_{L0}) - (1-\omega)\,\beta_0\,C_{S0}\,(r_{S0} - r_{SM0}) -$$
$$- \rho_0\,\alpha_0\,(r_{LM0} - r_{L0}) - \rho\,\alpha\,(r_{LM} - r_L) + P_{pr} - K_{pr} + P_{RK} - K_{RK} + P_{op} - K_{op} - K_A +$$
$$+ Z_n - S_n - P_{cit} - K_{un} - U_1 + U_0\,(1-\mu) \qquad (25)$$

where: π – CB's financial surplus used to subsidise interest rates on loans and deposits in reporting year;
r_{L0} – interest rate on customers loans in CB in pre-reporting year;
r_L – interest rate on customers' loans in CB in reporting year;
r_{S0} – interest rate on customers' savings in CB in pre-reporting year;
r_S – interest rate on customers' savings in CB in reporting year;
P_{pr} – CB's revenue from commission charges in the reporting year;
K_{pr} – CB's commission expenses in the reporting year;
r_{IM0} – interest rate on CB's investments/liabilities on financial market in pre-reporting year;
r_{IM}[2] – interest rate on CB's investments/liabilities on financial market in reporting year;
ρ_0 – total net provisions (= those established for credit exposures minus released provisions) as a share of total amount loaned by CB to its customers in pre-reporting year;
ρ – total net provisions as a share of total amount loaned by CB to customers in reporting year;
P_{RK} – income from positive foreign exchange rate changes in reporting year;
K_{RK} – costs of negative foreign exchange rate changes in reporting year;
P_{op} – remaining operating revenues in reporting year;
K_{op} – remaining operating costs in reporting year;
P_{rez} – revenues from released provisions in reporting year;
K_{rez} – costs of establishing provisions in reporting year;
K_{dz} – operating costs in reporting year;
C_{L0} – unit loan servicing costs in pre-reporting year;
C_{S0} – unit deposit servicing costs in pre-reporting year;
C_L – unit loan servicing costs in reporting year;
C_S – unit deposit servicing costs in reporting year;
K_A – depreciation costs in reporting year;
Z_n – extraordinary profits in the reporting year;
S_n – extraordinary losses in the reporting year;
P_{cit} – corporate income tax (CIT);
K_{un} – costs of social services provided by CB for its members/local community,
U_0 – retained profit from previous year;
μ – fraction of retained profit from previous year used to pay dividends and raise own funds;
U_1 – profit retained by CB to pay out dividends, raise own funds and subsidy interest rates on customers' loans and deposits in the next reporting year.

[2]CB may locate its surplus funds in short-term securities or time deposits in affiliating bank, and respectively borrow financial funds exclusively from this bank.

OPTIMAL LOAN AND DEPOSIT INTEREST RATES IN A CO-OPERATIVE BANK

The study considers four possible approaches undertaken by CB: the complete borrower preference (Equation 49); the neutrality (Equation 50), the complete saver preference (Equation 51) and the purely commercial (business) orientation (Equation 52).

Under commercial approach which seeks profit maximisation, the objective function $f(r_L, r_S)$ value equals to financial surplus (π). After solving the first order condition, we obtain either loan interest rate (r_L) (Equation 26) or deposit interest rate (r_S) (Equation 27) used to solve the problem of financial surplus maximization (Equations 28 and 29).

Formula for calculating an optimal loan interest rate (r^*_L) – complete commercial approach:

$$r^*_L = \frac{r_{LM} + r_{IM} + C_L + \rho}{2} \tag{26}$$

Formula for an optimal deposit interest rate (r^*_S) – complete commercial approach:

$$r^*_S = \frac{r_{SM} + r_{IM} + C_S}{2} \tag{27}$$

Maximum financial surplus in business-oriented CB – general formula:

$$\pi^* = \frac{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2 + \beta(r_{IM} - r_{SM} - C_S)^2}{4} + RFS \tag{28}$$

Maximum financial surplus in business-oriented CB – extended formula:

$$\begin{aligned} \pi^* = {} & \frac{(1-\varphi)\alpha 0(r_{LM0} - r_{iM0} - C_{L0} - \rho_0)^2 + (1-\omega)\beta 0(r_{IM0} - r_{SM0} - C_{S0})_2}{4} + \\ & + \frac{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2 + \beta(r_{IM} - r_{SM} - C_S)^2}{4} + P_{pr} - K_{pr} + P_{RK} - K_{RK} + \\ & + P_{op} - K_{op} - K_A + Z_n - S_n - P_{cit} - K_{un} - U_1 + U_0(1-\mu) \end{aligned} \tag{29}$$

When CB is completely commercial-oriented, interest rate on customer loans depends on: the best market loan interest rate (r_{LM}); interest rate on CB's investments/liabilities on financial market (r_{IM}); unit cost of loan servicing (C_L) and the total net provisions (ρ). Deposit interest rate is affected by: the best market deposit interest rate (r_{SM}); CB's return on financial market (r_{IM}) and unit cost of deposit service (C_S). Rates r_{LM}, r_{SM}, and r_{IM} are external, while C_L, C_S and ρ depend mainly on CB's policy. For other scenarios optimal loan interest rates (r_L) are given by Equations 30, 32 and 34 while optimal deposit interest rates (r_S) by Equations 31, 33 and 35.

Formula for calculating an optimal loan interest rate (r^*_L) – complete borrower preference:

$$r*_L = \frac{r_{LM} + r_{IM} + C_L + \rho}{2} - \frac{r_{LM} - r_{IM} - C_L - \rho}{2} \times \times \left[1 + \frac{\beta(r_{IM} - r_{SM} - C_s)^2 - 4RFS}{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2} \right]^{1/2} \quad (30)$$

Formula for calculating an optimal deposit interest rate ($r*_S$) – complete borrower preference:

$$r*_S = \frac{r_{SM} + r_{IM} - C_S}{2} \quad (31)$$

Formula for calculating an optimal loan interest rate ($r*_L$) – complete saver preference:

$$r*_L = \frac{(r_{LM} + r_{IM} + C_L + \rho}{2} \quad (32)$$

Formula for calculating the optimal deposit interest rate ($r*_S$) – complete saver preference:

$$r*_S = \frac{r_{SM} + r_{IM} - C_S}{2} + \frac{r_{IM} - r_{SM} - C_S}{2} \times \times \left[1 + \frac{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2 - 4RFS}{\beta(r_{IM} - r_{SM} - C_S)^2} \right]^{1/2} \quad (33)$$

Formula for calculating an optimal loan interest rate ($r*_L$) – the neutral approach:

$$r*_L = \frac{r_{LM} + r_{IM} + C_L + \rho}{2} - \frac{r_{LM} - r_{IM} - C_L - \rho}{2} \times \times \left[1 - \frac{4RFS}{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2 + (r_{IM} - r_{SM} - C_S)^2} \right]^{1/2} \quad (34)$$

Formula for calculating an optimal deposit interest rate ($r*_S$) – the neutral approach:

$$r*_S = \frac{rIM + rSM - CS}{2} + \frac{rIM - rSM - CS}{2} \times \times \left[1 - \frac{4RFS}{\alpha(r_{LM} - r_{IM} - C_L - \rho)^2 + \beta(r_{IM} - r_{SM} - C_S)^2} \right]^{1/2} \quad (35)$$

During the modelling process, optimal interest rates ($r*_L$, $r*_S$) are obtained by using general set of Equations (36–38) and the Lagrange multiplier (λ). Financial surplus equal to zero acts as a constraint since its total amount is believed to be used for subsidising interest rates on loans and deposits. Equations 36 and 37 express differentiation of

the objective function with respect to interest rates while Equations 39–41 represent an extended formula for estimation of optimal rates. Additional assumptions are given by Equations 42–45. The second-order behaviour of the objective function is expressed in Equation 46.

An equation set (36–38) for estimating optimal rates (r^*_L, r^*_S) – general formula:
The first-order derivative of objective function with respect to interest rate r_L:

$$\lambda \frac{1+d}{d+\varphi}\left[(r_{LM}-r_L)\frac{\partial L}{\partial rL}-L\right]+\lambda\frac{\partial \pi}{\partial r_L}=0 \tag{36}$$

The first-order derivative of the objective function with respect to interest rate r_S:

$$\sigma \frac{1+d}{d+\omega}\left[(r_S-r_{SM})\frac{\partial S}{\partial r_S}+S\right]+\lambda\frac{\partial \pi}{r_S}=0 \tag{37}$$

Assumption that CB's financial surplus equals

$$\pi = 0 \tag{38}$$

An equation set (39–41) for calculating optimal interest rates – extended formula:
The first-order derivative of objective function in respect to interest rate r_L:

$$\gamma \frac{1+d}{d+\varphi}[-2\alpha(r_{LM}-r_L)]+\lambda\alpha(r_{LM}-2_{rL}+r_{IM}+C_L+\rho)=0 \tag{39}$$

The first-order derivative of objective function in respect to interest rate r_S:

$$\sigma \frac{1+d}{d+\omega}[2\beta(r_S-r_{SM})]+\lambda\beta(r_{SM}-2_{rS}+r_{IM}-C_S)=0 \tag{40}$$

Assumption that CB's financial surplus equals

$$\pi = 0 \tag{41}$$

An increment in the surplus π against loan interest rate (r_L) in CB (the first-order derivative of the function π in respect to the variable r_L) – general formula:

$$\frac{\partial \pi}{\partial r_L}=\frac{\partial L}{\partial r_L}r_L+L>0 \tag{42}$$

An increment in the surplus π against deposit interest rate (r_S) in CB (the first-order derivative of the function π in respect to the variable r_S) – general formula:

$$\frac{\partial \pi}{\partial r_S}=-\frac{\partial S}{\partial r_S}r_S-S<0 \tag{43}$$

An increment in the surplus π against loan interest rate (r_L) in CB (the first-order derivative of the function π in respect to the variable r_L) – extended formula:

$$\frac{\partial \pi}{\partial r_L} = \alpha(-2r_L + r_{LM} + r_{IM} + C_L + \rho) > 0 \tag{44}$$

An increment in the surplus π against deposit interest rate (r_S) in a co-operative bank (the first-order derivative of the function π in respect to the variable r_S) – extended formula:

$$\frac{\partial \pi}{\partial r_S} = \beta(-2r_{Scz} + r_{SM} + r_{IM} - C_S) < 0 \tag{45}$$

The determinant of the symmetric Hessian matrix used to indicate the response of interest rates r_L and r_S to balance-sheet variables and profit and loss account in co-operative bank:

$$|\Delta| = \begin{vmatrix} \Delta_{11} & 0 & \frac{\partial \pi}{\partial r_L} \\ 0 & \Delta_{22} & \frac{\partial \pi}{\partial r_S} \\ \frac{\partial \pi}{\partial r_L} & \frac{\partial \pi}{\partial r_S} & = \end{vmatrix} = -\left[\frac{\partial \pi}{\partial r_S}\right]^2 \Delta_{11} - \left[\frac{\partial \pi}{\partial r_L}\right]^2 \Delta_{22} > 0 \tag{46}$$

The second derivative of objective function with respect to loan interest rate (r_L):

$$\Delta_{11} = \gamma \frac{1+d}{d+\varphi}\left[(r_{LM} - r_L)\frac{\partial^2 L}{\partial r^2 L} - 2\frac{\partial L}{\partial r_L}\right] + \lambda \frac{\partial_2 \pi}{\partial r^2{}_L} \tag{47}$$

The second derivative of objective function with respect to deposit interest rate (r_S):

$$\Delta_{22} = \sigma \frac{1+d}{d+\omega}\left[(r_S - r_{SM})\frac{\partial^2 S}{\partial r^2{}_S} + 2\frac{\partial S}{\partial r_S}\right] + \lambda \frac{\partial^2 \pi}{\partial r^2{}_S} < 0 \tag{48}$$

The financial surplus' (π) change upon the change of loan and deposit interest rates (the first-order derivative of the function π in respect to r_L and r_S):

$$\text{Complete borrower preference } (\gamma = 1);\ (\sigma = 0)\ \frac{\partial \pi}{\partial r_L} > 0;\ \frac{\partial \pi}{\partial r_S} = 0 \tag{49}$$

$$\text{Neutrality } (\gamma = 0.5);\ (\sigma = 0.5)\ \frac{\partial \pi}{\partial r_L} > 0;\ \frac{\partial \pi}{\partial r_S} < 0 \tag{50}$$

Complete saver preference $(\gamma = 0);\ (\sigma = 0)\ \dfrac{\partial \pi}{\partial r_L} = 0;\ \dfrac{\partial \pi}{\partial r_S} < 0$ (51)

Purely commercial approach $(\gamma = 0);\ (\sigma = 0)\ \dfrac{\partial \pi}{\partial r_L} = 0;\ \dfrac{\partial \pi}{\partial r_S} = 0$ (52)

The second-order derivatives of the objective function with respect to r_L and r_S (Equations 47–48) allow for assessing changes in loan and deposit interest rates upon CB's balance-sheet elements and financial surplus (Table 1). The effect of the preference parameters on interest rates (Equations 53–56) is also identified. Estimations reveal that with rising parameter γ (denoting borrower preference), r_L and r_S should fall, whereas with rising parameter σ (saver preference), they should rise.
Response of loan interest rate (r_L) to the borrower-orientation parameter γ (the first-order derivative of the function r_L in respect to the variable γ):

$$\frac{dr_L}{d\gamma} = \frac{\dfrac{1+d}{d+\varphi}\left[(r_{LM} - r_L)\dfrac{\partial L}{\partial r_L} - L\right]\left[\dfrac{\partial \pi}{\partial r_S}\right]^2}{|\Delta|} < 0 \tag{53}$$

Response of deposit interest rate (r_S) to the borrower-orientation parameter γ (the first--order derivative of the function r_S in respect to the variable γ):

$$\frac{dr_S}{D\gamma} = \frac{-\dfrac{1+d}{d+\varphi}\left[(r_{LM} - r_L)\dfrac{\partial L}{\partial r_L} - L\right]\dfrac{\partial \pi}{\partial r_L}\dfrac{\partial \pi}{\partial r_S}}{|\Delta|} < 0 \tag{54}$$

Response of loan interest rate (r_L) to the saver-orientation parameter σ (the first-order derivative of the function r_L in respect to the variable σ):

$$\frac{dr_L}{D\sigma} = \frac{-\dfrac{1+d}{d+\omega}\left[(r_S - r_{SM})\dfrac{\partial S}{\partial r_S} + S\right]\dfrac{\partial \pi}{\partial r_L}\dfrac{\partial \pi}{\partial r_S}}{|\Delta|} > 0 \tag{55}$$

Response of deposit interest rate (r_S) to the saver-orientation parameter σ (the first-order derivative of the function r_S in respect to the variable σ):

$$\frac{dr_S}{D\sigma} = \frac{\dfrac{1+d}{d+\omega}\left[(r_S - r_{SM})\dfrac{\partial S}{\partial r_S} + S\right]\left[\dfrac{\partial \pi}{\partial r_L}\right]^2}{|\Delta|} > 0 \tag{56}$$

Table 1. The response of CB's interest rates to changes in the selected variables – the model

Specification	Orientation of co-operative bank			
	complete borrower preference	the neutrality	complete saver preference	purely commercial orientation
dr_L/dL_0	<0	<0	=0	=0
dr_S/dL_0	=0	>0	>0	=0
dr_L/dr_{L0}	<0	<0	=0	=0
dr_S/dr_{L0}	=0	>0	>0	=0
dr_L/dS_0	>0	>0	=0	=0
dr_S/dS_0	=0	<0	<0	=0
dr_L/dr_{S0}	>0	>0	=0	=0
dr_S/dr_{S0}	=0	<0	<0	=0
dr_L/dP_{Pr}	<0	<0	=0	=0
dr_S/dP_{Pr}	=0	>0	>0	=0
dr_L/dK_{Pr}	>0	>0	=0	=0
dr_S/dK_{Pr}	=0	<0	<0	=0
dr_L/dI_0	<0	<0	=0	=0
dr_S/dI_0	=0	>0	>0	=0
dr_L/dr_{IM0}	<0	<0	=0	=0
dr_S/dr_{IM0}	=0	>0	>0	=0
dr_L/dI	<0	<0	=0	=0
dr_S/dI	=0	>0	>0	=0
dr_L/dr_{IM}	<0	<0	=0	=0
dr_S/dr_{IM}	=0	>0	>0	=0
dr_L/dP_{RK}	<0	<0	=0	=0
dr_S/dP_{RK}	=0	>0	>0	=0
dr_L/dK_{RK-}	>0	>0	=0	=0
dr_S/dK_{RK-}	=0	<0	<0	=0
dr_L/dP_{op}	<0	<0	=0	=0
dr_S/dP_{op}	=0	>0	>0	=0
dr_L/dK_{op}	>0	>0	=0	=0
dr_S/dK_{op}	=0	<0	<0	=0
dr_L/dP_{rez}	<0	<0	=0	=0
dr_S/dP_{rez}	=0	>0	>0	=0
dr_L/dK_{rez}	>0	>0	=0	=0
dr_S/dK_{rez}	=0	<0	<0	=0
dr_L/dK_{Dz}	>0	>0	=0	=0
dr_S/dK_{Dz}	=0	<0	<0	=0
dr_L/dK_A	>0	>0	=0	=0
dr_S/dK_A	=0	<0	<0	=0
dr_L/dZ_{nad}	<0	<0	=0	=0
dr_S/dZ_{nad}	=0	>0	>0	=0
dr_L/dS_{nad}	>0	>0	=0	=0
dr_S/dS_{nad}	=0	<0	<0	=0
dr_L/d_{Kun}	>0	>0	=0	=0
dr_S/d_{Kun}	=0	<0	<0	=0
dr_L/dU_1	>0	>0	=0	=0
dr_S/dU_1	=0	<0	<0	=0
dr_L/dU_0	≤ 0; $\mu \leq 1$	≤ 0; $\mu \leq 1$	=0	=0
dr_S/dU_0	=0	≥ 0; $\mu \leq 1$	≥ 0; $\mu \leq 1$	=0

Source: Own research.

According to obtained results, loan interest rate (r_L) under CB's policy preferring entirely borrowers is lower compared with that under purely commercial orientation, while saving interest rates (r_S) are identical for both orientations. It suggests that when CB is focusing on borrowers its whole financial surplus is used for subsidising (reducing) loan interest rates. If just savers are preferred by CB, estimated optimal interest rates are either equal (r_L) to or higher (r_S) than relevant interest rates under commercial orientation. In that case savers benefit from deposit interest rates subsidised with resources derived from CB's financial surplus. In the neutral CB loan interest rate (r_L) resulted to be higher compared with its level in entirely borrower-oriented bank and lower than that in complete saver-oriented bank. The reverse is found for deposit interest rate (r_S), i.e. under the neutrality its level exceeds that obtained for borrower orientation but is below that under saver orientation.

Referring to Table 1, the general observations on behaviour of interest rates are as follows:

- Loan interest rate (r_L) does not move with an increase in explanatory variables when CB prefers savers or is business-oriented. Respectively, deposit interest rate (r_S) does not change if bank focuses on borrowers or is business-oriented.
- In neutral and borrower dominated bank, r_L declines when the variables from assets side of balance sheet rise. The saver and neutral preferences imply that r_S rises along with increasing asset variables. Growing balance-sheet liabilities result in higher loan price (r_L) in borrower and neutral orientations and lower deposit rate (r_S) in saver and neutral orientations.
- Increasing bank costs lead to higher loan interest rate (r_L) under borrower-oriented and neutral policy as well as to lower deposit interest rate (r_S) under neutral- and saver--oriented policy.
- As bank revenues (regardless of their type) go up, r_L falls in CB focused on borrowers or neutrally oriented, and r_S falls when CB either prefers savers or is neutrally oriented.
- When retained profit (U_1) rises, an adjustment of interest rates (r_L and r_S) in CB is alike that for costs rise. When profit retained from previous period (U_0) increases, a response of interest rates is the same like in the case of rising revenues but under condition that U_0 is partially used to subsidise interest rates (r_L and r_S). When total U_0 goes to build up a CB's capital or else to pay dividends, r_L and r_S will change under all the four approaches.

SUMMARY AND CONCLUSIONS

This study presents a formal theoretic framework seeking to explain a co-operative bank's behaviour of setting loan and deposit interest rates that maximize benefits for bank members-customers. According to the model results, the interest rates which maximize gains for savers and borrowers essentially depend upon bank orientation but are also affected by market interest rates and CB's balance sheet and income statement elements. Loan interest rate will be the lowest if CB is focusing on borrowers, while the highest one when it adopts both commercial and saver orientation. Deposit interest rate is the lowest

under commercial and borrower-oriented policy while the top one – under saver-oriented policy.

In our opinion, the co-operatives, represented in our study by a bank, should treat all member customers equally. Considering dual roles of CB's members as borrowers and lenders, bank neutral policy can help to ease conflict between them. Since CB is democratic organization, in practice, however, the median owner's (member's) preferences are pivotal.

The advantage of the presented model lies in incorporating economic and social aspects of CB's activity. Its construction considers CBs' specific mission of which finally is to support and benefit their members (owners). The model may be useful to bank managers for setting, *ex post* assessing and *ex ante* planning of deposit and loan interest rates. Its limitation arises from the assumption (based on Polish facts) that CB's member and non-member customers have the same terms and conditions of using bank services.

Institutionally forbidden interest rate discrimination by CBs in Poland possibly impedes their existing and potential membership base. The banking law should then allow for privileged treatment of CB's members as regards loan and deposit pricing since it would attract new members and stem exit of current ones. The growth in the membership base would contribute to rise in bank's own capital which essentially determines the scale of banking activities. Additionally, mutual benefits could be derived from the use of more local savings (raised as deposits with CBs) to finance local socio-economic activities and investments.

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USTALANIE OPTYMALNYCH STÓP PROCENTOWYCH OD DEPOZYTÓW I KREDYTÓW W BANKACH SPÓŁDZIELCZYCH

Streszczenie. W artykule podjęto się teoretycznie rozwiązać problem ustalania stóp procentowych od depozytów i kredytów przez bank spółdzielczy w przypadku braku ich różnicowania dla członków (właścicieli) banku oraz pozostałych klientów. W modelu optymalizacyjnym przyjęto trzy warianty preferencji klientów przez bank: orientacja na kredytobiorców, orientacja na depozytariuszy oraz polityka zorientowana neutralne, jak również podejście czysto komercyjne (nastawione na zysk). Według uzyskanych wyników, wysokość optymalnych stóp procentowych od kredytów i depozytów w banku spółdzielczym zależy przede wszystkim od jego preferencji. Znajdują się one również pod wpływem

rynkowych stóp procentowych oraz elementów bilansu oraz rachunku zysków i strat banku. Badanie może przyczynić się do lepszego zrozumienia funkcjonowania banku spółdzielczego, jako podmiotu ekonomii społecznej, oraz uzupełnia dotychczasową literaturę w zakresie modelowania optymalnych stóp procentowych w spółdzielczych instytucjach finansowych.

Słowa kluczowe: bank spółdzielczy, ekonomia społeczna, stopy procentowe, depozyty, kredyty

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RESOURCES AND USE OF AGRICULTURAL LAND IN POLISH CITIES ACCORDING TO CHOSEN THEORIES OF LOCATION OF AGRICULTURAL PRODUCTION

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Abstract. This article is written to verify the hypothesis which states that the share of land used by farms within the surface of cities and their scope of production usage are determined by the mechanism of land rents. It can be noted that in big cities (above 500 thousands of inhabitants) and in cities with a concentration of companies from non-agricultural sector, the share of agricultural lands is above 8.5 and 5.1 percentage points lower than in the researched city population. It should also be mentioned that in these units above 35% of agricultural lands are not used agriculturally, whereas in Polish cities, on average, this proportion amounts up to about 28%. Upmost importance to the use of lands in cities is also attached to speculative actions and public intervention, which are prevalent in big cities and cities with a large number of companies from non-agricultural sectors.

Key words: agricultural land, urban agriculture, location of agricultural production, economic rent

INTRODUCTION

The last two hundred years have been a period of a dynamic technical and civilization progress as well as socio-economic changes. Industrial growth followed by the growth of the services sector have considerably contributed to an increased importance of towns and cities and gave a start to the urbanization process. As of late 20th century or earlier, dynamic urbanization processes as well as a gradual increase in the size of urban areas have been noted in Poland. The main constituent parts of these process are: natural growth, migration from villages to towns and changes in administrative borders [Bagińska and Szmytkie 2005]. This has been mainly linked to strong industrialization processes in 1960–1985, when almost 90% of big cities with the population over 100 thousand increased in size. Szymańska et al. [2006] note a strong correlation between

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the scale of growth in the area and the size of cities depicted by their population. Both at the time as well as at present, frequently the size of a city would grow as a result of swallowing adjacent towns which would not necessarily have compact development and high population density, hence areas of an agricultural profile are found within city administrative limits [Bański 2008]. As a result of an ongoing urbanization, an increasingly large population would become an urban population and an increase in the size of the urban center would be noted, whereas rural land (landscape) would have been transformed into urban land (landscape). The lifestyle of the population would change as well.

Some authors [Wagner 2005, Tarkowski 2007, Giecewicz 2010, Krzyk et al. 2013] claim that agricultural land is nowadays perceived as a territorial reserve for other more profitable actions. It also seems that the share and ways of agricultural land usage are determined by the mechanism of land rent. The approved hypothesis states that increase in both the size of and the intensity of occurrence of business entities from non-agricultural sector in urban areas is concomitant with decrease in both the share of agricultural lands in the surface of these areas and the percentage of lands used productively. This phenomenon is the result of the mechanism of land rent (agriculture, which is characterized by a relatively small differential ground rent, is displaced from cities).

RESOURCES, METHODOLOGY AND PURPOSE OF RESEARCH

The objective scope of analysis is aimed at diversity in resources and ways of agricultural lands usage, which are owned by farms situated in administrative borders of 306 urban districts. The main source of information is data available in the Local Data Bank of the Central Statistical Office, data available from the Agency for Restructuring and Modernisation of Agriculture (ARMA) as well as literature references. A statistical study was carried out with mainly 2010 data being used and data related to the sample of farms studied is presented by location of the seat of a relevant entity. The use of data from the Agricultural Census (2010 AC) poses certain interpretation problems as specifically in terms of farms which are different than individual farms, instances are noted where the seat of the farm is located in a town or a city whereas related agricultural land is located outside the town or the city. Despite this, according to the 2010 AC methodology, agricultural land which belongs to such farm is considered urban land. Nonetheless, relatively insignificant discrepancies were noted in the process of analyzing a large number of towns and cities and establishing average results.

The objective of the study is to assess agricultural land resources as well as the manner in which they are used in municipalities, while taking into account the size of a town or a city as well as the number of economic entities which operate in the services sector and industry sectors. Thus posited, the objective of the study was then facilitated by identifying a number of research tasks. The first one consisted in establishing a classification of towns and cities, the second one – in presenting a discussion of key theories related to the location of agricultural output, and the third one – in assessing the impact of the size of a town or a city as well as the number of non-agricultural enterprises on agricultural land management. The study employs a range of research methods including generic methods (deduction, reductire reasoning, comparisons and analogies), the descriptive method and quantitative methods (analysis of the dynamics and mix, correlation coefficient).

The purpose of the study required that a classification of towns and cities be proposed and a number of variables be employed. The variables were selected based on subject-matter prerequisites. The first and an essential criterion of the classification of towns and cities is the size as depicted by their population [Runge 2012]. This study groups towns and cities into four categories, i.e. small town (with the population up to 20 thousand), medium small (20–50 thousand), medium large (50–100 thousand), large (over 100 thousand) and very large (with the population over 500 thousand). Due to specific characteristics of Katowice and Gdańsk, i.e. the fact that they are directly adjacent to other municipalities, it was decided that these centers will be considered cohesive urban entities. This approach is justified as both the Tricity (Gdańsk, Gdynia and Sopot) as well as Katowice Urban Area (Katowice, Bytom, Chorzów, Dąbrowa Górnicza, Gliwice, Jaworzno, Mysłowice, Piekary Śląskie, Ruda Śląska, Siemianowice Śląskie, Sosnowiec, Świętochłowice, Tychy, Zabrze) are geographically and functionally cohesive compact urban centers.

Another classification of towns and cities used is concentration of entities registered in the National Register of Economic Units (REGON) in industry sectors as well as the services sector converted into 1 km^2 of urban areas as the delimitation criterion. A detailed rationale for an adoption of this solution is presented in the next section of the study. After concentration indices were calculated for economic entities per area unit ($C_{\text{e. entities}}$), towns and cities were divided into four groups, and an arithmetic mean (A) and standard deviation (SD) were employed:

- $C_{\text{e. entities}} \geq A + SD$ – towns and cities with the highest concentration of REGON entities;
- $C_{\text{e. entities}}\ \varepsilon < A, A + SD)$ – towns and cities with a medium concentration of REGON entities;
- $C_{\text{e. entities}}\ \varepsilon < A - SD, SD)$ – towns and cities with a low concentration of REGON entities;
- $C_{\text{e. entities}} \leq A - SD$ – towns and cities with the lowest concentration of REGON entities.

As a result of this categorization process, towns and cities characterized by the highest concentration of economic entities registered in the REGON system revealed 64 towns and cities, and the subsequent categories revealed 77, 76 and 77 municipalities respectively.

LOCATION OF AGRICULTURAL PRODUCTION IN TOWNS AND CITIES: THEORETICAL STUDY

Studies related to the location of agricultural production initially followed regional geography, and they acquired economic features when D. Ricardo proposed the economic rent theory [Grabowska 1986]. Mainstream economic literature mentions land rent issues in the works of A. Smith and T. Malthus, who identified four types of rent: based on differences in soil fertility, its location, additional capital outlays, and a generic rent referred to as absolute rent [Czyżewski 2013]. Other schools of economy also described sources and mechanisms of economic rent – to varying extents. Due to the fact that this

topic has been discussed and described in detail in recent years in many academic studies, especially by Czyżewski and Matuszczak [2010], Marks-Bielska [2010], or Szymańska [2012], or Czyżewski [2013], this study presents only an outline of the rent issue due to the location of land with special considerations for specific features of cities.

While referring to the issue of agricultural production location, the classical theory formulated by J.H. Thünen should be mentioned at first. Thünen noted that the manner in which space is used is determined by rent, i.e. income from agricultural output less production costs [Kurz 2011]. Kurz [2011] searched for links between the production profile of a farm and the distance from the market. Thünen proved that the heaviest, the least durable – and by the same the most profitable – agricultural products should be produced closest to the market while less labor-intensive and less profitable products should be produced relatively further from the market [Schulze-Steinmann and Holm--Muller 2010]. As a result, he came up with the idea of spheres (circles) for various types of agriculture (which were symmetrical to the market). The significance of this theory has now diminished when applied to agricultural production and it was as early as in 1967 that R. Sinclair presented his thesis about reversing Thünen spheres [Wigier 2012]. The fact that this classical theory of location is no longer up-to-date was caused by the following factors: the growth of transportation, refrigerator technology, processing industry etc. Nonetheless, the basic notion that the location of a specific activity depends on the economic rent it generates is still up-to-date and may be used when explaining the manner in which farmland is used in towns and cities. A. Marshall decided that the land rent theory for developed land is essentially the same as for agricultural rent, while the price of developed land equals the price of agricultural land plus discounted location benefits [Luchter 2010]. Hence, the production of goods for which benefits/profitability is sufficiently high are located the closest to the market (as these goods can ensure the highest differential rent). Hence, relevant entities compete for land which allows them to produce the best utility (profits/income). For a relevant location, they are prepared to pay a price which is related to expected profits which can be realized in that location. This refers to both enterprises which due to a good location (developed infrastructure, presence of prospective customers) will earn more profits as well as to other entities, e.g. individuals who – when choosing residence (a house or a flat) – will maximize the level of utility earned on the consumption of housing services [Tarkowski 2007]. Land rent (urban rent) and its derivative, i.e. the price of land, represent discounted benefits which can be acquired by the user in a given urban location.

Alonso adapted the Thünen model for the requirements of spatial studies of metropolitan area development and the model was subsequently extended to the so-called general format (Generalised Thünen Models) [Lorens and Martyniuk-Pęczek 2010]. While studying four types of economic activity (Fig. 1), it should be noted that they are located at different distances from the urban center. Services and commerce where access to the client is the priority are located in an urban center. This is so as this type of activity, especially higher-end services, generates high income which makes is possible to pay high rates for the area used (e.g. rental).

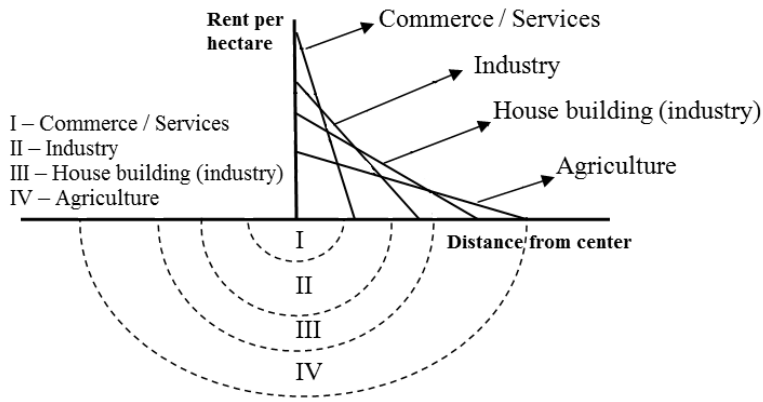

Fig. 1. Land rent (urban rent) versus land location for land of various designations
Source: Author's own study based on Lorens and Martyniuk-Pęczek [2010].

Production activity is located further from the center. This is because enterprises which belong to the industry sectors as well as large-floor commerce operators have more requirements for necessary space and by the same their profitability per unit of area will be lower than that for services. Residential housing is located even further from the center as it generates lower income for investors than that earned by other sectors indicated [Tarkowski 2007]. Residential housing is certainly located everywhere around a town or a city, however, prices per 1 m^2 in the center are very high so that the investor may cover the high costs of land purchased. A similar correlation relates to locations of other types of activity. According to this model, agricultural areas are located definitely the furthest from the center as their profitability is lower than that noted in other sectors of the economy.

Considerations about a selection of an optimum location for production were also analyzed by Weber, who decided that as far as industrial enterprises are concerned, distance from the market and costs of transportation are key location factors [Lewandowska-Gwarda 2013]. On the other hand, Lösch [1961] based his theory on profit maximization as the key criterion for an optimum location. According to his concept, producers and consumers, resources and products, distribution and consumption create a cohesive market-regulated system. E.M. Hoover, while agreeing with key assumptions of both Thünen's as well as Lösch's concept, notes that zones which demonstrate rational distribution of various types of activity around towns and cities may become deformed as a result of an impact from various factors, such as changes in production technology, changes in the size of the market, planning requirements [Grabowska 1986], and presently – planning conditions and speculative actions [Sroka 2014].

To recapitulate, it should be stressed that the majority of theories devoted to production location point to the importance of distance from the market, i.e. principally, distance from the city center. Differences resulting from the location of specific types of activity relative to metropolitan areas are – in most part – derivatives of their utility/profitability. Interrelationships presented are mainly based on principles of neoclassical economics and public intervention has not been taken into consideration here. In reality, the pattern

of the economic rent is disturbed especially by administrative decisions or by local plans of spatial development approvals; hence the share of agricultural land and other land in towns and cities will not always correspond to patterns and regularities presented.

DIVERSIFICATION OF AGRICULTURAL LAND RESOURCES IN POLISH CITIES: EMPIRICAL STUDY

Land management in towns and cities is linked to the requirement for decision-making as to the manner in which land is to be used, the process being the forum of a unique game conducted in the macro- as well as the micro-scale. The game involves confrontation of principally opposing interests conveyed by particular participants who control land [Lorens and Martyniuk-Pęczek 2010]. From the spatial planning perspective as well as the economic perspective, the mix of relevant urban land designations is very important. It will vary depending on the size of a town or a city, on the degree of growth of an urban and regional economy as well as on the level of public intervention.

Taking into account the spatial aspect, agricultural land is definitely the element of cities and towns which is the most important and is frequently marginalized. Sroka [2013] stresses that on the average, there are twice as many urban agricultural areas per citizen in Poland than developed and urbanized areas. While assessing the share and importance of agricultural land in total areas of municipalities, it should be noted that Poland is characterized by a very high diversification in this respect. According to data sourced from the Agricultural Census (2010), the percentage of agricultural land which is owned by farms in urban areas ranges between a few percent (e.g. in Chorzów and Katowice municipalities) and significantly over 75% (e.g. in Przeworsk, Racibórz and other municipalities). On the average, the sample of municipalities studied indicates the percentage of agricultural land at 35.6% of total urban areas (Table 1), whereas definitely the lowest percentage of agricultural land is located in cities with the population of over 500 thousand

Table 1. Selected features of agricultural land in municipalities by town/city size

Town/City size by population (thousand inhibitants)	Number of towns/ /cities studied	Population density (person·km^{-2})	Percentage of farms in total town/city area (%)	Agricultural land (ar·person^{-1})	Number of REGON entities from industry and services sectors (km^{-2})
Below 20	119	466	35.8	7.7	50.5
20–50	99	1,080	41.8	3.9	119.4
50–100	43	1,341	41.4	3.1	141.6
100–500	26	1,626	33.6	2.1	198.1
Above 500	7	2,194	26.9	1.2	334.4
Total[a] municipalities	294	1,344	35.6	2.6	171.0

[a]The study was conducted on the sample of 306 municipalities; however, the total number of towns/cities is lower due to the fact that Katowice Urban Area, made up of 14 towns and cities, as well as the Tricity are presented as single centers.

Source: Author's own study based on Central Statistical Office data.

(approximately 26.9%), and the highest percentage of agricultural land is located in local government units with the population ranging between 20 and 50 thousand (41.8%).

A relatively low percentage of agricultural land in the smallest towns (35.8%), which are usually surrounded by rural areas and – as it would seem – are predestined for the development of urban and suburban agriculture, results from their relatively small areas, which brings about fierce competition for land. Small towns are characterized by typical low-rise (single-family) housing which occupies relatively large areas [Wójtowicz-Wróbel 2008]. Hence, it may be suggested that where demand for land to be used by the services and industry sectors is low (average number of entities registered in REGON per 1 km^2 is as low as 50.5 while this average for municipalities stands at 171 entities 1 km^2), land is used mainly for housing purposes and transportation facilities. A low economic rent on the cultivation of agricultural land, especially where relative land deficits are noted, makes the percentage of agricultural land relatively small. Nonetheless, despite a relatively small percentage of agricultural land in urban areas, as high as 7.7 ar of agricultural land are noted per citizen, the figure being three times higher than a corresponding average in the sample of towns and cities studied.

Studies of agricultural land resources in towns larger than those with the population of 20 thousand indicate that as population density increases, the percentage of agricultural land which belongs to farms in the total area of towns and cities decreases. In municipalities with the population between 20 and 50 thousand, agricultural land represents 41.8% of their total area, whereas in local government units with the population over 500 thousand this indicator is lower by almost 15 percentage points. Moreover, it is noted that as the percentage of agricultural land shrinks, the number of entities registered in REGON per 1 km^2 of urban areas increases. Hence, it should be noted that towns characterized by a relatively high concentration of entities and high population density to a larger extent use land to facilitate non-agricultural economic activity, residential housing and transportation infrastructure. This dependency is also noted in instances where towns are depicted by the concentration of REGON-registered entities (Table 2). It turns out that in local government units where over 240 economic entities per square kilometer are noted, the percentage of agricultural land in urban areas is lower by 12 percentage points than in towns and cities where the number of economic entities ranges between 40 and 139. Municipalities characterized by the number of REGON-registered entities

Table 2. Selected features of agricultural land resources in municipalities by concentration of economic entities

Town/City size (economic entity·km^{-2})	Number of towns and cities studied	Population density (person·km^{-2})	Percentage of agricultural land in total urban areas (%)	Area of agricultural land (ar·$person^{-1}$)	Number of REGON entities in industry and services sectors (km^{-2})
Below 40	77	227	24.4	10.7	23.5
40–139	76	864	42.4	4.9	89.1
139–240	77	1,568	41.4	2.6	184.6
Above 240	64	2,172	30.4	1.4	309.2
Total municipalities	294	1,344	35.6	2.6	171.0

Source: Author's own study based on 2010 Agricultural Census data.

below 40 per 1 km^2 are an exception to this rule. As indicated earlier, this group consists mainly of small towns.

Relatively small differences in the percentage of "urban agricultural land" across municipalities which noted average concentration of economic non-agricultural entities (40 to 139 entities per 1 km^2) and high concentration of entities (139 to 240 entities per 1 km^2) partly result from an overall change in urban areas. In the category of local government units studied, it is the municipalities characterized by significant concentrations of economic entities which have noted approximately 2.5% of an increase in the total area in the last 10 years, whereas other categories have noted an increase of 0.7% in the corresponding period. Growth of towns and cities involved annexation of adjacent locations which were mainly rural and contributed to an increase in the share of land belonging to farms in the total areas of towns and cities. These changes could thus contribute to an increase in the share of agricultural land belonging to farms in the total areas of towns and cities even by 2 percentage points. To a certain extent, this explains a relatively large share of agricultural land in towns and cities where also a high concentration of economic entities is noted.

Based on figures produced, it may be concluded that the share of agricultural land (belonging to farms) is largely determined by their size as well as the number of economic entities per 1 km^2. Municipalities which are the biggest centers in relevant regions, particularly provincial capitals, demonstrate regional growth poles and it is there that a large number of service sector companies (including commerce), industry sector companies (including construction) as well as public administration units are located. Moreover, a very high population density (over 2,200 people per 1 km^2) is a trigger to use some land for the construction of residential housing. The agricultural sector in the largest local government units is pushed outside city limits and occupies relatively small areas. This dependency is certainly weakened by a range on non-economic factors including public intervention, historical spatial landscaping of towns and cities, etc.

Taking into consideration the concept of balanced growth of towns and cities, it seems that particular attention should be paid to the mix of agricultural land, and predominantly, issues of the share of land excluded from agricultural production. The latter is not beneficial from the economic, social and environmental point of view, and relevant studies indicate that a very high percentage of agricultural land recorded in towns (over 28%) is made up of land which is not cultivated, i.e. land which is not maintained in a good farming culture, fallow land, and land excluded from production (Table 3). As a comparison, the share of this type of land in rural areas is approximately 8.5% of the total area of agricultural land. The evidence of marginalizing agricultural production in urban areas is a small percentage of agricultural land which is cultivated, i.e. approximately 49% (against 68% for rural areas in Poland) as well as low absorption of direct subsidies. In 2012, these subsidies were granted up to 40% of agricultural land in municipalities whereas on the average, they are sourced for approximately 92% of agricultural land in Poland. Towns and cities studied are characterized by a very high degree of diversification in indicators discussed. A significantly smaller share of cultivated land in the total of agricultural land as well as in areas subject to receiving direct subsidies was noted in cities with the population between 100 and 500 thousand, i.e. 44.4 and 31.6% respectively. Towns with the

Table 3. Use of agricultural land and selected features of the mix of farms in municipalities by population size

Town/City size by population (thousand inhibitants)	Percentage of agricultural land which won direct subsidies (%)	Percentage of land which is sowed in total area of agricultural land (%)	Percentage of agricultural land excluded from production in total area of agricultural land (%)	Percentage of farms not involved in agricultural activity (%)
Below 20	53.9	52.9	20.1	33
20–50	39.3	47.5	26.4	36.3
50–100	40.8	56.4	24	37.6
100–500	29.9	42.2	35.6	43.4
Above 500	35.7	47.5	37.1	44.2
Total municipalities	40.3	49.2	28.2	38.2

Source: Author's own study based on 2010 Agricultural Census data.

population below 20 thousand note the percentage of land where direct subsidies were sought at 53.9%, hence much higher than in other categories.

When assessing diversification in the share of agricultural land excluded from agricultural production as well as the percentage of farms which are not involved in agricultural activity in towns and cities of varying sizes, it should be noted that indicators get higher as the size of towns and cities increases. The bigger the town or city, the higher the indicator, a fact which points to an ongoing disagrarization. Big cities offer more jobs outside agriculture while the price of agricultural land is higher there, which translates into withdrawing labor and land resources from agricultural activity. It is also the case that farm owners discontinue agricultural activity and await the right moment when they can sell off land or pass them on to the heirs. If the spatial development plan allows it, they change the designation of land from agricultural land to construction land. This process may have intensified after amendments to the Farm and Woodland Conservation Act became effective, by force of which land located within urban administrative limits is excluded from conservation.

A relatively large share of agricultural land used which is being sowed as well as land which receives direct subsidies in the largest cities (with the population over 500 thousand) results from the fact that relatively large arable areas controlled by bigger-size farms are noted there. In towns and cities, the share of farms with the areas over 20 ha is the largest and stands at 2.5% while the average corresponding figure for other towns and cities is 1.6%.

Studies conducted show that the differences in how urban agricultural land is used are even more visible where the number of REGON-registered economic entities per 1 km^2 of municipal areas is considered. A moderately strong negative correlation may be noted between the percentage of land receiving direct subsidies and the number of REGON-registered economic entities per 1 km^2 of towns and cities analyzed. The correlation coefficient is –0.38 and is important from the statistical point of view. This means that as the importance of non-agricultural features depicted by the concentration of economic entities grows, the percentage of farms which receive direct subsidies shrinks. In

current economic conditions, including a very big significance of direct subsidies to the income of farms as well as relatively low criteria needed in order to securing the subsidies, this means that in reality, agricultural land is not maintained in good agricultural culture and the landowner has discontinued agricultural production. This is confirmed by yet another correlation. As the concentration of economic entities in towns and cities grows, the pace at which land is excluded from agricultural production and the share of farms which are not involved in agricultural production increase (Table 4). In towns and cities where which disclose the lowest concentration of economic entities, the share of agricultural land excluded from production is around 21%, whereas in local government units, where very high concentrations of economic entities are noted (240 entities per 1 km^2) almost as high as 35% of agricultural land is no longer cultivated.

Table 4. Use of agricultural land and selected features of the mix of farms in municipalities by the concentration of REGON-registered economic entities

Town/City size (economic entity · km^{-2})	Share of agricultural land which receives direct subsidies (%)	Share of land which is sowed in total agricultural land area (%)	Share of agricultural land excluded from production in total agricultural land area (%)	Percentage of farms not involved in agricultural activity (%)
Below 40	60.9	43.4	20.9	35.5
40–139	46.9	52.2	24.8	35
139–240	34.4	50.1	29	36.5
Above 240	29.4	46.7	34.5	47.1
Total municipalities	40.3	49.2	28.2	38.2

Source: Author's own study based on data from the Main Statistical Office [2010] and ARMA [2012].

In bigger cities, and predominantly in municipalities which note high concentrations of economic entities (hence, potentially high demand for land), a high percentage of land is not cultivated. Landowners are not interested in cultivating the land nor selling it as they speculate that an alternative use of money obtained from its sales or lease will generate less income than an increase in the value of land due to its attractive location. The pattern of land use in towns and cities is strongly determined by the so-called capital rent which results from an ownership title to the land in an attractive location [Musiał and Wojewodzic 2013] as well as a planning rent which results from changes in the land designations approved by the local plan of spatial development. Both types of rent are deferred in time and their impact is stronger when anticipated benefits are bigger. This is even more important as costs incurred due to land ownership are insignificant in Poland (rates of farm tax are low if the quality of agricultural soil is poor), and land ownership may give its owners some entitlements, including insurance benefits. Thus, the economic and legal environment encourages the process of setting aside agricultural land and an intensified speculative activity as far as land management. This refers particularly to very big cities and cities and towns which note high concentrations of non-agricultural entities.

CONCLUSIONS

Agricultural land in towns and cities is a very important constituent of half-open spaces and an important feature of the natural world. In Poland, the average share of agricultural land controlled by farms is over 35% of municipalities' areas. However, the study conducted confirms a high diversification in the share of agricultural land in municipal areas as well as in the manner in which they are used. The use of municipal areas in very big cities where the share of agricultural areas is approximately 27% in total is very different from that noted in medium-size towns (with the population of 20–50 thousand) where this percentage is higher by 15 percentage points on the average. The diversification is also a derivative of the condition and mix of the economy depicted in this study by the number of enterprises which operate in the services and industry sectors per unit of area. Findings of empirical studies confirm the concept of pushing out land uses which are economically weak (i.e. agricultural use) by stronger ones. New forms of economic activity on the rise, growth of the services sector and commerce followed by growth of residential housing construction and transportation systems result in the percentage of agricultural land noted in towns characterized by a large concentration of enterprises, which is on the average lower by 5 percentage points than in the population studied.

The study conducted also indicates that the size of the town or a city as well as the number of non-agricultural entities per unit of an area have created significant differentiation in the mix of agricultural land use. The biggest cities note that the share of land which is not cultivated is higher by over 17 percentage points than in the smallest towns. The former also saw the highest percentage of farms which are not involved in agricultural activity. Speculative activity of landowners of agricultural land is of significance in an urban market of agricultural land as far as future property prices. The bigger the town or the city and the more economic areas of a non-agricultural profile, the higher the capital rent and the lower interest in cultivating land.

Therefore, it seems that in the current legal environment, i.e. excluding agricultural land in urban centers from conservation by force of the Farm and Woodland Conservation Act, speculative activity will intensify. This will specifically refer to towns and cities where local plans of spatial development have not been approved.

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ZASOBY I WYKORZYSTANIE GRUNTÓW ROLNYCH W POLSKICH MIASTACH W ŚWIETLE WYBRANYCH TEORII LOKALIZACJI PRODUKCJI ROLNEJ

Streszczenie. W pracy poddano weryfikacji hipotezę, że udział gruntów użytkowanych przez gospodarstwa rolne w powierzchni miast, a także zakres ich produkcyjnego wykorzystania są determinowane działaniem mechanizmu rent gruntowych. Wykazano, iż w bardzo dużych miastach (powyżej 500 tys. ludności) oraz miastach, gdzie występuje bardzo duże natężenie przedsiębiorstw z sektora pozarolniczego udział użytków rolnych jest odpowiednio o ponad 8,5 oraz 5,1 punktów procentowych mniejszy niż średnio w badanej populacji miast. Ponadto w jednostkach tych ponad 35% użytków rolnych nie było użytkowane rolniczo, podczas gdy średnio w polskich miastach odsetek ten wynosił około 28%. Duże znaczenie dla sposobu wykorzystania gruntów w miastach oprócz mechanizmu rent gruntowych mają również działania spekulacyjne oraz interwencja publiczna, które są najbardziej nasilone w dużych miastach oraz miastach o dużej liczbie przedsiębiorstw z sektora pozarolniczego.

Słowa kluczowe: użytki rolne, rolnictwo miejskie, lokalizacja produkcji rolnej, renta gruntowa

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TRENDS IN CONSUMER BEHAVIOUR CHANGES. OVERVIEW OF CONCEPTS

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Abstract. The aim of this paper is to review the approaches to the analysis of consumer behaviour conditions and to determine their suitability for segmentation analyses, with particular attention paid to the food market. The starting point for consideration is the placement of consumer behaviour in the theory of consumption, with emphasis on the contribution to its development by other scientific areas and disciplines. The next section is devoted to the overview of various classifications used to describe the determinants of consumer behaviour. In addition, the paper presents consumer typologies and their significance in the process of segmentation. The last part of the study is devoted to the methods of assessment of the level of satisfaction of food needs.

Key words: consumer behaviour, theory of consumption, behaviour patterns, consumer typologies, level of satisfaction of consumer needs

INTRODUCTION

Consumer behaviour is the subject matter of research of numerous fields of science, including economic, as well as psychological and sociological, as evidenced by the multitude of studies in this area. This paper presents both directions of changes in consumer behaviour, as well as research methodology, with identification of the broad view of this issue in its various aspects: theory, methodology and application.

THE PLACE OF CONSUMER BEHAVIOUR IN THE THEORY OF CONSUMPTION

The interdisciplinary approach to research into the economics of consumption results from the multiplicity of its areas, verging on economics, social, biological and agricultural sciences. Contribution of other scientific fields and disciplines is used to create the

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theory and examine the processes occurring in different areas of consumption. In terms of theory and application of consumption research, a particular place and attention is given to "consumer behaviour" and its determinants, as well as the decision-making process arising therefrom. The multifaceted approaches used to describe the causative factors of consumer behaviour determine the typology of consumers on the basis of social and psychological conditions. As a result of activities conducted in this area, it is possible to determine consumer "lifestyles". Another important aspect, from the point of view of research into consumption, is the assessment of the level of satisfaction of purchasing needs. The approach to the economics of consumption, as a sub-discipline of economics, stems from the essence of the concept and the function fulfilled by it in the economic system. The scope of consumption includes both the direct act of satisfying individual needs, as well as human behaviour in the process of production, exchange and consumption of goods and services. In the macroeconomic approach, consumption is treated as a stage of social reproduction, responsible for the finalisation of the whole reproduction process. This multifaceted approach to consumption indicates its special place in economic sciences. At the same time, it should be noted that previously (in the period of so-called school of classic economics, i.e. at the turn of the eighteenth and the nineteenth century, as well as pre-classic approaches, including Mercantilism, Physiocracy and Marxist economics), consumption was pushed to the margins of the theory of economics [Bywalec, Rudnicki 1999]. Oscar Lange left a significant mark on shaping the view on the role of consumption in the centrally planned economy. According to him, consumption was the subject of interests of non-economic sciences [Lange 1978]. The position of consumption in economic sciences was developed in the 1960s and is attributed mainly to such outstanding scientists as Krzyżewski [1959], Lipiński [1960], Hodoly [1965] and Piasny [1967]. In the 1970s, consumption gained a permanent position in economic sciences. Particular contribution in this regard came from Pohorille [1971], Hodoly [1975], Zielińska [1978] and other scientists.

DETERMINANTS OF CONSUMER BEHAVIOUR

There are numerous classifications of determinants of consumer behaviour in the market. A similar approach in this regard is presented by: Szwacka-Salmonowicz [1991], Marciniak [1994], Garbarski [2001], and Żelazna et al. [2002]. In light of these approaches, economic, social and marketing factors are of key importance in the shaping of consumer behaviour in the market. A slightly different approach to this question is presented by Kall [1992], who identifies the following determinants of consumer behaviour: psychological, personality-related and social factors. Boczar and Kossut [1983] presented a definitely different classification, taking into account the role of objective social and economic factors in the shaping of consumer behaviour in the market.

Simultaneously, it should be noted that the dichotomy-based division of such determinants, as proposed by Kramer [1983],Wiszniewski [1983], as well as Kos and Nowak [1988], offers a certain derogation from the aforementioned classifications.

A definitely different principle of classification of consumer behaviour determinants was proposed by Mynarski [1990] and Żelazna [2000]. There is a great similarity of the divisions developed by these authors with the division proposed by Kotler [1994]. The classification adopted by these authors limits the division of such determinants to two groups: family-related (internal) and external – located outside the family. The division of determinants of behaviour of consumers in the market, as adopted by Duliniec and Żelazna, is based on the aforementioned proposal. According to Duliniec, internal determinants include: needs, motives, perceptual processes, attitudes and preferences, personality as well as learning and memory process. On the other hand, external determinants include: economic, social and cultural factors as well as marketing activities. A similar form of division has been proposed by Żelazna, by reference to the factors in the sphere of food and nutrition. However, Żelazna has defined internal determinants as those which directly characterise the consumer or his/her household, while external determinants as those which constitute the macro-environment of the consumer [Żelazna 2000, Żelazna et al. 2002]. In light of divisions presented by Mazurek-Łopacińska, the development of consumption remains under the influence of demographic, cultural, economic and technological factors. Changes occurring in the area of these factors determine the main trends of consumption transformation and define opportunities for new qualitative phenomena and new consumer behaviour [Mazurek-Łopacińska 2003]. The analysis of demographic determinants is combined, in particular, with the aging process in highly developed countries, the increasing number of single-person households, and growth in the professional activity of women. Separation of technological factors is a relatively new approach. Such factors include, i.a.: interactive communication, forms of direct sales, eco-friendly technology and development of biotechnology. The presented division of determinants of consumer behaviour in the consumption market indicates a similarity of the approaches in this area [Bywalec, Rudnicki 2002].

An extended classification of determinants of consumer behaviour in the market, with reference to the food market, was created by Szwacka-Salmonowicz and Zielińska [1996], who combined it with the specific nature of this market. According to them, the basic factors influencing the level and structure of consumption are: economic, biological, demographic, psycho-social and socio-professional factors.

The weight and the significance of individual factors are related to the nature of the product satisfying consumer needs in terms of food [Szwacka-Salmonowicz 2003]. For instance: in the market of basic food products, the most important are economic and social factors. In the market of luxury food products, there is a growth in the importance of psychological and marketing factors. At the same time, it should be noted that the proposed division is rather artificial due to the complexity of consumer behaviour, and the related complementary influence of various factors on the market decisions of food consumers. Food consumers satisfy both their needs in terms of necessity and needs in terms of aspirations. As mentioned before, the realisation of the first group of needs (basic needs) is affected mainly by demographic and biological factors. On the other hand, needs in terms of aspirations are shaped primarily by socio-psychological factors and fulfilled by luxury food products.

CONSUMER TYPOLOGIES AND MARKET SEGMENTATION

Consumer typology involves examination and definition of features differentiating consumer behaviour and its determinants, and then, identification of types of consumers whose behaviour, in the sphere of consumption, is similar. The division (typology) of consumers may be executed by taking into account their affiliation to a certain type of household, by means of traditional demographic, economic and social criteria [Gutkowska et al. 2001]. The aforementioned classifications are limited to the description of general determinants of consumer behaviour. In order to consider the complete set of features of each group of consumers, we also have to take into account social and psychological characteristics, which make up the so-called lifestyle.

The achievements in terms of publications on the global lifestyles of society are quite extensive. European studies indicate consumer typologies based on the concept of lifestyle – the acknowledgement of motivations and the system of values shared by consumers (the following methodologies are of key importance in this regard: Eurostyle and 4C – Cross Culture Consumer Characteristics – lifestyles, opinions, interests, consumer behaviour patterns [Szwacka-Mokrzycka 2013]. These methodologies are based on the concept of Euro-consumer, i.e. a standard buyer of standard products. The concept of Euro-consumer emerged in the European Union at the end of the 1980s, in the period of advanced research into consumer lifestyles. The results of the research formed the basis for attempts at segmentation of the European market. Consumer typologies, based on the concept of their lifestyle, provided an opportunity for a system approach to consumer behaviour. These typologies allow for the differentiation of target groups by learning the motivation and the system of values shared by consumers. They also form the basis for the development of communication strategy. Within the Eurostyle typology, we can differentiate sixteen Euro-segments [Komor 2000]. As mentioned before, another of these typologies – 4C – is a method of identification of different segments of buyers, on the basis of their objectives, motivations and value systems. At least seven types of consumers can be differentiated here. For each type, a separate set of objectives, motivations and value systems is determined. In light of different views on the subject of existing consumer typologies, we may conclude that they do not indicate a truly European profile of the buyer in the background of other profiles based on lifestyles [Tkaczyk 2012]. Nevertheless, it is possible to differentiate segments of consumers who behave in a similar manner and share similar values, regardless of the country of residence.

The research conducted in Poland after 1997, focused mainly on the analysis of demographic and socio-economic trends [Zielińska 1989, Kusińska 2009]. However, less attention was paid to lifestyles which are necessary for the proper description of consumers, their preferences and predictions as to changes in their behaviour patterns. However, in 1998, in Poland, studies based on the psycho-graphic segmentation, similar to 4C methodology, were initiated. They took into account various lifestyles, opinions, interests and consumer behaviour models [Tucek, Friedlaenderova 2002].

Today, the process of globalisation continues to progress, as a result of unification of consumer behaviour patterns in the global perspective. In light of the ongoing transformation, we should recognise consumption as a process involving popularisation of products available in global markets. This situation is conducive to unification of consumption

models and consumer behaviour. Among factors affecting globalisation of consumption, we can distinguish those which are conducive to the process, as well as those which hinder its development [Mazurek-Łopacińska 2003]. Conducive factors include factors related to demand and those related to supply. Demand factors are primarily associated with the creation of the modern lifestyle, and search for the food belonging to the category of so--called convenience food. Among the factors contributing to such globalisation, we should also mention the possibility for consumers to buy global products and the increase in their spatial mobility. Among the factors associated with supply, we should mention increased competition and the desire of companies to achieve economies of scale, as well as the free movement of production factors and development of new technologies. Undoubtedly, another factor contributing to globalisation is the development of competition and the search for new markets by companies (in international terms).

The key factor hampering the globalisation of consumption involves cultural circumstances. In light of such circumstances, we can distinguish global attitudes of consumers, expressing themselves in the acceptance of global products, and ethnocentric attitudes associated with acceptance of domestic products, with strong cultural connotations.

Despite the fact that the Polish consumption model is becoming more and more similar to the one observed in other EU countries, there are still essential differences. The basis for identification of such differences is provided by the following factors: the level of economic advancement, the degree of experience in the implementation of the principles of market economy and cultural differences [Szwacka-Mokrzycka 2013].

The process of market segmentation offers a practical dimension to consumer typology.

METHODS OF ASSESSMENT OF THE LEVEL OF SATISFACTION OF CONSUMER NEEDS

The basis for assessing the level of satisfaction of consumer needs is provided by the results of econometric and single-source studies (Target Group Index). The source of information for the analysis of econometric studies is provided by GUS (Main Statistical Office) household budget surveys. For many years, econometric analysis methods have been a recognised tool of research into the growth rate of consumption of consumer goods and changes in their structure. Because of their quantitative nature, they provide a variety of measures enabling assessment of such changes. These measures are the parameters of various models of demand and income elasticity coefficients defining the force of response of demand to changes in the income levels of consumers [Zielińska 1978].

As a result of many years of work, aimed at the substantial analysis of the processes of food consumption, the adequacy of different econometric models was verified against the background of description of empirical processes of development of food consumption in Poland. Based on the results of the work of numerous authors, it has been determined that the most suitable, for the purposes of description of food consumption processes, are those functions of demand which offer the asymptote defining the empirical level of consumption saturation, on the assumption that consumer incomes grow indefinitely. The presented methodology has been repeatedly verified by the successively published data

on household budgets. This has provided results showing long-term dynamics of changes in food consumption along with estimates of the saturation level in the coming years [Szwacka-Salmonowicz, Zielińska 1996, Szwacka-Salmonowicz 2003, Kwasek 2008, 2012].

The basis for diagnosis of changes in the consumer behaviour patterns and segment analysis, as well as assessment of changes in the system of purchasing preferences of consumers, has been provided by the results of single-source studies – Target Group Index (TGI). TGI studies are conducted by the Research Institute of Millward Brown Company [Wielkopolan 2001]. These studies enable us to position existing brands, determine behaviour of their users, type of use or consumption, and to describe, in detail, the consumers and market segments. Based on the results of single-source studies (TGI), it was possible to assess the level of satisfaction of food needs and purchasing preferences of consumers, and to conduct segmentation analyses [Szwacka-Salmonowicz 2003, Szwacka-Mokrzycka 2013].

CONCLUSIONS

Consumer behaviour and its determinants, as well as the resulting segmentation process, have a special place and significance in the consumption research in terms of theory and application. Having reviewed the scientific achievements in the field of analysis of changes in the behaviour patterns of Polish consumers, it should be noted that they are extensive both in theoretical and research terms. There are many classifications of determinants of consumer behaviour. Changes in such determinants define the main trends of consumption transformation and opportunities for new qualitative phenomena and new consumer behaviour. In the development of the issues in question, a special role is played by scientific studies regarding the influence of various factors on the shaping of consumer behaviour and their implications for segmentation decision-making processes. The basis for the assessment of the level of satisfaction of consumer needs is provided by the results of econometric and single-source studies (Target Group Index). As a result of many years of work, aimed at the substantial analysis of the processes of development of food consumption, the adequacy of different econometric models was verified against the background of description of empirical processes of development of food consumption in Poland. The results of single-source studies (TGI) serve as the basis for assessment of the level of satisfaction of food needs and purchasing preferences of consumers, as well segmentation analyses.

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TENDENCJE ZMIAN ZACHOWAŃ KONSUMENCKICH. PRZEGLĄD KONCEPCJI

Streszczenie. Celem opracowania jest dokonanie przeglądu podejść do analizy uwarunkowań zachowań konsumenckich i określenie ich przydatności do prowadzenia analiz segmentacyjnych, ze szczególnym zwróceniem uwagi na rynek żywnościowy. Punktem wyjścia rozważań jest umiejscowienie zachowań konsumenckich w teorii konsumpcji z podkreśleniem wkładu innych dziedzin i dyscyplin naukowych w jej rozwój. Następnie dokonano przeglądu różnych klasyfikacji wykorzystywanych do opisu uwarunkowań zachowań konsumenckich. Przedstawiono ponadto typologie konsumentów i ich znaczenie w procesie segmentacji. Ostatnia część opracowania została poświęcona metodom oceny poziomu zaspokojenia potrzeb żywnościowych.

Słowa kluczowe: zachowania konsumenckie, teoria konsumpcji, wzorce zachowań, typologie konsumentów, poziom zaspokojenia potrzeb konsumenckich

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AREAS OF BUSINESS ACTIVITY IN THE DEVELOPMENT OF ENVIRONMENTALLY VALUABLE ECO-PRODUCTS – AS EXEMPLIFIED BY THE LUBLIN VOIVODESHIP

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Abstract. The purpose of this study is to classify the activity of entrepreneurs in the field of the integration of environmental concerns into the various phases of the life cycle of a product/service and the evaluation of the potential of the selected elements of the organizations important from the perspective of expanding this activity. This paper includes an assessment of the significance of some selected factors in the implementation of business support solutions in the adoption of pro-environmental ideas, and outlines the importance of the location as regards a natural, valuable area for the formation of eco-products. The study revealed no formal basis for the implementation of an eco-product policy and the pro-ecology motivation of half of the entities, resulting mainly from the need for compliance with environmental regulations. Activity in the shaping of eco-products requires a strengthening of the case study group and a more comprehensive approach. Its limitations are financial and information barriers. Most respondents see opportunities for creating organic products as a result of their location.

Key words: product life-cycle, ecological marketing, Lublin Voivodeship

INTRODUCTION

Nowadays, there are more and more market opportunities for companies and products contributing to environmental marketing widely understood as planning, coordination, implementation and control activities undertaken by companies on the markets, taking into account environmental issues [Sommer and Brauweiler 2013]. Eco-marketing is part of the new marketing approaches which do not just refocus, adjust or enhance the existing marketing thinking and practice, but seek to challenge those approaches and provide a substantially different perspective. It belongs to the group of approaches which seek to reorient marketing strategies based on the ecological and social realities of the wider

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marketing environment [Mishra and Sharma 2012]. Instruments of the ecological marketing-mix are to implement and push through proactive, pro-ecological marketing strategies in the operating range. Their effectiveness requires a comprehensive approach based on environmental management and the support of other features of companies [Rheinländer 2005].

Eco-products are the basic tool of environmental marketing, they are a benchmark for other tools. The concept of eco-products spans various approaches to determining environmentally friendly products. In the narrower sense, organic products are those that meet the requirements of the environment through the processing of raw materials into the finished product, for example organic food. In the broader sense, authors write about how ecological products, which include those products in which substances harmful to health and the environment have been restricted, and new technologies were used in their production, thereby protecting the environment [Kokoszka 2008].

According to one of the most universal definitions of eco-products by K. Peattie, as was adopted as a starting point for this study, it is such a product, the production and use of which, as well as the disposal of waste are, in terms of environmental and social requirements, significantly improved, as compared with conventional or competing products [Zaremba-Warnke 2009]. It should be emphasized that environmental requirements should be taken into account in the case of eco-products, comprehensively in all stages of its life-cycle, i.e. in the design phase, the acquisition of the necessary raw materials, production, distribution, use by the consumer and the postconsumer phase [Kokoszka 2008].

The objectives of ecological product policy include: minimizing environmental pollution by the product and its packaging as a result of the improvement in the environmental impact of a product throughout the supply chain, as well as in all activities related to the creation of added value in the enterprise [Sommer and Brauweiler 2013]. In the case of services, ecological characteristics relate to the design and delivery of services, which usually coincides with the phase of use by the consumer. However, attention should be paid to the fact that the products supporting the process of providing the service must also meet the requirements in all phases of the life-cycle [Zaremba-Warnke 2009].

Among the many established criteria for evaluating the environmental performance of the products indicated in the literature, the 12 universally accepted include [Lye et al. 2001]:

- minimize the use of materials that significantly impact on the environment;
- minimize the diversity of materials used;
- ease of manufacture;
- minimize the use of manufacturing processes that impact significantly on the environment;
- ease of assembly;
- minimize the use of modes of transportation that impact significantly on the environment;
- high product reliability;
- ease of servicing (including disassembly and re-assembly);
- minimize the use of resources that impact significantly on the environment;
- ease of disassembly;

- ease of recyclability;
- low environmental impact of the decommissioned product.

Activities in the areas of natural value force entrepreneurs to pay special attention to environmental issues. According to L. Białoń [2011], the ecological functioning of companies should be preferred in such areas, adhering to the principles of sustainable development, and pro-environmental projects within the business should ensure the minimizing of the negative impact on the individual components of natural valuable sites.

Sustainable development requires valuable natural areas to ensure their viability, but within the limits, the priority of which is to protect their natural resources and values. It is important to seek innovative ways to enhance the economic competitiveness of these areas, while being consistent with the principles of sustainable development, with the use of the opportunities created by the natural environment. One such tool is ecological marketing.

The purpose of this study[1] is to classify the activity of entrepreneurs in the field of integration of environmental concerns in the various phases of the life-cycle of a product/ /service and to evaluate the potential of some selected elements of the organizations, seen as important from the perspective of expanding this activity. The paper includes an assessment of the significance of the support of some factors in encouraging businesses to implement innovative solutions to environmental problems, and outlines the importance of the location of the area for the formation of a valuable natural eco-products. The issues investigated in this paper are part of the problem of environmental management and – more broadly – the theory of sustainable development.

The study included the following formulated research questions:

1. What are the actions taken by the surveyed entrepreneurs in order to mainstream environmental requirements during the life-cycle of a product/service?
2. Which internal conditions, resulting from the potential of the organization, and external, arising from the environment, are seen as factors motivating entrepreneurs into mainstreaming environmental requirements during the life cycle of a product/service?

The study hypothesized: within the group of companies studied, the highest level of activity as regards the environmental requirements during the product life cycle applies to areas that may pose a direct threat to the environment and the organization itself; expanding the scope of activities for the development of eco-products requires above all an increase in the availability of financial support, as well as a broadening of the knowledge of environmental marketing.

MATERIAL AND METHODS

The study area consisted of 30 municipalities[2] from the group with the highest environmental value in the Lublin Voivodeship, as designated by the index developed by D.

[1]The report was prepared as part of the research project 2011/01/D/HS4/03,927 entitled "Environmental conditions and factors of development of the economic functions of valuable natural areas of the Lublin province", funded by the National Science Centre.

[2]Janów Podlaski, Konstantynów, Józefów, Łukowa, Obsza, Dzwola, Janów Lubelski, Modliborzyce, Janowiec, Kazimierz Dolny, Wąwolnica, Kraśniczyn, Wilków, Dębowa Kłoda, Sosnowica, Stężyca, Lubycza Królewska, Susiec, Tarnawatka, Tomaszów Lubelski, Rossosz, Sławatycze, Urszulin, Włodawa, Adamów (zamojski), Krasnobród, Łabunie, Skierbieszów, Stary Zamość, Zwierzyniec.

Guzal-Dec in the study of the natural value of ecological rural and urban-rural areas of the Lublin Voivodeship[3]. In each of the municipalities, on the basis of the REGON registry, five companies were selected for testing, those located in rural areas, attempting to reflect the sectorial structure of business entities in the municipality and nominating test subjects with the highest level of employment. A diagnostic survey was applied in the clinical study, using a questionnaire interview. Interviews with owners (or managers) of businesses were held during the period November–December 2013.

From the group of 150 surveyed companies 53 firms were selected whose representatives pledged to take action in relation to the processes that affect the state of the environment in order to minimize their impact on the environment. The presented results of the study refer to this group.

A study of the business involvement in the development of eco-products in the five phases of the life-cycle of a product/service included a detailed description of the elements of each of the phases presented by K. Kokoszka [2008]. On this basis, the author of this paper has adopted by Ryszko [2007], for the purpose of this analysis, 18 indicators describing the actions/environmental activities undertaken by entrepreneurs within individual phases of the life-cycle of a product within individual phases in the form of tables. Results are presented in a descriptive and graphic form in tables.

GENERAL CHARACTERISTICS OF THE SURVEYED COMPANIES

More than half of the companies, whose representatives agreed to take action in relation to the processes that affect the state of the environment in order to minimize their impact on the environment (66.0%), were micro-entities – total employment does not exceed nine persons; small entities accounted for 24.6% and average entities – 9.4%. The dominant organizational and legal form was their individual economic activity (54.7%) and a limited liability company (24.5%). Less than half of the subjects (44.2%) had the status of a family business.

The separate group was dominated by manufacturing companies, including 28.3% – manufacturing companies and 26.4% – the first production sector, including agriculture, forestry, hunting and fishing. The sample was marked with activities related to the accommodation and food services (13.2%) or wholesale and retail trade and repair (7.5%). It should also be noted that the sample was dominated (74%) by business entities based on the use of natural resources.

The studied group of companies was characterized by an established market position determined mainly by supra-local coverage of the markets served, the positive assessment of the economic and financial situation and declared development plans. The vast majority (69.8%) of the companies operated on supra-local markets, of these 13.2% operated on the regional market, 35.8% on the national market, and 20.8% of the entities served international markets in addition to the national market. More than half of the respondents

[3]The procedure is described in detail in the publication: D. Guzal-Dec, 2013. Operationalizing the pressure-state-response model in the study of ecological values of rural communities on the example of the Lublin voivodeship. Annual Set of the Environment Protection, Vol. 15, No 3, 2925–2941.

assessed the economic and financial situation of the company as good (51.9%) and very good (5.8%), 38.5% – average, and only 3.8% – bad.

Positive assessments of the current economic and financial situation were accompanied by the opinions of the companies developing their business activity during the period 2010–2012 (64.1%). In addition, it should be noted that the vast majority of entrepreneurs (86.9%) planned to further develop their companies, including 38.1% of those who planned to create new jobs.

In most cases (69.2%), owners were responsible for decisions in the company. More than half of those making decisions had received a higher education or incomplete higher education (56.6%), secondary (general and vocational) education – 35.8%, basic and incomplete secondary education – 7.5 and 16.2% of them graduated from natural science training.

ACTIVITY IN SHAPING ECO-PRODUCTS

Self-evaluation of the surveyed businesses with respect to participation in eco-friendly activities indicates that only 30.6% of the subjects analyzed exhibited a high level of sophistication in the field of environmental protection against competitors. Moreover, none of the parties declared implementation of a certified environmental management system or a certification system, including e.g. ISO 14001 – Environmental Management System, EMAS – Eco-Management and Audit System, or FSC – System of Custody Certification and Forest Management.

Analysis of business activities in the integration of environmental requirements in relation to the product-life cycle in the group indicates that it was focused on production/ /providing services and their effect on the natural environment. The overwhelming majority of companies declared measures aimed at reducing consumption of resources and energy, and the waste and pollution associated with the introduction of modern techniques and technologies. Equally frequently, eliminating unwanted and problematic chemicals from the production process/service providing was declared, along with paying attention to the safety of transport and storage of hazardous substances and waste. Somewhat less frequently was the use of recycling declared, due to the need to invest in specialized technologies.

In the use and postconsumer phase, over half of respondents inform customers on how to use and dispose of products to minimize their impact on the environment.

In the design phase, the highest percentage of respondents declared taking into account the reduction of the impact on the environment during the production process/service providing. At this stage, taking into account the impact of use and maintenance, repair and decommissioning or disposal after consumption was clearly claimed to a lesser extent.

Quite a significant proportion (over 70%) of respondents indicated that, during the acquisition of raw materials, attention is paid to the criterion of reducing the negative impact on the natural environment. Moreover, more than half of the respondents declared that their choice of suppliers was influenced by their advancement in the field of environmental protection and the ecological characteristics of the offered products.

The surveyed businesses rarely undertook activities in relation to the choice of means of transport and distribution channels taking into account the consideration of environmental requirements. Re-use or recycling of products after consumption was taken into account less frequently (Table 1).

Table 1. Percentage of enterprises in which efforts are directed to take into account the environmental requirements in the various stages of the life cycle of a product/service

Phase of the product life cycle	Types of pro-ecological activities[a]	Percentage
Design	reducing the environmental impact of the production of a process/service is included	82.9
	considered limitation of the environmental impact within the use and maintenance/repair	77.1
	considered limitation of the environmental impact within removal/disposal after consumption	65.7
Acquisition of raw materials	eliminated use of undesirable and problematic chemicals	100.0
	materials are replaced by more environmentally friendly ones	73.5
	where it is possible, non-renewable resources are replenished or replaced with renewable	71.0
	selection of suppliers is influenced by their level of advancement in the field of environmental protection	57.1
	selection of suppliers is influenced by the ecological characteristics of the offered products	52.9
Production	limited consumption of raw materials and energy and the generation of pollutants in the process of production/providing services	91.9
	polluting technologies are replaced with safe	90.6
	preventing waste generation in the enterprise	90.0
	implemented methods to improve the efficiency of resource use	85.4
	recycling is used	66.7
Distribution	hazardous substances and wastes are transported and stored in a safe manner	100.0
	choice of means of transport and distribution channels takes into account ecological criteria	44.4
The use by a consumer and post-consumer phase	size of packages and their impact on the environment is limited	73.8
	customers are informed about how to use and dispose of products to minimize their impact on the environment	63.6
	re-use or recycling after consumption are made easier	25.0

[a]Types of pro-ecological activities based on Ryszko [2007].
Source: Own development on the basis of own study.

More than half of the respondents (55.8%) declared that they take actions aimed at strengthening the ecological corporate image and their promotional activities emphasize the company's commitment to environmental protection. In addition, the promotional activities regarding products/services emphasize their ecological characteristics (54.2%). Quite a significant proportion of respondents (45.7%) indicated that they direct products/services to the so-called eco-consumers.

Obtaining an ecological trademark is an important expression of enterprise communication with the buyer, as part of environmental marketing. In the study group, three organizations, respectively, declared to have ecological trademarks with regard to their product and packaging, and five – with regard to food. The group of entities that do not have ecological trademarks includes 1/5 of those who admit that they do not know much about the definition of eco-labeled products.

Factors of activity in the field of environmental protection. Expanding business activity in the field of environmental mainstreaming depends on many factors inherent in both the enterprise and its environment. Among the elements creating the potential in most organizations, respondents had an unusually high appreciation of the level of environmental and ecological awareness in their company and the employees that enable the creation of environmental solutions. Self-evaluation of potential indicates a high knowledge of the relationship between the organization and its natural environment. At the same time, significantly lower mean scores related to the knowledge resources concerning pro-ecology opportunities and knowledge of the supply and demand for green products.

The respondents assessed the material resources of their organization as high enough in terms of their ability to meet the requirements of environmental protection and modern equipment and installations for the protection of the environment. The chance to gain ecological trademarks and the introduction of an environmental management system were rated as average, while the lowest assessment regarded the ability to finance and/or co-finance environmental investments from own resources (Table 2).

Table 2. Assessment of the selected elements of the company's potential, significant in the field of environmental protection[a] (evaluation on a scale of 1–5, where 1 is very poor and 5 – very high)

Elements of the company's potential	$\bar{x}$	S
Degree of the identification of the impact on the environment	3.91	.694
Environmental knowledge of the possibilities and limitations of the company's development in valuable natural areas	3.82	.691
Knowledge of the management in the field of environmental protection and environmental technologies	3.76	.692
Environmental awareness of management and their willingness to take up pro-ecological actions	3.66	.656
Technical capacity of the existing infrastructure to meet the requirements of environmental protection	3.55	.876
Human resources capable of introducing pro-environmental solutions	3.44	.660
Modernity of equipment and systems for the protection of the environment	3.39	.728
Knowledge on how to support pro-ecological actions	3.33	.869
Knowledge of the market supply with respect to green products	3.18	.917
Knowledge of the market demand for green products	3.15	.906
Chances to gain ecological trademarks	3.14	.705
Chances of introducing a system of environmental management	3.00	.672
Ability to finance own research on clean production, product	2.91	.777
Ability to finance/co-finance environmental investments from own resources	2.82	1.121

[a]List of factors based on M. Witkowska-Dąbrowska cf. M. Burchard-Dziubińska [2010].
Source: Own development on the basis of own research.

Among the most important external factors supporting the implementation of environmental solutions by entrepreneurs those of a financial nature should be highlighted, including tax preferences, preferential loans, as well as the possibility of direct support for environmental investments. Others, assessed as important support factors included: support in the form of free-of-charge promotion, the introduction of subsidies for environmentally friendly products, the ability to train staff free of charge and access to technical and organizational support (Table 3).

Table 3. Assessment of the significance of some support factors in attracting entrepreneurs to implement innovative environmental solutions, assessment made on a scale of 0–5, where 0 is a non-significant and 5 – very important

Factors	$\overline{x}$	S
Introduction of tax preferences for local or national levels	4.06	.810
Introduction of preferential loans	4.04	.651
Opportunity to obtain direct financial support for investments	4.02	.785
Possibility of free-of-charge promotion of ecologically-oriented enterprises	3.96	.824
Subsidies for environmentally friendly products used by the company	3.88	.890
Possibility of free-of-charge training for employees	3.81	.915
Substantive and organizational support	3.67	.834
Exchange of experiences with other companies	3.25	.978
Cooperation with institutions and scientific research sector	3.08	1.269

Source: Own development on the basis of own research.

Location of companies in natural valuable areas creates opportunities to shape eco-products, especially in the case of businesses based on the use of local natural resources, most of the cases in the analyzed sample. Research suggests that the opportunities arising from the location in areas with valuable natural assets were recognized by the analyzed entities. The majority (65%) of respondents felt that their location offers the possibility of creating environmentally friendly corporate images. With regard to the products/services, the vast majority of them (74%) agreed that, through the use of local resources, their products/services are of high quality and attract the greatest interest due to their place of origin (52%).

CONCLUSIONS

Generally, the activities of the surveyed entrepreneurs regarding the commencement of activities in relation to the processes that affect the condition of the environment, aimed at minimizing their environmental impact, should be assessed as low – only 35.3% of the respondents declared such initiatives. In this group, actions taken up by entrepreneurs in various phases of the life-cycle of eco-products/services were, however, in most areas quite numerous.

The study group of companies was characterized by the lack of a formal basis for eco-product policy implementation in the form of the implementation of a certified environmental management system or a certification system. Few businesses have introduced

ecological trademarks, and many of them did not possess the knowledge about how to implement them or what potential benefits can be derived from them.

The study conducted enables us to accept the formulated hypothesis of the research process. Taking into account environmental requirements, as declared by the test group, within a companies' activities, in relation to the life-cycle of a product/service focused on the production/service delivery and eliminating disturbance to the natural environment. This was also reflected in the design phase. One should note that, in the case of half of the businesses, pro-ecological activities resulted primarily from a desire to meet the environmental regulations, which represents the initial stage of the journey towards the implementation of environmental management in the company to create a framework for effective and comprehensive action within environmental marketing.

A large group of respondents declared that they undertook activities aimed at strengthening their ecological corporate image and their promotional activities emphasize the company's commitment to environmental protection and the ecological characteristics of the products/services. Location within natural valuable areas was not without significance for the respondents in relation to the development of eco-products, as it was connected with the possibility of creating a pro-ecological corporate image based on the high quality of a product using local resources and the green image of its place of origin.

It seems that activities in shaping eco-products need a more systematic, comprehensive approach in the case of the surveyed businesses. They require dissemination of access to expertise and organizational knowledge and the support opportunities within ecology among entrepreneurs, knowledge of the supply and demand for green products, of the principles, benefits and opportunities associated with ecological trademarks. From the perspective of sustainable development of valuable natural areas, it should be emphasized that education is a prerequisite for sustainable development [Kałuża 2009].

However, financial constraints are the primary barrier to ecological activity, as reported by the surveyed companies. The reformed Common Agricultural Policy will be connected with the emphasis on environmental protection and balanced management of natural resources [Sadłowski 2012], which may create opportunities for ecological activity in rural areas.

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AKTYWNOŚĆ PRZEDSIĘBIORCÓW OBSZARÓW PRZYRODNICZO CENNYCH W KSZTAŁTOWANIU EKOPRODUKTU – PRZYKŁAD WOJEWÓDZTWA LUBELSKIEGO

Streszczenie. Celem opracowania jest charakterystyka aktywności przedsiębiorców w zakresie uwzględniania wymogów środowiskowych w ramach poszczególnych faz cyklu życia produktu/usługi oraz ocena wybranych elementów potencjału badanych organizacji istotnych z perspektywy zwiększenia tej aktywności. W pracy dokonano także oceny istotności wybranych czynników wsparcia przedsiębiorców we wdrażaniu rozwiązań proekologicznych oraz zarysowano problem znaczenia lokalizacji na obszarze przyrodniczo cennym dla kształtowania ekoproduktu. Badania ujawniły brak formalnych podstaw wdrażania polityki ekoproduktu oraz motywację działań proekologicznych połowy podmiotów wynikającą głównie z potrzeby spełniania regulacji środowiskowych. Aktywność w kształtowaniu ekoproduktu wymaga w przypadku badanej grupy wzmocnienia i bardziej kompleksowego podejścia. Jej ograniczenie stanowią bariery finansowe i informacyjne. Większość badanych dostrzega możliwości w zakresie kreowania produktu ekologicznego wynikające z lokalizacji.

Słowa kluczowe: cykl życia produktu, marketing ekologiczny, województwo lubelskie

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ECONOMIC POVERTY IN RURAL AREAS OF POLAND

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Abstract. In Poland relatively more families live in economic poverty in rural areas, which is reflected in the fact that in the years 2007–2013 the extreme and relative poverty risk as well as the national poverty threshold indices in rural areas were higher than in urban areas. The greatest differences in the mentioned poverty indices between rural and urban areas were revealed in the scope of the relative poverty. The fact that there is no evident decrease in the relative poverty index, particularly in rural areas, indicates persistent income inequalities. In comparison with the remaining household groups, the socioeconomic situation of farmers' households was particularly difficult. Their extreme, national and relative poverty risk indices were one of the highest. Many negative tendencies that promote poverty accumulate in Poland's rural areas. The most important of them include the high unemployment rate and a relatively low level of education among the rural population.

Key words: poverty, economic poverty, rural areas, Poland

INTRODUCTION

Poverty exists in every country and is very difficult to eradicate. It poses a great challenge to each society, principally since it embraces many spheres of human life, both in rich and poor nations. Poverty is a condition of a complex and multidimensional nature. Many definitions of it can be found in the literature on the subject. They are all connected with the fact that certain needs are not being met on a desirable level. The following can be adopted as a general definition: "a condition below a certain, variable in time, income threshold or a needs satisfaction threshold in relation to an individual, a family or a social group" [Toczyński 1991].

According to the definition of poverty adopted by the European Union, poverty is a condition of "those persons, families and groups of persons whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable

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way of life in the Member State to which they belong" [Radziukiewicz 2006]. A choice of a particular poverty definition considerably influences the results of its measurement [Hagennars 1986].

The situation on the labour market in rural areas of Poland is poor. It directly translates into the employment opportunities and the income levels of the rural population, including the scope of poverty. The rural areas also suffer a low education level and the underinvestment in social and technical infrastructures that are poorly adapted to the existing needs [Żmija 2013]. The impoverishment process is particularly strong in remote areas where state farms used to exist, and in those areas where farming is the dominant form of economy, lacking in non-agricultural employment opportunities [Żmija 2011]. Significant differences in the scope of poverty are identified in the spatial arrangement of Poland. Rural population often continues to rely on small and low-profit agricultural holdings as a result of a very high unemployment in rural areas and of the fact that rural families are bigger than the ones in urban areas, leading to a higher risk of impoverishment.

The primary aim of this paper is to present the phenomenon of the economic (income) poverty in rural areas of Poland. We concentrate on a short discussion of the theoretical issues connected with poverty, analyse the level of economic poverty (extreme, national, relative) in Polish rural areas in the years 2007–2013, and evaluate the economic poverty risk index for selected socioeconomic groups of households. Determinants of the scope of poverty in rural areas were also indicated.

MATERIAL AND METHODS

Two approaches are typically employed to analyse poverty – the classic one and the multidimensional one. The classic approach is used to analyse income (monetary) poverty. It is a question of choice whether the poverty indices should refer to income *sensu stricto* or rather to consumption. However, the measurement of poverty based only on these parameters does not take other factors into account. Therefore, it ignores some aspects of the actual condition of people at risk of poverty. In order to eliminate this problem, multidimensional approaches to poverty are designed, which take into account the analysis of its non-income aspects, such as the access to medical care, education and culture, the perception of the lack of social security or the weakening of social ties [Holik et al. 2014]. The multidimensional approach to poverty is problematic, as it often requires solving a number of methodological problems. However, the analyses take into account A. Sen's postulate that the measurement should identify the poor in a population and design a quantitative metric of poverty [Sen 1976].

The scope of poverty can be identified with various, objective or subjective metrics, adopting absolute or relative measures. In the objective approach, the evaluation of the level of satisfaction of the participating individuals' or households' needs is performed independently of their personal valuations in this scope. In the subjective approach, the participants evaluate their satisfaction of needs levels. The absolute measures of poverty are based on a quantitative and qualitative determination of the basic goods and services. Those individuals and households which are not able to satisfy the needs recognised as

basic, are identified as poor. These metrics are variable in time and space. Moreover, the needs described as basic are perceived in various ways. Relative poverty lines are established by comparing the satisfaction of the participants' needs with the level on which the needs of other society members are satisfied. Such an approach to poverty accepts a form of inequality, an excessive contrast between the living standards of individual social groups [Auleytner, Głąbicka 2001].

The data published by GUS (Polish Main Statistical Office) for the years 2007–2013 and the literature on the subject are the basis of the analysis in this work. However, it should be stressed that due to methodological changes in the presentation of data by GUS, the data on poverty for the years 2010–2012 differ from those published earlier by the Office. The study of household budgets in the years 2010–2012, including the data pertaining to poverty, were generalized by the new weights that take into account the results of the Polish National Census of 2011.

RESULTS AND DISCUSSION

The scope of economic poverty in rural areas of Poland

The Polish Main Statistical Office (GUS) publishes such data about the scope of economic poverty which take into consideration various poverty lines, since in this country no line has been adopted as an official one. Moreover, there exists no methodological basis to favour one of them, and each has its strengths and weaknesses, as well as different interpretations. The estimation of the extreme poverty's scope is based on the adopted poverty line equal to the living wage. Taking into consideration the national poverty line allows to establish a number of people who, legally, are eligible for social aid, and the application of the relative poverty line on the level of 50% of the all household's median expenditures is necessary to identify individuals with a consumption level lower than in the case of the majority of people in Poland and significantly lower than the average level [GUS 2013].

In the years 2007–2013 the level of extreme poverty risk in Poland varied (Fig. 1). In the years 2007–2008 it decreased, and from 2009 to 2013 it increased by 7.4%. The extreme poverty risk was much higher in rural areas than in the cities. In the years 2007––2013 the greatest difference in the percentage of poor people between rural areas and cities was in 2013, when it reached 7 percentage points. The lowest difference, 5.7 percentage points, was observed in 2009. The years 2009–2013, with the exception of 2012, witnessed the systematic increase in the percentage of extremely poor inhabitants of rural areas. The same trend existed in urban areas in 2010–2013. The growth rate of extremely poor individuals' percentage was greater in rural areas. As many as 4.6% of inhabitants of urban areas lived in extreme poverty in 2013, as compared to 11.6% in rural areas. The inhabitants of the Polish rural areas accounted for about 60% of all individuals living below the extreme poverty threshold, while the inhabitants of rural areas constitute below 40% of the total population of the country. This means that extreme poverty touches relatively more inhabitants of rural than urban areas.

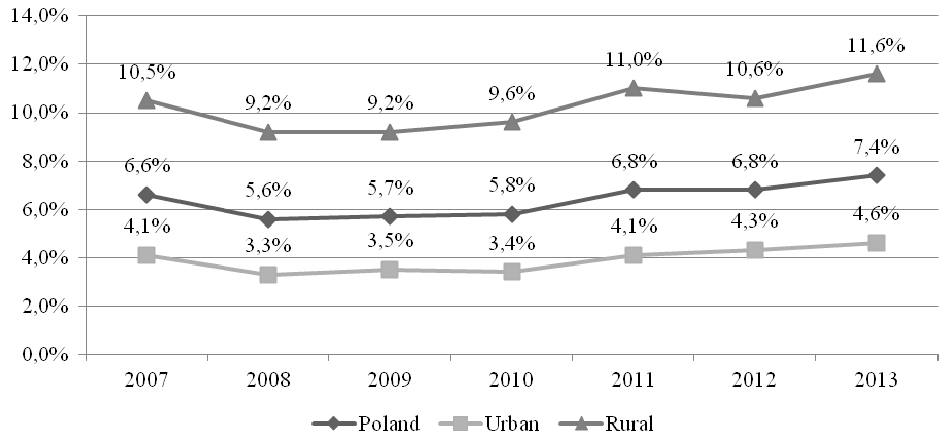

Fig. 1. Economic poverty risk index – the percentage of persons in household spending less than the extreme poverty threshold, by the place of residence in 2007–2013

Source: Own study based on GUS data.

The scope of extreme poverty evidently varies by socioeconomic groups, defined in accordance with the prevailing source of income. In the years 2007–2013 the most difficult situation affected the members of households relying on other unearned sources of income (the average rate of extreme poverty about 20%,) while the smallest percentage of extremely poor individuals was identified among the self-employed. The groups exposed to extreme poverty on more than the average level included members of households relying mainly on disability pensions (the percentage of extreme poverty at the average level of 11%) and the members of farmers' households. In the years 2007–2013 the percentage of extremely poor individuals among farmers varied, but was not lower than 9.0%; it reached the peak value, 13.4%, in 2013.

The second metrics recognised as an economic poverty threshold is the national poverty line. The percentage of individuals living on income below the national poverty line in Poland in 2007–2011 steadily decreased from 14.6% in 2007 to 6.6% in 2011 (Fig. 2). In that period the highest decrease in this index was observed in rural areas, where it decreased from 21.9 to 10.7%, or by 11.2 percentage points.

In 2013 the national poverty risk index grew to 12.8% in Poland. It increased both in urban and rural areas, to 8.4 and 19.6% respectively. One of the reasons for the steady decrease of that index in 2007–2011 was the fact that the value of the national poverty line was not valorised between October 2006 and October 2012. The valorisation of that threshold undoubtedly promoted the growth of the index in 2013.

As in the case of extreme poverty, the scope of the national poverty clearly varies by socioeconomic groups of population. In the years under study the national poverty risk index was the greatest among the households relying on unearned sources of income, and the second greatest among farmers. Despite the general decline in the percentage of individuals at risk of such a poverty in 2007–2012, in 2012 as many as 12.2% of the members of farmers' households were at risk of national poverty. In 2013 the index grew to 22.8%,

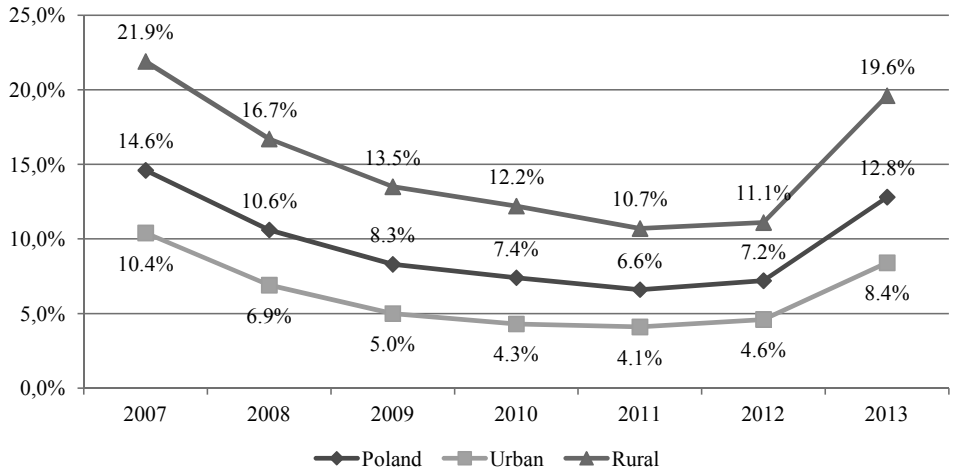

Fig. 2. The economic poverty risk index as a percentage of individuals in households spending less than the national poverty line, by the place of residence in 2007–2013

Source: Own study based on GUS data.

which means that in that year, in comparison with 2012, nearly twice as high percentage of farmers' households was eligible to apply for social aid.

The third metric of economic poverty, used by GUS to measure poverty, is the relative poverty line. In 2007–2013 the level of relative poverty risk in Poland decreased from 17.3 to 16.2% (Fig. 3). That decrease was recorded in both urban and rural areas of the country, respectively by 1 and 1.5%. The relative poverty risk index was considerably higher in rural areas than in cities, and the difference was as much as 12.8 percentage points in 2013. It proves the existence of income inequalities in Poland, particularly in the case of the residents of rural areas.

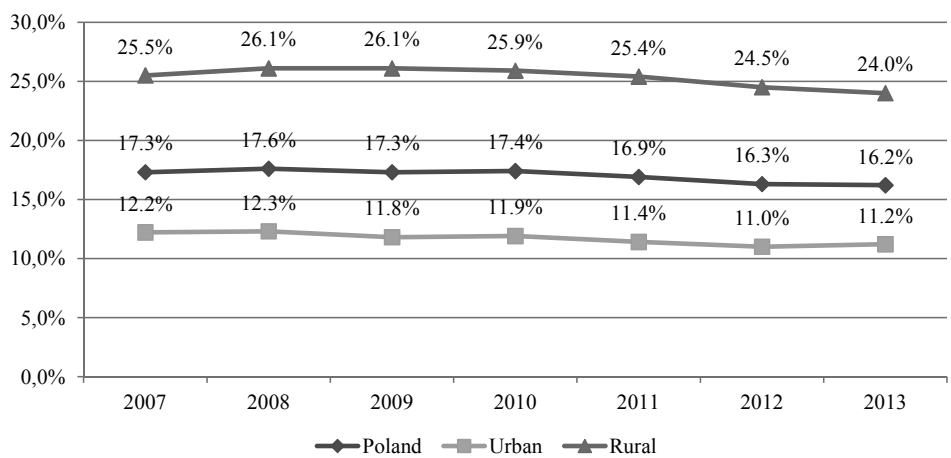

Fig. 3. The economic poverty risk index as a percentage of individuals in households spending less than the relative poverty line, by the place of residence in 2007–2013

Source: Own study based on GUS data.

The scope of relative poverty also varies by socio-economic groups defined in accordance with the prevailing source of income. In the years 2007–2013 the most difficult was the situation of the individuals living in households relying on other unearned sources of income, while the lowest percentage of relatively poor persons was among the self--employed. The members of households relying mainly on disability pensions, as well as the members of farmers' household were at risk of poverty to more than average degree. In the years 2007–2013 the percentage of relatively poor individuals among farmers was still on a high level. The index was 26.7% in 2013, which reveals the existence of high income inequality among farmers.

Determinants of poverty in rural areas

The factors that determine poverty in rural areas are manifold. According to the report of the conference devoted to combating poverty and social exclusion in rural areas, organised by the European Commission in 2009 in Budapest, such factors include demography, education, labour market and remoteness. The demography factor includes such key issues as migrations, low population density, aging and low birth rate. As far as the education factor is concerned, education and training are the basic issues that positively affect the quality of life. Employment rates in rural areas are an important determinant of poverty indices, since low employment rates result in low incomes, increased migration or out-migration and the low quality of public services. Other variables which may affect poverty in rural areas include: low incomes and labour market seasonality, low retirement benefits or intergenerational transmission of poverty.

Inhabitants of rural areas constitute nearly 60% of all poor people in Poland, while only 40% of the Polish society lives in rural areas. The values of poverty indices in rural areas differ considerably from those in urban areas, which results from such factors, as differences in household structures. In comparison with urban households, rural households consist of more members, and have higher fertility rates. However, a larger number of household members does not translate into a larger number of the employed to the same extent as it does in urban areas. The lack of labour is therefore one of the most important problems in Polish rural areas, and, to a considerable extent, it determines poverty [Kabaj 2000]. Unemployment in rural areas is a derivative of both general unemployment and low mobility of rural population coupled with labour markets' limited opportunities in rural areas. The disagrarisation process takes place in Polish rural areas, which is reflected in the systematic decrease in agriculture's role in the productive engagement of human labour and providing incomes for the rural population. Occupational development of the unemployed in rural areas is an important condition of those areas' modernisation and the improvement in the incomes and financial situation of their populations. The freeing up of the labour force engaged in agriculture and the improvement in its productivity must take place in the context of new workplaces, which should be created in various areas of the national economy [Kłodziński 2012]. As compared with urban households, the education level in the rural ones is lower, which results in the lower competitiveness of the latter in the labour market. Without an improvement in the education levels, the reduction in

unemployment is impossible, therefore it is extremely crucial to encourage young people from rural areas to continue their education on the secondary and university levels.

According to the "Employment in Poland. Poverty and Jobs" report [Raport... 2011], poverty in Polish rural areas is highly diversified, depending on a type of a household based on income sources. Three types of rural household are proposed based on this criterion: agricultural households, where farming is the main source of income; partly agricultural households (with an secondary income from farming); and non-agricultural.

Members of household connected with agriculture constitute nearly half of all the poor population of rural areas. A negative correlation of the poverty ratio and the area of arable land owned by a household exists. Therefore, the poverty risk in such households depends on the scope of agricultural activities. It should be noted here that in the spatial arrangement there are no static relationships between the level of employment in agriculture and poverty in rural areas.

Poverty risk in non-agricultural households is lower than the average in rural areas, thus, despite their number, they are not responsible for the scope of poverty in Polish rural areas. However, many members of partly agricultural households obtain income from wage labour, which considerably lowers their risk of poverty.

The elimination of poverty and social exclusion is one of the European Union's priorities. Its implementation is based on the collaboration of member states in the scopes of social policy, employment, social protection and economic development, fostering social inclusion. The membership of Poland in the EU and the opportunity to use its aid funds promoted a faster development of social services, infrastructure, social entrepreneurship and other programs of social integration and cohesion.

The policy of rural areas' development in the framework of the Common Agricultural Policy plays and important role in the growth of employment and combating social exclusion in Polish rural areas. The implementation of the Policy is expected to generate income and employment options by means of training courses and the supply chain development for traditional agricultural businesses, as well as by means of investing in modern, more efficient agricultural holdings and infrastructure in rural areas, in order to promote competitiveness and entrepreneurship in those areas.

Polish communes have been also included in activities connected with the Social Agenda 2000, which focused on social integration through creating own problem-solving strategies. Studies show that the issues connected with poverty and social exclusion are not as important in the policies of local commune governments, as those connected with the educational, communal or transport needs. NGOs are often closer to those in need. However, most of them operate in more urbanised areas [Golinowska 2012].

The lack of labour and unprofitable agricultural holdings are the main sources of poverty in Polish rural areas. They require strategic actions both in the framework of the economic policy of the state, and in the regional policies, as social aid alone only mitigates the most difficult situations. Unemployment in rural areas is higher than in urban areas, and rural households are larger. Moreover, rural and small town populations use social aid to a larger extent.

CONCLUSIONS

The differences in the level of the socio-economic development of Poland among separate regions as well as between urban and rural areas, are reflected in the disparities in data pertaining to poverty. The families that relatively most frequently experience poverty are those from rural areas. The greatest difference in the described values of poverty between the rural and urban areas was identified in the case of the relative poverty. The fact that the index of relative poverty is not decreasing substantially proves the existence of persistent income disparities. Polish rural areas also generate a high percentage of people living below the national and extreme poverty line.

In the period under study, individual socio-economic groups were subjected to economic poverty to various degrees. In comparison with other socio-economic groups, the members of farmers' households were in a particularly grave position. Their extreme, national and relative poverty risk indices were among the highest. The individuals living in agricultural holdings of the smallest arable land areas are at a particular risk of poverty, since, as GUS analyses show, the level of poverty is correlated with, among other factors, the area of arable land. Those individuals should therefore be recipients of a special state-provided social care and special programmes aimed at limiting the scope of poverty in rural areas. Many negative trends that affect poverty accumulate in rural areas. One of the most important ones is the high unemployment rate, which affects the scope of poverty, as well as the relatively low level of education, which increases the risk of poverty. Other poverty-promoting factors include impoverishment that results in accepting low-paid jobs, and having many children in families – more frequent than in urban areas. The lower economic activity level, the smaller population density, and the less developed infrastructure than in urban areas, are only some of the determinants that hamper the proper use of the rural areas' potential, as well as inhibit their socio-economic growth and the creation of new workplaces, resulting in the persistence of a high poverty level in rural areas.

The accumulation of adverse issues, economic ones in particular, promotes poverty despite the region. The relatively low productivity in agriculture and the diffused nature of agricultural holdings are undoubtedly the factors which deepen the wealth gap between the rural and urban populations. The aid directed to the poor should not be managed on the territorial level, but rather constitute an answer to local problems that increase the poverty risk.

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UBÓSTWO EKONOMICZNE NA OBSZARACH WIEJSKICH POLSKI

Streszczenie. W Polsce relatywnie częściej w ubóstwie ekonomicznym egzystują rodziny, które mieszkają na wsi, o czym świadczy fakt, iż w latach 2007–2013 wartości wskaźników zagrożenia ubóstwem skrajnym, ustawowym i relatywnym na wsi były większe niż w miastach. Największa różnica w opisanych wskaźnikach ubóstwa między miastem a wsią występowała w przypadku ubóstwa relatywnego. Brak wyraźnego obniżania się wskaźnika ubóstwa relatywnego, zwłaszcza na wsi, jest oznaką utrzymywania się w Polsce nierówności dochodowych. W szczególnie trudnej sytuacji społeczno-ekonomicznej na tle pozostałych grup gospodarstw domowych znajdowali się członkowie gospodarstw domowych rolników, dla których wartości wskaźników zagrożenia ubóstwem skrajnym, ustawowym i relatywnym były największe. Na obszarach wiejskich Polski kumuluje się wiele negatywnych zjawisk, które sprzyjają zjawisku ubóstwa. Do najważniejszych z nich zaliczyć można bardzo duże bezrobocie oraz stosunkowo niski poziom wykształcenia ludności wiejskiej.

Słowa kluczowe: ubóstwo, ubóstwo ekonomiczne, obszary wiejskie, Polska

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ALLOCATION OF THE EU FUNDS AND THE DEVELOPMENT LEVEL OF COMMUNES IN RURAL AREAS OF THE MAŁOPOLSKA PROVINCE

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Abstract. Due to the specific problems of the rural areas in the Małopolska Province, the measures directed at the support of their multifunctional development are of a particular importance. Such measures are one of the principal aims of the rural areas development policy. This paper is an attempt to determine the direction of the spatial allocation of the funds received in the framework of the selected measures within the Rural Development Program (PROW) in the years 2007–2013, assigned to the support of the multifunctional development of rural areas, taking into account the socio-economic development level of the communes in the rural areas of the Małopolska Province. The results of the study suggest a territorial variations in the funds' absorption and the existence of significant differences in this respect among the studied communes. However, on the level of individual communes, no relationships among the socio-economic development level of a commune and the total value of the subsidies obtained by the beneficiaries in the commune were revealed.

Key words: socio-economic development level, rural areas, absorption of EU funds, Małopolska Province

INTRODUCTION

The times of the socio-economic transformation in Poland were connected with the radical changes in the system's principal conditions accompanying the development of agriculture, in the economy of rural areas and the communities of their inhabitants. In the first years of the transformation, the economic situation of the rural population worsened to the much higher degree than the situation of the urban population, and the country's development in the following years was associated by growing discrepancies in the socio-economic development levels not only among the individual regions of Poland, but also between the rural and urban areas [Żmija 2013]. Studies of the socio-economic develop-

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ment level of rural areas reveal their strong regional differentiation. Due to the variations in the sizes and types of communes, their location and the local setting of the development process, values of the socio-economic development level indices also show strong variations within individual provinces, thus studies conducted on the lowest, local level of the country's administrative division are of a significant research value [Stanny 2013, Paluch, Sroka 2013].

In the last over a dozen years, the integration of Poland with the European Union had the greatest impact on the acceleration of the rural areas development rate. It was associated with the institutionalization and the formation of the agricultural policy conditions, and in its framework, of the rural areas development policy and the allocation of significant funds to the realization of its aims [Wilkin 2007]. The current picture of the rural areas development policy and the programs realized within its scope were importantly impacted by the dissemination of the multifunctional rural areas development concept, which is the consequence of the systematic decrease in the importance of the agricultural function in the economy of rural areas. Such a shaping of the rural areas' economy fosters positive changes in the socio-economic structure of the population and in the scope of the economic efficiency, which is important for the growing attractiveness of rural areas as a place to live and work. Therefore, the principal aim of the EU programs supporting the multifunctional development of rural areas is the support of initiatives promoting the diversification of the rural economy, creating alternative sources of income and new workplaces in rural areas [Żmija 2014].

Many conditions influence the process of absorption of the EU funds allocated to the support of the multifunctional rural areas development. Due to their nature, a classification can be made, dividing them into such two categories as external conditions, independent of the beneficiary (e.g. various conditions of a historical, political, legal, economic, social or institutional nature) and conditions which are internal in the relation to the entity applying for funds, which are directly dependent on the beneficiary, his creativity and entrepreneurial skills, his available resources, previous experiences etc. [Bielecka 2006]. The consequence of the overlapping of various conditions is the diversification of the funds' absorption by territorial distribution. The question arises whether absorption of EU funds has a form similar to allocation of capital. The affirmative answer to this question would mean in practice that the funds, despite their different aim and nature, are supplied in their majority to the communes with a higher socio-economic development level, and therefore to communes enjoying a more advantageous location resulting from more favorable conditions for the development of entrepreneurship in its broad sense. Therefore, it can be expected that the number of entities competing for the EU support is greater in these communes, and the implemented projects are of a broader scope, which translates into the higher value of the obtained funding, and, in consequence, into an uneven distribution of the support for the multifunctional development of communes in rural areas.

Therefore, the purpose of this paper is to determine the directions of the spatial allocation of EU funds for the support of the multifunctional development of rural areas, taking into consideration the socio-economic development level in the studied communes. The aim of the conducted study was to verify the claim that a higher socio-economic development level of a commune is accompanied by a higher absorption of EU funds by beneficiaries investing in that commune.

MATERIAL AND METHODS

The study covered rural areas of the Małopolska Province due to their specific situation reflected in the highly fragmented structure of their agricultural holdings, agrarian overpopulation, a poor manufacturing specialization, and a poor level of commercial production and work productivity in farming. These specific problems are connected with the situation of agriculture in the region, combined with other problems, typical for rural areas throughout the country, such as the high unemployment, the development level of the technical and social infrastructure which is lower than in urban areas, and the lower quality of the human capital in rural areas, considerably hamper the development of rural areas in the province. Consequently, measures directed at the support of their multifunctional development are of a particular importance.

The study examined selected measures of the Rural Development Program for 2007––2013 (PROW 2007–2013), offering non-reimbursable financial assistance to investment projects carried out by private beneficiaries. Measures were selected which are connected with the diversification of economic activities in rural areas, implemented by the Agency for Restructuring and Modernization of Agriculture (ARMA), i.e. Measure 311 – Diversification into non-agricultural activities, Measure 312 – Establishment and development of microenterprises, and Measure 413 – Local development strategies for operations conforming with the terms of financial assistance in the scope of Measures 311 and 312. The discussed measures, in their primary aim, were devised to provide for the creation of new workplaces and income sources, alternative to agriculture, by stimulating the development of activities in the scope of manufacturing, commerce, tourism, consulting and other services.

For the purpose of this study, a definition of rural areas was adopted from the Rural Development Program for 2007–2013 [Program Rozwoju Obszarów Wiejskich na lata 2007–2013, 2014]. The spatial scope of the study covered 168 urban-rural and rural communes of the Małopolska Province, according to their status at the end of 2011. The time scope of the study covered the years 2007–2012. The source materials were the data of the Agency for Restructuring and Modernization of Agriculture and the Main Statistical Office (GUS).

The study of the directions of the spatial fund allocation considered the diversification of the communes in the aspect of the socio-economic development level, using the synthetic measure of the socio-economic development. Many methods of creating synthetic variables can be found in literature [Krakowiak-Bal 2005]. This paper doesn't contain the methodological issues, stating only that the study was based on the hierarchical typology of the spatial diversification of the rural areas' socio-economic development level, obtained with the use of Z. Hellwig's taxonomic method of development pattern [Hellwig 1968].

The study of the socio-economic development level of communes was of a static nature, and was conducted for 2011, partially supplemented with data for 2010 due to the limited availability of certain features in the commune aggregation. In the case of some variables, the metrics were computed on the basis of the average data for the years 2008––2011, in order to avoid incidental values. No single, universal set of features describing socio-economic development level exists [Heffner 2007]. Adopting the strong

content-related substantiation of variables and the availability of data on the communal level as the criterion of the variables selection, 17 variables illustrating the economic and social aspects of development were eventually adopted. The variables are presented in Table 1.

Table 1. Variables adopted for the socio-economic development level of the communes in the Małopolska Province

No	Variable
1	The registered unemployed as a percentage of the total working age population
2	Average area of an individual agricultural holding over 1 ha of arable land
3	The number of registered economic entities in the REGON system per 1,000 of working age population
4	Number of individuals conducting economic activity per 100 working age population
5	The ratio of private entities providing non-market services to public entities providing such services
6	Average commune budget's own revenue per 1 resident
7	The average value of EU funds for financing EU programs and projects per 1 resident
8	The share of capital expenses in the total budget expenditures of a commune
9	Post-working age population per 100 residents at pre-working age (demographic burden index)
10	Migration attractiveness index for internal migrations
11	Birthrate per 1,000 population
12	Percentage of commune councilors with secondary, post-secondary and university education
13	Average value of expenditures on education, culture and national heritage protection, and healthcare per 1 resident
14	Number of foundations, associations and social organizations per 10,000 residents
15	Average usable floor area of a flat in the housing stock per 1 person (m^2)
16	Average expenditures for welfare benefits and in-kind assistance, and pension contributions per 1 resident
17	Percentage of residents using sewage system

Source: Own study.

As a consequence of the employed research procedure, a synthetic metric was obtained that illustrates the socio-economic development level in the spatial approach, adopting values mainly from the interval [0, 1]; the higher value of m_i value of an object (commune), the higher socio-economic development level it represents. Within the ordered set of objects, a typological classification of similar objects was performed, establishing the following groups:

- Group I (very high development level): $m_i > \bar{m} + S(M)$;
- Group II (high development level): $\bar{m} < m_i \leq \bar{m} + S(M)$;
- Group III (moderate development level): $\bar{m} - S(M) < m_i \leq \bar{m}$;
- Group IV (low development level): $m_i \leq \bar{m} - S(M)$;

where: $\bar{m}$, $S(M)$ stand for, respectively, the arithmetic mean and the standard deviation of development measure.

In order to verify the claim that a higher socio-economic development level of a commune is accompanied by a greater absorption of EU funds by the beneficiaries investing in the commune, Spearman's rank correlation coefficient was calculated [Kukuła 2003].

Socio-economic development level in the communes of the Małopolska Province

Figure 1 presents the spatial arrangement of the communes of the Małopolska Province according the their socio-economic development level. Studies showed that amongst the 168 rural and urban-rural communes, the majority present a moderate or high socio--economic development level – 67 and 47 respectively. Less numerous are very highly developed communes (30), and the least numerous are communes with a low socio-economic development level (24).

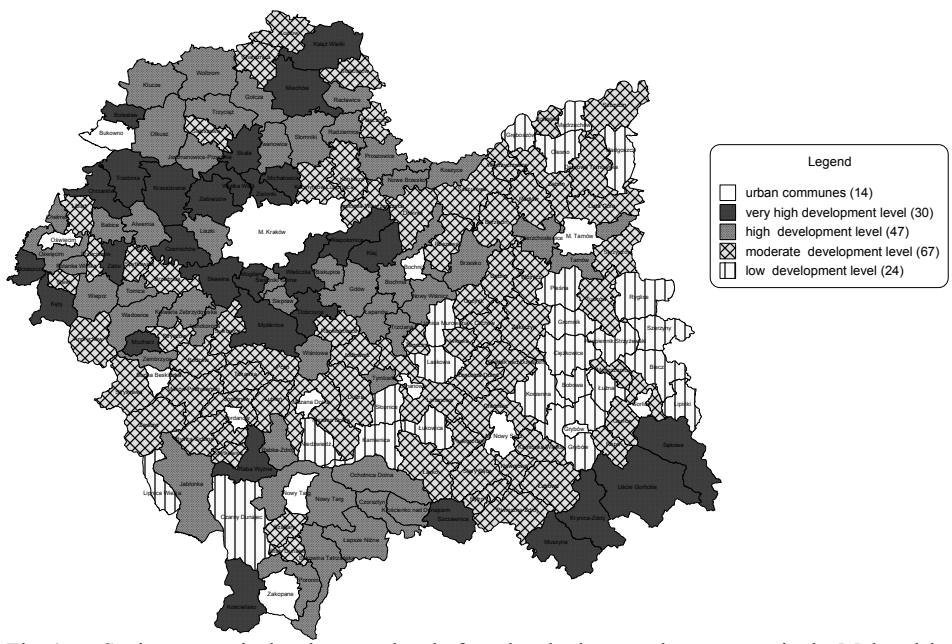

Fig. 1. Socio-economic development level of rural and urban-rural communes in the Małopolska Province

Source: Own study based on GUS data.

The communes of the highest socio-economic development level are mainly in the north-western part of the province and near its southern border. The high development level is clearly promoted by the proximity of Krakow, Upper Silesian urban area, and – to a lesser degree, Bielsko-Biała. Besides the proximity of urban centers, the touristic and spa values of communes are a factor promoting the socio-economic development, as proved by the very high development level of the communes near the southern border of the province.

The communes classified as the ones of a high development level are also mainly located in the north-western and southern part of the province. A small concentration of

such communes lies in the suburban zone of the city of Tarnów. Such communes usually neighbor very highly developed ones. The third group of communes, with a moderate socio-economic development level, is the most numerous one. Such communes are scattered throughout the Małopolska Province, and there are no specific patterns as to their location. Larger concentrations are in the Tarnów, Sucha and Brzesko Powiats. Communes with a low socio-economic development level constitute the least numerous group (24). They are mainly concentrated in the eastern part of the province, in the Tarnów, Gorlice and Dąbrowa powiats, and in the central part, in the Limanowa Powiat.

A very high or high development level is relatively more frequent amongst urban-rural than rural communes, 61% and less than 40% respectively. Urban-rural communes constitute 53.3% of all the very highly developed communes, 27.6% of the highly developed communes, 26.4% of the communes with a moderate development level and only 20% of the communes with a low development level. Therefore, status-dependent differences in the communes' development-related structure are apparent.

Private projects' funding in the scope of the studied measures across individual communes of the Małopolska Province

The analysis of the total value of subsidies granted in the framework of the studied measures allows us to conclude that, as of July 2012, the beneficiaries were allocated subsidies in a total amount of PLN 190.1 million, while the amount of PLN 97.1 million (just over 51% of all the granted subsidies) was actually paid to them. The analysis of data on the commune level revealed that the beneficiaries' actions in the scope of obtaining EU funds for investments connected with starting or developing businesses, and consequently the absorption of EU funds within the examined assistance programs' measures, is territorially diversified (Table 2). Investment projects co-financed from the PROW funds are carried out in nearly all urban-rural and rural communes, with the exception of three of them (Mucharz, Libiąż, Stryszów). The value of all subsidies granted to the communes, in which at least one project has been carried out, varies, from nearly PLN 20,000 in the Zembrzyce commune to nearly PLN 6.2 million in the Gdów commune.

Figure 2 presents the spatial distribution of the total value of the granted subsidies. In all the examined PROW measures, the smallest amount of subsidies was obtained by beneficiaries from the communes in the western, more urban part of the province (Chrzanów, Sucha and Oświęcim Powiats), while the greatest amount – by the beneficiaries from the communes in the western part of the province (Nowy Sącz and Nowy Targ Powiats) and near Krakow (Krakow Powiat). Considering the commune status, it should be noted that the share of the subsidies granted to beneficiaries in urban-rural communes was similar to their percentage in the total number of the province's communes – the beneficiaries from these communes (28.0% of all the communes) were granted 26.3% of all the funds. Nearly 3/4 of the subsidies were therefore granted to projects implemented in rural communes constituting 72% of all communes in the Małopolska Province.

In order to verify the claim that the socio-economic development level of a commune is correlated with the value of subsidies obtained by beneficiaries implementing projects in the commune, Spearman's rank correlation coefficient was calculated, which allows to examine the relationships between the position of a commune in the ranking of the

Table 2. Ranking of communes according to the value of the allocated subsidies in the framework of the studied PROW 2007–2013 measures (selected items)

Commune		The position in the ranking according to the socio--economic development level	Group of the socio-economic development level	Number of signed contracts	Value of granted subsidies (PLN)	Amount of received payments (PLN)
1	Gdów	46	2	30	6 151 172	2 684 596
2	Jabłonka	56	2	35	5 892 457	3 345 184
3	Limanowa	141	3	32	4 543 280	2 087 309
4	Chełmiec	104	3	31	4 042 945	2 339 750
5	Mszana Dolna	112	3	23	3 890 616	1 423 927
6	Łososina Dolna	123	3	33	3 293 713	2 786 048
7	Grybów	163	4	20	3 088 938	1 999 191
8	Wolbrom	47	2	22	2 847 937	1 159 228
9	Proszowice	64	2	27	2 763 832	2 091 594
10	Szczucin	142	3	26	2 675 577	1 411 693
…	…	…	…	…	…	….
159	Wierzchosławice	42	2	2	119 995	19 995
160	Zator	10	1	2	114 781	0
161	Łukowica	167	4	1	100 000	100 000
162	Brzeszcze	20	1	1	99 999	99 999
163	Chełmek	50	2	1	89 464	89 464
164	Stryszawa	120	3	2	62 017	60 671
165	Zembrzyce	71	2	1	19 981	19 981
166	Mucharz	19	1	0	0	0
167	Libiąż	107	3	0	0	0
168	Stryszów	114	3	0	0	0

Source: Own study based on ARMA data and own studies.

socio-economic development level, and the position of the commune in the ranking of the total value of the contracts signed by beneficiaries in the commune in the framework of PROW 2007–2013 measures. The results of the calculations ($r_s = 0.015$) show a lack of a statistically significant correlation between the position in the socio-economic development level ranking and the position in the ranking of the total value of contracts signed by beneficiaries in the commune in the framework of PROW 2007–2013 measures. This means that there is no correlation between the socio-economic development level of a commune and the value of subsidies obtained by beneficiaries for implementation of projects in the commune.

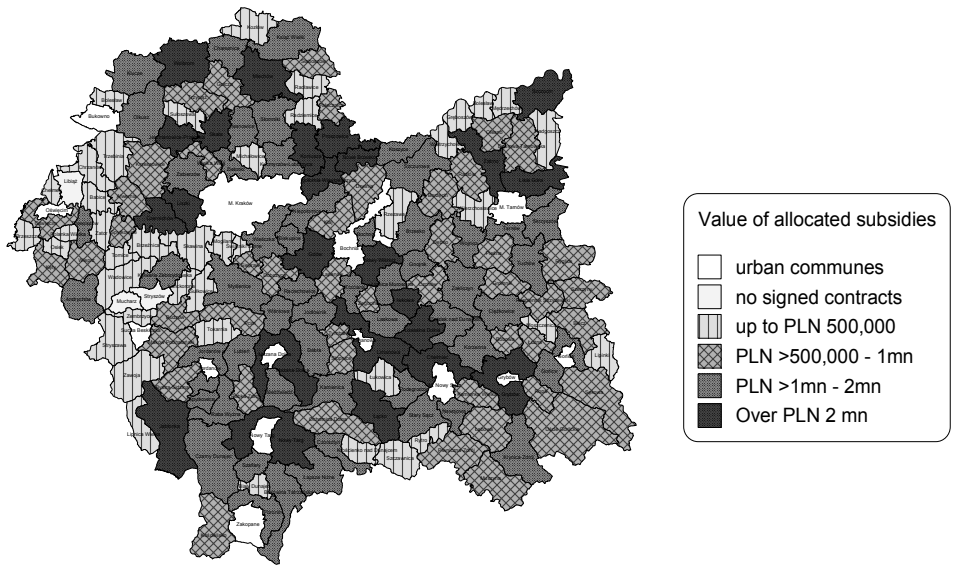

Fig. 2. Value of subsidies awarded in the framework of the examined PROW 2007–2013 measures
Source: Own study based on the data of the Agency for Restructuring and Modernization of Agriculture (ARMA).

For the sake of a more precise examination of the discussed problem, data referring to the utilization of EU funds in the framework of the examined PROW 2007–2013 measures in the four groups of communes were analyzed. The data are presented in Table 3.

The presented data show that the very high socio-economic development level is accompanied by the lowest absorption of funds per one commune and the smallest average of the number of implemented projects in a statistical commune of that type. However, the projects are of a high value of eligible costs, to which relatively high subsidies are allocated, which translates into the third highest total value of the allocated subsidies. The beneficiaries from the communes of a high development level realize relatively the greatest number of projects per commune, which translates into the highest value of the allocated subsidies per a statistical commune of this type. Moreover, the said projects receive subsidies of relatively high individual values, which, combined with a high number of such communes, places them on the second position according to the total amount of the financing obtained by the beneficiaries.

The beneficiaries from the communes of a moderate development level realize, on average, slightly less projects than in the highly developed ones, which translates into the slightly lowest value of the allocated subsidies per commune. The projects implemented by the beneficiaries from this group are allocated subsidies of rather low individual values, however, due to the large number of such communes and the large number of realized projects, the total value of subsidies obtained in such communes is the greatest. In the communes of a low development level, the beneficiaries implement, on average, less projects than in the communes of a high and moderate development level. Moreover, the projects are rather small, with lower funding values, which, combined with their

Table 3. The utilization of EU funds in the framework of the examined PROW 2007–2013 measures according to the group of communes

Group	Number of communes in the group	Number of signed contracts	Total value of awarded subsidies (PLN million)	Average number of projects in a commune	Average value of subsidies per commune (PLN million·commune^{-1})	Average value of subsidies per project (PLN thousand·project^{-1})
Communes of a very high development level	30	189	26.1	6.3	0.87	137.9
Communes of a high development level	47	470	61.7	10.0	1.3	131.3
Communes of a moderate development level	67	660	80.3	9.9	1.2	121.7
Communes of a low development level	24	175	22.0	7.3	0.92	125.8
All communes	168	1 494	190.1	8.9	1.1	127.2

Source: Own study based on ARMA data.

relatively small number and the small number of communes, translates into the lowest level of funding absorption within PROW in this group of communes. However, the recalculation of the allocated subsidies' value into a statistical commune of a given type does not prove the claim that a higher socio-economic development level of a commune is accompanied by a higher absorption of EU funds by the beneficiaries in that commune, since in a statistical commune of a low development level more funds have been obtained than in a very highly developed commune.

CONCLUSIONS

The EU assistance funds are a considerable funding source for various projects promoting the local and regional development in its broad sense. For that reason, achieving a high level of those funds' utilization became an important challenge both for the local authorities and the residents. The chance to implement development projects with the EU support, promoting the multifunctionality of rural areas, becomes particularly important in the context of solving or mitigating many problems which they are facing.

The examined communes of the Małopolska Province are highly varied in their socio-economic development level. A dual polarization exists in the territorial division of the socio-economic development levels of those communes, across the "center-peripheries" and "east-west" lines. The results of studies confirm the territorial variations in the absorption of the EU funds available in the framework of PROW 2007–2013 for projects promoting the economic diversification of rural areas. Considerable differences in that respect among the studied communes are visible. Only in three of the studied communes no

contracts for funding projects in the framework of PROW measures were signed, which is an optimistic trend. However, very high disparities in the values of allocated subsidies exist on the commune level.

On the level of individual communes, no correlation between the socio-economic development level of a commune and the total value of subsidies obtained by the beneficiaries in the commune in the framework of PROW was revealed. This is also proved by the analysis performed on the level of the four groups of communes. Therefore, we can assume that the decision about applying for EU funds and allocating them is, to a large extend, dependent on the conditions which are not directly related to the socio-economic development level of a commune. However, the high disparities in the amounts of the allocated subsidies in the studied measures among individual communes will mean that the results of the projects implemented with their support will not be evenly promoting positive transformations in all the communes in the rural areas of the Małopolska Province. The low absorption level of the funds in a particular commune should prompt their local authorities to perform a more detailed analysis of its reasons and to take actions directed at the support of the commune residents' active involvement in the scope of applying for EU funds.

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ALOKACJA ŚRODKÓW UNII EUROPEJSKIEJ A POZIOM ROZWOJU GMIN NA OBSZARACH WIEJSKICH WOJEWÓDZTWA MAŁOPOLSKIEGO

Streszczenie. Specyficzne problemy obszarów wiejskich województwa małopolskiego sprawiają, że szczególnego znaczenia nabierają działania ukierunkowane na wsparcie ich wielofunkcyjnego rozwoju, co jest jednym z zasadniczych celów polityki rozwoju obszarów wiejskich. W artykule podjęto próbę określenia kierunków przestrzennej alokacji dotacji przyznanych w ramach wybranych działań Programu Rozwoju Obszarów Wiejskich na lata 2007–2013, przeznaczonych na wspieranie wielofunkcyjnego rozwoju obszarów wiejskich, uwzględniając poziom rozwoju społeczno-gospodarczego gmin zlokalizowanych na obszarach wiejskich województwa małopolskiego. Wyniki badań wskazują na terytorialne zróżnicowanie absorpcji środków oraz występowanie znacznych różnic w tym względzie między badanymi gminami. Na poziomie poszczególnych gmin nie stwierdzono natomiast zależności między poziomem rozwoju społeczno-gospodarczego gminy a łączną wartością dotacji pozyskanych przez beneficjentów w tej gminie.

Słowa kluczowe: poziom rozwoju społeczno-gospodarczego, obszary wiejskie, absorpcja środków UE, województwo małopolskie

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Pisulewski, P., Strzetelski, J., Antoniewicz, A. (2009). Podstawowe założenia IZ PIB-INRA norm żywienia przeżuwaczy (Basic objectives of nutritional standards for ruminants of the IZ PIB-INRA). [In:] J. Strzetelski (Ed.), IZ PIB-INRA. Normy żywienia przeżuwaczy. Wartość pokarmowa francuskich i krajowych pasz dla przeżuwaczy. Wyd. IZ PIB, Kraków, 11–20.

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Turski, W. (1972). Projektowanie oprogramowania systemów liczących. (Software design of computing systems). Mat. konf. Projektowanie maszyn i systemów cyfrowych. Warszawa 2–5 czerwca 1971. PWN, Warszawa, 132–139.

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