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Wojciech Lis



Anna Barczyk¹

THE IMPLEMENTATION OF ENVIRONMENTAL ASPECTS OF THE SUSTAINABLE DEVELOPMENT IN POLAND AND IN THE EUROPEAN UNION

Abstract: The aim of the study is to present selected methods and results of implementation of environmental assumptions of sustainable development concept in European Union countries and especially in Poland after 2004 based on the statistical data from Eurostat. The measures of implementation of environmental goals are: share of permanent meadows and pastures area, area of forests and trends in afforestation process, number and area of organic farms and area of Natura 2000 protection. The main method used in this article is vertical and horizontal statistical analysis of gathered data and its synthetic presentation in graphs and tables.

Keywords: forests, grassland, meadows, Natura 2000, organic farms, pastures, , sustainable development

INTRODUCTION

The scientific description and popularization of the concept of sustainable development have origins in the 70s of the XX century. It was created as an answer for intensive economic development observed in the other half of the XX century. Negative effects of the economic development are over-exploitation of natural resources, dynamic growth of the population and deterioration of the natural environment [Żmija 2014]. The main ecological issues referred to water, air and soil pollution. One of the most important causes of this degradation is contemporary model of agriculture, that assumes specialization and intensification of agricultural production to maximize profits of the agricultural activities [Kutkowska, Kotecki 2012].

According to the report of WCED the sustainable development is meeting the needs of people and taking into account needs of future generations [Our Common Future 1987]. The basis of sustainable development is reasonable manage of natural resources which exclude prodigality. The process of implementation of the concept should be accomplished in three dimensions: social, economic and environmental. Sustainable development should play particular role in agriculture which bases on accessibility and quality of resources especially the land. Care of the agricultural land should result of its peculiar features which is: non-translocation, non-multiplication, indestructibility, spatiality and limitation of area [Kapusta 2012]. At the same time intensive agrotechnical treatments which are applied in farms causes negative influence on state of the natural environment especially on the degradation of agricultural soil and the condition and quality of water. Such actions are in conflict with environmental purposes of the sustainable development.

After 2004 phenomenon of growing importance of concept of the sustainable development in Poland is observed. Role and methods of its implementation defines, among others, Strategy of Sustainable Development of Rural Areas, Agriculture and Fishing in years 2012-2020 (Ministry of Agriculture and Rural Development) and Long-term Strategy of Country Development Poland 2030 (Ministry of Administration and Digital Affairs).

The aim of the study is to present methods and results of implementation of sustainable development in agriculture in specified groups of European Union countries basing on the statistical data from Eurostat. The measures of implementation of environmental goals are: area of permanent meadows and pastures, area of forests, number and area of organic farms and area of Natura 2000 protection.

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The article presents only selected indicators of sustainable development in agriculture because of the volume restrictions of the article.

METHODOLOGY

The study addresses issues related to implementation of the sustainable development concept in agriculture in European Union after 2004. Selected indicators of sustainable development in this paper are:

- area of permanent meadows and pastures,
- area of forests,
- area and number of organic farms,
- area of Natura 2000 protection.

Considerations were made on the basis of EUROSTAT statistical data resource and related to three periods: 2005, 2010, 2015. In this study statistical methods, which include the rate of dynamic changes, the trend and determination of the average values of the studied phenomena were employed. Considerations were based on the vertical analysis (compilation of statistical data in years 2005, 2010, 2015) and horizontal one, comparing the data in a spatial system.

In the analysis three groups of countries were featured:

1. Values for all the members of the EU
2. Values for the old members (participants before 2004: Austria, Belgium, Netherlands, Luxembourg, Spain, Portugal, Italy, Greece, Germany, United Kingdom, France, Sweden, Finland, Denmark, Ireland)
3. Values for the new members (participants after 2004: Czech Republic, Poland, Lithuania, Latvia, Estonia, Malta, Cyprus, Slovakia, Slovenia, Croatia, Bulgaria, Romania, Hungary).

Data for Poland were presented independently of mentioned groups to present trends for the country and to compare it to data for these groups of countries.

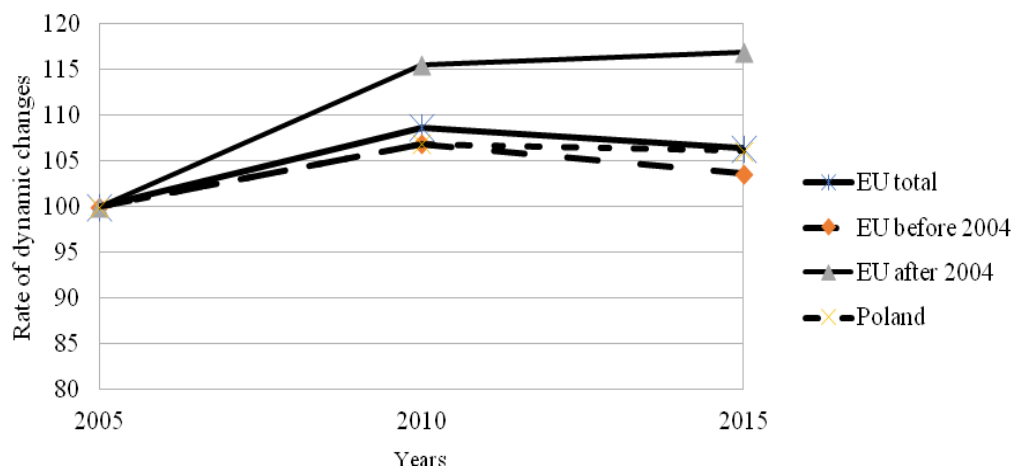
RESEARCH OUTCOMES

1. Permanent meadows and pastures

Permanent meadows and pastures are the land under grass and other green crops are important both for agriculture as for the environment. The main agricultural function is animal feeding. Also, there are many environmental functions of permanent meadows and pastures, for example soil protection against water and wind erosion, water retention, peat soil mineralization and habitat for rare animal and plant species [Kucharski 2010]. Meaning of permanent meadows and pastures is underlined in Common Agricultural Policy and the program of greening is the method that aims to protect area of grassland [Zazielenienie... 2014].

Chart 1. presents dynamic of changes of area of permanent meadows and pastures. In all analyzed groups increase of area of permanent meadows and pastures comparing to 2005 was observed. In the European Union countries jointly, in members before 2004 and in Poland the dynamic curve is similar – growth of permanent meadows and pastures area by about 7% in period from 2005 to 2010 and than slight decrease after 2010 were observed. In group of members of the EU after 2004 the curve of the dynamic of changes of grassland area was opposite. In that group constant growth of grassland area was observed. It is result of implementation of environmental payments from the EU budget for the new member states [Jankowska-Huflejt, Domański 2008].

Chart 1. The dynamic of changes of area of permanent meadows and pastures in European Union after 2004 (%)



Source: own study based on EUROSTAT

Analyzing permanent meadows and pastures, the share of each group in total area of grassland in the EU was studied (table 1). More than 3/4 of permanent meadows and pastures is located in countries of the old EU-15. Its share in studied period was shrinking in the old EU-15 for the benefit of new members where, according to the chart 1., was observed trend of growing area of permanent meadows and pastures. It is also effect of accession of new members in 2007 and 2013. In 2005 the share of permanent meadows and pastures area in group of new members was 20,61% of total area of grassland in the EU and until 2015 it increased by 2%. Poland is country with substantial areas of grassland. It is over 5% of total area of grassland of the EU in whole period.

Table 1. The participation of area of permanent meadows and pastures in specific groups in comparison to total area of permanent meadows and pastures of EU countries after 2004 (%)

Specification/Year	2005	2010	2015
EU total	100	100	100
EU before 2004	79,39	78,08	77,33
EU after 2004	20,61	21,92	22,67
Poland (in copmarison to total EU)	5,39	5,31	5,38
Poland (in comparison to EU after 2004)	26,17	24,21	23,75

Source: own study based on EUROSTAT

2. Organic farming

Another analyzed factor presenting implementation of environmental goals of the sustainable development in agriculture are number and area of organic farms. The organic farming is agricultural system based on sustainable plant and animal production. Organic production should be

supported by pro-ecological methods of farming, should support biodiversity, use natural processes and ensure animal welfare. There are many fields in CAP that support development of organic farms [Plan... 2011].

As we can see in table 2. majority of organic farms is located in the EU-15, but in researched period the share was shrinking (from 90,97% in 2005 to 77,24% in 2015). The reason of that occurrence is starting up the process of financing of the organic farming among new members and, as a result, growing number of organic farms. Poland is important producer of organic food in EU. In 2015 more than 8% of all organic farms in EU were located in Poland. However, number of organic farms in Poland is decreasing after 2010. Poland is also the most important producer of organic food in group of the new members (over 36% of total number of organic farms in 2015).

Table 2. The participation of number of organic farms in specific groups in comparison to total number in EU countries after 2004 (%)

Specification/Years	2005	2010	2015
EU	100	100	100
EU before 2004	90,97	81,61	77,24
EU after 2004	9,03	18,39	22,76
Poland (in comparison to total EU)	4,53	9,35	8,22
Poland (in comparison to EU after 2004)	50,18	50,84	36,10

Source: own study based on EUROSTAT

Table 3. presents participation of area of organic farms in specific groups in comparison to total number of European Union countries. Trend in area of organic farms in researched period is similar to trend in number of organic farms. Over 75% of area of organic farms is located in the „old EU” but this share is about 10% smaller than in the beginning of researched period. The opposite trend present countries of the new EU where area of organic farms is growing (over 23% in 2015). Poland contains 6,39% of total area of organic farms in EU and over 27% in group of the new members.

Table 3. The participation of area of organic farms in specific groups in its total area in EU countries after 2004 (%)

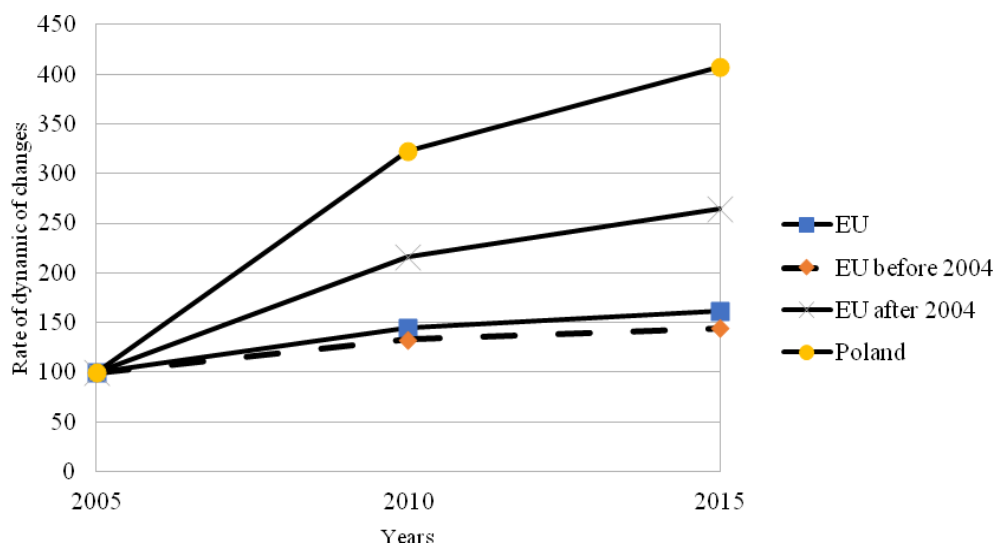
Specification/Years	2005	2010	2015
EU	100	100	100
EU before 2004	85,80	78,79	76,76
EU after 2004	14,20	21,21	23,24
Poland (in comparison to EU)	2,54	5,68	6,39
Poland (in comparison to EU after 2004)	17,88	26,78	27,51

Source: own study based on EUROSTAT

On the chart 2 dynamic of changes of area of organic farms was presented. In each researched group growing area of organic farms is observed. The intensity of growth of area of organic farms is differential in each group. The most intensive growth of area is observed in Poland (over 400% in 2015 in comparison to 2005). Slighter dynamic of growth is observed in group of members after

2004. Area of organic farms in this group grew by 265%. The smallest increase of area of organic farms is observed was recorded in group of old members of EU and in EU as a whole (about 150%).

Chart 2. The dynamic of changes of area of organic farms in specific groups in comparison to total area of EU (%)



Source: own study based on EUROSTAT

3. The forests

Forests similarly to the permanent pastures and meadows, are fulfilling many environmental functions. The process of afforestation is introducing new forests on agricultural land. Table 4. presents participation of area of forests in specified groups in comparison to total area of countries. In 2015 almost 36% of total area of the EU countries is covered by forests and the number was growing comparing to 2005 (almost 1% growth). Countries that joined the EU before 2004 are more forested than countries of the new EU (about 3% more in each analyzed year). Both in group of old members as in new members the trend of growing of forested area is observed. This trend is also observed in Poland but the share of area covered by forest is smaller than in EU generally (29,42% in 2005, 29,83% in 2010 and 30,17% in 2015).

Table 4. The participation of area of forests in specific groups in total area of each group of countries after 2004 (%)

Specification/Years	2005	2010	2015
EU	34,98	35,54	35,92
EU before 2004	35,96	36,54	36,88
EU after 2004	32,15	32,61	33,12
Poland	29,42	29,83	30,17

Source: own study based on EUROSTAT

Table 5. The participation of area of forests in specific groups in total forested area of EU countries after 2004 (%)

Specification/Years	2005	2010	2015
European Union	100,00	100,00	100,00
EU before 2004	76,53	76,56	76,45
EU after 2004	23,47	23,44	23,55
Poland (in comparison to the EU)	5,87	5,86	5,86
Poland (in comparison to EU after 2004)	25,00	25,00	24,89

Source: own study based on EUROSTAT

Table 5. contains data about participation of area of forests in specified groups in comparison to total forested area of EU countries. Majority of forested land is located in countries of EU-15 – over 76%. The rest of the forests is located in the new countries (about 24%). Area of Polish forests is about 6% of whole EU forested land and about 25% of forested land of the new members group.

The dynamic of changes of forested area was presented in table 6. In each researched group similar additive dynamic was observed. However, this growth is slight – about 3% in each analyzed group in whole studied period.

Table 6. The dynamic of changes of forested area in specific groups after 2004 (%)

Specification/Years	2005	2010	2015
European Union	100	101,58	102,66
EU before 2004	100	101,63	102,55
EU after 2004	100	101,44	103,02
Poland	100	101,40	102,55

Source: own study based on EUROSTAT

4. Natura 2000

According to the European Commission definition „Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. It stretches across all 28 EU countries, both on land and at sea. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive” [Natura 2000 viewer].

In table 7. the share of area of Natura 2000 in total area of specific groups of countries in 2015 was presented. Data about area of special protection of birds and habitats were distinguished. Total area of Natura 2000 presented in column 4 is not sum of areas of birds and habitats protection because of overlapping of part of these protected areas. In countries of the EU over 18% of area is covered by Natura 2000 (including 12,84% of birds protection and 12,38% of habitats protection). Smaller share is observed between the old members of the EU (jointly 16,54%) and bigger – between new members (23,05%). In Poland there is 19,56% area of the state covered by Natura 2000 (including 10,93% area of birds protection and 15,84% area of habitat protection).

Table 7. The share of area of the Natura 2000 in total area of countries in 2015 (%)

Specification	Area of special protection of birds	Area of special protection of habitats	Natura 2000 total area
EU	13,84	12,38	18,12
EU before 2004	12,30	11,05	16,54
EU after 2004	16,95	17,07	23,05
Poland	10,93	15,48	19,56

Source: own study based on EUROSTAT

CONCLUSIONS

The analysis comes down to the following observations:

1. Area of permanent meadows and pastures in the European Union in researched period increased slightly. The most intensive dynamics was observed in group of the new EU members (after 2004).

2. Poland reflects general EU trend in area of permanent grassland and meadows – growth from 2005 to 2010 and slight decrease from 2010 to 2015.

3. Majority of permanent meadows and pastures is located in the old members state (over 75%). Less than a quarter of it is located on area of the new member states. Share of Polish grassland in its total area in EU is about 5,5% in whole period.

4. Poland is important producer of organic food in the EU. Number and area of organic farms in Poland is significant comparing to the EU. In 2015 more than 8% of farms were located in Poland and almost 6,5% of EU organic farming area is located in Poland.

5. Poland has also the greatest areas of organic farming among new EU members.

6. Area of organic farms in Poland in period from 2005 to 2015 increased fourfold.

7. Area of forests in countries of the EU is growing slowly. In 2015 the share in total area of the EU it was about 35%. In Poland area of forests also grows but is still smaller than average in the EU (which is about 30%).

8. The Natura 2000 is important method of environment protection. 18,12% of the EU is covered by the network. In the new EU it is more than 23% of area of the countries.

Observations pointed above lead to the conclusion that the environmental goals of sustainable development are implemented in field of agriculture. The EU and the state institutions by using economic, administrative and legal instruments make possible realization of this concept and its results are visible in all EU countries.

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Hanna Doroz-Tomasik²

THE WESTERN PART OF THE TRANSBESKIDIAN HORSE TRAIL (TRANSBESKIDZKI SZLAK KONNY): A VALUE OR A TRAP?

Abstract: horse-riding tourism has been attracting more and more interest among tourists. There have been numerous horseback riding centres established and horse trails marked out within the areas attractive for their natural qualities. One of such trail is the Transbeskidian Horse Trail which has been waymarked through the particular mountain ranges, starting from Brenna and ending up as far as Wołosate.

The article aims at analysing attractiveness, accessibility and tourist facility development of the western part of the Transbeskidian Horse Trail as a tourist attraction significant from the perspective of horse-riding tourism in the regions of Silesian Beskids and Żywiec Bieskids.

The research material was collected during a field study carried out on the Transbeskidian Horse Trail (Zawoja-Brenna sector). The main research method was a participant observation.

The research showed numerous irregularities on the trail. First of all, its designing stage has included neither camping and grazing areas and facilities, nor routes as an alternative to the trail marked out through exposed top parts of the upland, which would significantly improve safety and comfort of tourists and horses. Due to the improper trail development, horseback riding on the Transbeskidian Horse Trail within Zawoja-Brenna sector is now a dangerous trap.

Key words: horse-riding tourism, Beskids, tourist attractions, Transbeskidian Horse Trail

INTRODUCTION

Horse-riding as a form of outdoor physical activity enjoys increasing popularity. This results from a kind of trend towards engaging in exclusive sports and a need of close relations with animals in the great outdoors; and this especially concerns big city dwellers. Both wants can be satisfied by using the offer of horse-riding tourism.

It is said that the horse-riding trip to Hoverla in 1873 gave rise to the modern horse-riding tourism in Poland. However, this form of qualified tourism was first formalized only in 1990. The Horse-riding Tourism Committee [*Komisja Turystyki Konnej* (currently: *Jeździeckiej*)] of the Polish Tourist and Sightseeing Society [*Polskie Towarzystwo Turystyczno-Krajoznawcze* (PTTK)] was established in 1996 [Krzemień 2002]. PTTK has been trying to promote horse-riding tourism for years. There have been staff education regulations (for leaders of horse-riding tourism) as well as ranked horse-riding tourism badges created; the status and database of horse-riding centres affiliated by PTTK (specializing in organisation of horse-riding tourism and; especially, horseback tours) have been established as well as horse trails have been designed and marked out.

One of the main PTTK horse trails is the Transbeskidian Horse Trail [Józefczyk 2010]. It is the longest trail of the Mountain Horse-riding Tourism in Poland with over 400 km to cover. According to the initial assumption, its route was to refer to the PTTK Main Beskidian Hiking Trail (red one). The Transbeskidian Horse Trail leads from Brenna (Silesian Voivodeship, Cieszyn District, Silesian Beskids) to Wołosate (Podkarpackie Voivodeship, Sanok District, Bieszczady Mountains). It is assumed that it takes 14 days to ride the entire trail [www.gtj.pttk.pl].

This article focuses on the western part of the Transbeskidian Horse Trail. Three one-day sectors were selected: Zawoja – Korbiewów, Korbiewów – Żabnica (Cisiec) and Żabnica – Brenna. During the field research, its route and accessibility for horse-riding tourists were verified. What is

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more, the question whether the trail in its current form constitutes a tourist value or a kind of trap to horse-riding tourists was discussed.

The literature on the subject of tourist attractiveness offers the notion of a "tourist trap" understood as a facility established near a tourist attraction, which only purpose is a commercial gain [Kruczek 2009]. Another type of tourist traps are facilities which are to be an attraction "in itself", usually offering only "idle entertainment" [Doroz-Tomasik 2015]. This article however describes the notion of a trap in its literal sense - as an unexpected threat in potentially dangerous spots.

RESEARCH METHOD AND OBJECTIVE

The field research was conducted in August 2016. The participant observation method was used. This enabled one to verify accessibility and attractiveness of the particular sectors of the western part of the Transbeskidian Horse Trail. With regard to the fact that the trail is designed for horse-riding, the research involved horse-riding on this very trail.

The objective of this article was to analyse attractiveness, accessibility and tourist facility development of the western part of the Transbeskidian Horse Trail as a tourist attraction significant from the perspective of horse-riding tourism in the regions of Silesian Beskids and Żywiec Beskids.

RESULTS

The field research was composed of three stages. Each stage was a one-day sector of the Transbeskidian Horse Trail. Stage I started in Zawoja and ended in Kobielów; stage II started in Kobielów and ended in Cięcina; stage III started in Cięcina and ended in Szczyrk (despite the planned ending in Brenna).

Stage I: the journey started in GTJ PTTK "Dyzma" centre located on the Transbeskidian Horse Trail. The first sector in the westerly direction was difficult and required a good condition from a horse. On the way to Hala Barankowa, there was a necessity to modify the route due to the presence of an unwatched cow herd grazed on the horse trail. From Hala Barankowa the trail leads through a picturesque forest path and mountain streams. At the crosspaths, the waymarking was insufficient and required great sense of direction and map reading skills. After reaching the main path leading to Przełęcz Klekociny, the waymarking disappeared and appeared again in the pass itself. Near Zyguntówka shelter in Przełęcz Klekociny, there is a possibility of having a short break and grazing break. However, there was no safe hitching post - in order to hitch up the horse one should use the existing infrastructure (e.g. fencing).

Past Przełęcz Klekociny, there was another very difficult sector requiring a good horse condition. One had to use a narrow, stony and steep path to get to Hala Kamińskiego. This was a demanding path for the horse, but simultaneously very attractive with regard to its landscape qualities. In Hala Kamińskiego, there was a short sector where the horse could have a break and tourist could admire the panorama of Beskids Mountains. Past Hala Kamińskiego, the horse trail led through the forest. Initially, it traversed the hill; however, the very climb to Mędralowa (Wielki Jałowiec) was short but extremely steep. Down the descent to Przełęcz Głuchaczki, the trail led through top parts of the upland which is simultaneously Polish-Slovakian border. Going down to Przełęcz Głuchaczki was stony, steep and difficult – it required a great focus both from the horse rider and horse as well as skills and experience in mountain horse-riding. There is a camping site functioning in Przełęcz Głuchaczki in the summer season. Despite a lack of professional facilities, there is a possibility of organising a grazing break for horses (Photo 1a and 1b), as well as preparing a meal for horse riders.



a.



b.

Photo 1. The horse during a grazing break in "Głuchaczki" camping site (a) and its provisional hitching (b) (Photo: H. Doroz-Tomasik)

From Przełęcz Głuchaczki through Jaworzyna, the trail leads to Korbielów. Initially, one must climb to three mountain peaks (the third one is Jaworzyna). The climbs were steep, the bed was not stony and the descent from Jaworzyna was moderate. However, there were problems with the waymarking of the trail. The waymarks appeared less often than before which caused a feeling of anxiety. What is more, past Jaworzyna, the Transbeskidian Horse Trail separated from the red hiking trail and started to line up with the yellow hiking trail (according to the original version of the trail, the Transbeskidian Horse Trail lined up with the red trail as far as to Przełęcz Glinne).

Going down the horse trail lining up with the yellow hiking trail is a relatively long and difficult sector, requiring great watchfulness and experience from the horse rider and horse. On the trail and in its immediate surroundings there were numerous fens; the path was narrow (and sometimes even disappearing in forest glades), and some parts were maladjusted to horse-riding (too narrow paths in a young stand, tree branches cut off too low). After leaving the forest, the horse trail links with the bike paths. Routes were wider and covered with breakstone. In Korbielów itself, the waymarking became troublesome. One should go to the main road offering next marking enabling one to arrive at GTJ PTTK "Połonina" centre in Korbielów.

Stage II: The Transbeskidian Horse Trail goes through the area of "Połonina" centre and leads farther to a steep and long (over an hour) climb over the ski slope to Hala Miziowa. Due to the eroded surface of the ski slope, the bed is stony with sporadic rocky outcrops and tree roots. The trail waymarking is scarce but the ski slope makes it easier to get a sense of direction. The ski infrastructure degrades the natural landscape during the climb to Hala Miziowa; however, there is a fascinating view to Beskids behind one's back (or during going down Hala Miziowa). The bed gets much better after entering the forest; however, the trail becomes more difficult in a technical sense – the path is cut through by numerous tree roots, sometimes it gets narrow, and in the higher parts, over streams and fens, there are small bridges for hikers to pass through safely. Despite the fact that the route of the trail is quite evident in the forest (main path), there are numerous waymarks.

There is a necessity to organise a break in Hala Miziowa. There is no professional infrastructure which hinders safe hitching up for a grazing break (photo 2).



a.



b.

Photo 2. Grazing break in Hala Miziowa (a) and Hala Lipowska (b) with the use of the existing infrastructure (photo: H. Doroz-Tomasik)

The next part of the trail, past Hala Miziowa, is relatively easy and enables horse riders and horses to rest. There are picturesque views to be admired; the path is stony with small water seepages which can be passed by easily using the well-trodden path. After passing the peak of Trzy Kopce and continuing to Hala Rysianka, the area of fens is vast. There is no possibility of passing them with no risk and the only way to go are footbridges on the surface of the waterlogged area. These footbridges are designed for hiking - horse riding is very risky there (photo 3).



Photo. 3. Footbridge over the wetland on the trail (photo: H. Doroz-Tomasik)

In Hala Rysianka, the Transbeskidian Horse Trail separates from the red hiking trail and is marked out together with the yellow and green trails, and, before Hala Boracza, together with the black one. Up to Hala Lipowska, the trail is well-marked, but right past it there are some doubts concerning its routing so that good knowledge of land topography and map reading skills are

necessary. In Hala Redykalna, the view opens onto the mountains and the whole sector reaching as far as to Hala Boracza is very attractive with regard to the landscape. The trail's bed is quite stony but there are some flat areas enabling one to rest for a while. Past Hala Boracza, the horse trail separates from the black hiking trail and leads one with a soft, grass-covered path. Again, the trail's waymarking is unclear. Descending to Żabnica, during the research, was only possible thanks to the knowledge of land topography. In Żabnica, the horse trail can be found near GTJ "Piekielko" centre. The next part offers great views as it leads through Abrahamów mountain ridge (together with the red hiking trail). The bed is stony and the sector from Żabnica to Cięcina should be planned as a separate day of horse trekking. As the result, stage II took approximately 12 hours.

Stage III: This sector should lead from Żabnica to Brenna. Since the distance from Żabnica to Cięcina was covered in stage II, one left Cięcina and GTJ PTTK "Nad Potokiem" centre towards Węgierska Górka to reach the Transbeskidian Horse Trail in its centre. At the border of Węgierska Górka and Cisiec, the trail turns right from the main road. The road is still asphalt and located near the Soła River leading to the forest. The path gets more steep in the forest. Riding further in the woods can be hindered there with regard to the presence of a barrier of the Polish State Forest administration. During the research, the barrier was closed and that made it difficult to cover this distance of one of the main horse trails in Poland... Past the barrier, there is still an asphalt road and it turns into a concrete-stony path higher up the mountain (photo: 4a). Only the final climb to Magurka Radziechowska offers a stony bed typical of this part of the Beskids. One of the most dangerous elements of this part of the trail is a deep and seep hollow (in a form of a widening gutter) where a horse might get stuck (photo 4b), or where it might fall trying to omit the hollow. Another hazard is a several dozen centimetre wide path with a layer of loose, quite big stones of volume of several dozen centimetres lying there (unstable, loose bed).



a.



b.

Photo 4. Unpleasant surprises on the trail: concrete and stony path (a) and a deep gap in the path (b) (photo: H. Doroz-Tomasik)

The trail from Magurka Radziechowska leads one through top parts of the upland towards Malinowa Skała. There is no tourist infrastructure within this sector apart from the waymarks. The ridges of this part of the Beskids are exposed and only covered with short bushes and young trees. There are numerous sandstone bed outcrops and much sandstone mantle. Sandstones are coarse-grained; the grains are between sand and gravel fractions.

The research concerning the trail to Malinowa Skała was discontinued due to deteriorating weather conditions. The storm was approaching from the west. No shelter on the several-hour sector of the horse trail and no path as an alternative to the one running on the top parts of the upland forced one to retreat easterly and go down using the hiking trail to Kotlina Żywiecka.

ANALYSIS OF THE RESULTS

Each stage of the research involved unexpected inconveniences related to using a horse as a means of transport on the... horse trail. The field study verified information included on the official website of the Transbeskidian Horse Trail administrator, that is GTJ PTTK Committee. Irregularities concerned trek times (each time, it took several hours longer compared to original assumptions) and the route (no updates despite existing modifications in the field). The waymarking was questionable both with regard to the frequency of waymarks and their incompleteness (e.g. a white square alone or an orange point only instead of a complete mark – a white square with an orange point in its centre). What is more, information concerning the duties of centres affiliated by PTTK is misleading. The centres in Żabnica and Brenna refused to take one horse in for a night despite letting them know beforehand and despite the fact that the affiliated centres declare the possibility of taking up to three horses in (together with riders) for a night with no beforehand information necessary (in the case of the centre in Brenna, its affiliation status was unclear when the research was being carried out). Other inconveniences and dangers on the trail can be listed and divided into the specific research stages. (Table 1).

Table 1. Inconveniences and dangers in the west part of the Transbeskidian Horse Trail

Stage I	Stage II	Stage III
<ul style="list-style-type: none"> - 2 sectors requiring the above average condition from a horse - necessity of modifying the route - 3 sectors with improper waymarking - 2 sectors requiring above average technical skills from riders and horses - fens - paths in a lifeless young stand unadjusted to a size of a horse 	<ul style="list-style-type: none"> - sector requiring the above average condition from a horse - degradation of landscape by introducing ski infrastructure - loose stones and bed rocky outcrops - at least three insufficiently waymarked sectors - numerous and vast fens - infrastructure facilitating hiking is maladjusted to horse riding (footbridges) 	<ul style="list-style-type: none"> - improper bed (asphalt, thick layer of loose stones, deep gap in a path) - marking out the trail through the centre of Węgierska Górka - Polish State Forest Administration infrastructure making impossible to ride a horse on the horse trail - no tourist infrastructure (also designed for hiking) - no path alternative to the one running through the top parts of the upland

Source: own work

All the stages were lacking specialist facilities considering the specific character of horse-riding tourism. The most bothersome was a lack of horse pens or at least hitching posts. What is more, there was no shelter for riders which they can use to hide with the horse-riding equipment during a sudden weather change.

CONCLUSIONS

The presence of the Transbeskidian Horse Trail is a great advantage for the area of Silesian Beskids and Żywiec Bieskids. Horse-riding tourism enjoys a growing popularity, and a waymarked and well-maintained horse trail is of great value for tourists looking for a professional horse-riding tourism offer. One may use the trail's existence to promote a region and particular facilities (horse-riding centres).

Unfortunately, the research study showed numerous deficiencies concerning the design, implementation and maintenance of the Transbeskidian Horse Trail within the sector of Zawoja – Brenna. This trail is insufficiently waymarked in many spots. Additionally, the offered infrastructure is designed for hiking and this results in an increased risk of injury. Some sectors of the trail have been established with their use by local GTJ leaders and horses in mind (e.g. ponies from "Połonina" centre) which hinders (and in some extreme cases even makes it impossible) using the trail by big breed horses. Information concerning the trail included in public information sources has not been updated for a while. Furthermore, the horse-riding centres' managers are sometimes ill-informed and give misleading information, and this results from a lack of sufficient cooperation between the tourism branch entities in the region.

On the basis of the collected research results one may state that the west part of the Transbeskidian Horse Trail constitutes a trap for tourists who would like to cover this distance on their own horse and do not have great knowledge of and experience in navigation with the use of a map and land topography. This makes one think that the trail has been established only for local riding centres. Therefore, it should not be accessible for every horse-riding tourist.

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ASYMMETRY AND ALLOCATION OF DISPOSABLE INCOME OF RURAL AND URBAN HOUSEHOLDS IN POLAND IN 2006-2015

Abstract: Diverse living conditions of people in rural and urban areas may result from differences in the level of their income and consumption of goods and services. Monitoring of living conditions in households is aimed at planning actions for decreasing the gap between rural and urban households. The aim of this paper is the analysis of asymmetry and allocation of disposable income in rural and urban household in Poland in 2006-2015. Within the area of interest, assessment of changes in structure of consumption is also included. The subject of research were income and expenditure of selected categories of households. The time frame for research is the period between 2006 and 2015. Analyzed issues were discerned using secondary empirical data.

In years 2006-2015 disproportions of income and structure of consumption between analyzed households decreased. Dynamics of increase of income in rural households was relatively higher in comparison to urban households. Relatively high increase in share of non-agricultural sources of income (particularly contract work) of rural households was accompanied by decrease of share of income from their main source of subsistence. Despite being similar in nature, observed changes in structure of consumption of rural and urban households differed in scale and pace of occurrence.

Keywords: household, rural household, household income, consumption expenditure, basic expenditure, free choice expenditure.

INTRODUCTION

Obtaining consumption funds¹ and their allocation for purchasing goods and services by households is treated as means and stage of ultimate objective, which is highest possible level of satisfaction, i.e. living standard of each member of this smallest, but most numerable group of economic operators. In member countries of the European Union, the Common Agricultural Policy is being implemented as well as cohesion policy in order to improve living conditions of households, particularly those in rural areas. Differentiation of income level conditioned by, among others, reform of agricultural policy and changes to the system of financial support have been subjected to in-depth analysis [i.a. Grzelak 2016; Kozłowska-Burdziak 2015; Pawłowska-Tyszko 2014; Severini i Tantari 2013; Majewski i Wąs 2013; Grzelak 2013; Sahrbacher 2012; Józwiak 2012; Kaditi Nitsi 2011]. Constant monitoring of changes in income and expenditures of both urban and rural population allows for determination of how the process of decreasing distance between urban and rural households progresses.

Considering the significance of this research, the assumed main objective is analysis of asymmetry and allocation of disposable income by households in rural and urban areas in Poland between years 2006-2015. The subject of the research is income and expenditures of these households. The area of interest contains not only assessment of changes of those factors but also structure of consumption. Considerations pertain years 2006-2015. Assumed period is significant due to implementation of European model of social economy of 21st century, which is to be based

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¹ Consumption funds consist of monetary funds obtained from internal sources (income and savings) as well as external sources (any debt obligations, i.e. credits, loans)

on development that is intelligent, sustainable and (perhaps most of all) promoting social inclusion [Europe 2020... 2010, p. 8].

Within these considerations, the income asymmetry is differentiation in size and sources of that income. The term income allocation covers directing funds towards purchasing of goods and services. The level and structure of consumption expenditures is recognized as measure of efficiency of household operations and population living standard.

In these considerations, the division of household consumption expenditures is assumed onto basic expenditures⁵ and free choice expenditures⁶ [Kieźel 2004; Gardocka-Jałowiec 2015]. The percentage of basic and free choice expenditures indicates the level of wealth of household and structure of satisfaction of consumption needs. The higher the share of free choice expenditure, the higher are the following: (1) level of wealth of the society and vice versa [Kieźel 2004, p. 76-77]; (2) share of self-development and social needs in structure of total needs, which promotes improvement of consumption quality [Gardocka-Jałowiec 2015].

Level of income and consumption expenditures per person in rural and urban households in Poland in the analyzed period were presented using secondary empirical data from non-exhaustive sources. The source of the data was analysis of budgets of Polish households systematically undertaken by Central Statistical Office of Poland (GUS) [Budżety gospodarstw ... 2006-2015]. Gathered data were subjected to quantitative analysis. Application of descriptive statistics (structure analysis, dynamics analysis) allowed for recognition of structure and scale of changes within research categories. Considering the fact that variables describing consumption are frequently interlinked and structure and development of analyzed variables usually depends on other variables (features), comprehensive research was found necessary. Analysis of these links was conducted using Pearson correlation coefficients. The assumed level of statistical significance is $\alpha=0.05$.

LEVEL, DYNAMICS AND SOURCES OF INCOME OF RURAL AND URBAN HOUSEHOLDS IN POLAND IN 2006-2015

Disposable income per person in both urban and rural households was increasing every year in analyzed period (Tab. 1). The rate of increase was significantly different. In 2015, this rate reached level of 3% as compared to previous year. The highest average annual increase in disposable income throughout the analyzed period was observed in rural households. Income increased on average by 6.0%, whereas in urban households – by 5.8% - and in farmers' households by 5.2%. In 2015, level of income in rural households was higher by 67.7% in comparison to 2006. In urban households, the increase was 65.9% and in farmers' households – 51.9%. In case of farmers' households, years occurred when income level was lower than in previous year (in 2009 lower by 0.6%, in 2011 by 4%, in 2014 by 9% and in 2015 by 0.5%). The highest increase in farmer's household income was observed in 2007. Disposable income increased in relation to 2006 by ca. 23% and change was greater than that of rural and urban households by 9.9 and 12.2 pp. respectively.

⁵ Basic expenditures are divided, considering expenditure categories provided by GUS, into three elementary groups: (1) expenditures on foodstuffs, i.e. food and non-alcoholic beverages; (2) expenditures on non-food goods and services, i.e. clothing, alcoholic beverages and tobacco products, housing expenditures and energy media, house equipment and housekeeping; (3) expenditures on healthcare.

⁶ Among the free choice expenditures, the following are indicated: (1) transportation and communication expenditures; (2) expenditures on culture and recreation, education and spending on restaurants and hotels; (3) expenditures on other goods and services and miscellaneous expenditures.

Table 1. Average monthly disposable income per person in rural and urban households in Poland in 2006-2015

Specification/Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<i>Monthly available income [PLN/person]</i>										
Rural households	659.29	744.44	835.85	889.18	953.13	975.25	1027.63	1060.01	1067.38	1105.72
Households of farmers	689.75	847.24	889.85	884.91	1025.07	984.33	1092.91	1157.59	1052.86	1047.70
Urban households	943.90	1043.7	1176.11	1254.82	1342.11	1383.55	1439.5	1452.65	1516.05	1565.76
<i>Dynamics of monthly available income [PLN/person]</i>										
Rural households	-	112.9%	112.3%	106.4%	107.2%	102.3%	105.4%	103.2%	100.7%	103.6%
Households of farmers	-	122.8%	105.0%	99.4%	115.8%	96.0%	111.0%	105.9%	91.0%	99.5%
Urban households	-	110.6%	112.7%	106.7%	107.0%	103.1%	104.0%	100.9%	104.4%	103.3%

Source: own study based on: *Budżety gospodarstw domowych w 2006 r.*, GUS, Warszawa 2007, s. 50, 57; *Budżety gospodarstw domowych w 2007 r.*, GUS, Warszawa 2008, s. 69, 71; *Budżety gospodarstw domowych w 2008 r.*, GUS, Warszawa 2009, s. 83, 85; *Budżety gospodarstw domowych w 2009 r.*, GUS, Warszawa 2010, s. 79, 81; *Budżety gospodarstw domowych w 2010 r.*, GUS, Warszawa 2011, s. 87, 93; *Budżety gospodarstw domowych w 2011 r.*, GUS, Warszawa 2012, s. 90, 96; *Budżety gospodarstw domowych w 2012 r.*, GUS, Warszawa 2013, s. 83, 89; *Budżety gospodarstw domowych w 2013 r.-precyzja*, GUS, Warszawa 2014, tab.2; *Budżety gospodarstw domowych w 2013 r.*, GUS, Warszawa 2014, s. 107; *Budżety gospodarstw domowych w 2014 r.*, GUS, Warszawa 2015, s. 107, 113; *Budżety gospodarstw domowych w 2015 r.*, GUS, Warszawa 2016, s. 107, 253.

The reason for improvement of financial situation of households in rural areas may be found in increase of real income from agricultural production, participation of European Union programs in agricultural income, transfers of public funds directed to agriculture and the efficiency of direct payments. This should also be connected to changes occurring in structure of sources of income.

Primary source of income for rural households is work in individual farm. Share of this source in total disposable income decreased from 67.4% in 2006 to 65.12 in 2015. Second most important source are social security transfers. In analyzed period, level of this income remained unchanged, i.e. ca. 16% and was higher than in urban households by 4 pp. The observed tendencies are connected to change of share of non-farming sources of income. In rural households, the share of income from contract work increased from 9.7% in 2006 to 13.9% in 2015 (own calculations based on [Budżety gospodarstw... 2006, p. 50; Budżety gospodarstw... 2015, p. 107]). Agricultural production cannot provide sufficient income to all residents of rural areas, particularly owners of small farms. Moreover, the demand for work in this sector is decreasing. Thus, a surplus of work force in agriculture exists and no workplaces for people without farms. Increased activity of residents of rural areas in terms of improvement and/or change of qualifications, work place, labor migration to other areas of the country, seasonal works [Leśniak-Moczuk 2008, p. 280-281] leads to changes in structure of income sources.

Table 2. Average monthly share of expenditures on consumption goods and services in expenditures total per person in rural and urban households in Poland in 2006-2015

Specification	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Expenditures on consumer goods and services in rural households										
Food and non-alcoholic beverages	29.2%	27.5%	26.3%	25.7%	24.4%	24.6%	24.1%	23.3%	22.8%	22.0%
Alcoholic beverages, tobacco and narcotics	2.5%	2.4%	2.3%	2.4%	2.3%	2.3%	2.2%	2.1%	2.0%	2.0%
Clothing and footwear	4.8%	4.9%	4.7%	4.4%	4.2%	4.1%	4.0%	4.1%	4.4%	4.4%
Housing, water, electricity, gas and other fuels	17.0%	15.1%	16.0%	16.6%	16.8%	17.2%	16.3%	16.4%	15.7%	15.3%
Furnishing, household equipment and routine maintenance of the house	4.7%	4.9%	4.9%	4.7%	4.3%	4.1%	4.0%	3.9%	4.1%	4.0%
Health	4.3%	4.0%	4.0%	4.1%	3.8%	3.9%	3.9%	3.9%	3.8%	3.9%
Transportation	8.9%	8.7%	9.1%	8.8%	8.7%	8.3%	9.0%	8.9%	8.6%	7.9%
Communications	4.3%	4.2%	4.1%	3.9%	3.7%	3.6%	3.4%	4.0%	4.0%	3.9%
Recreation and culture	4.7%	4.8%	5.2%	5.5%	5.2%	5.4%	5.5%	4.6%	4.5%	4.5%
Education	0.9%	0.9%	0.8%	0.8%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%
Restaurants and hotels	1.1%	1.0%	1.1%	1.1%	1.3%	1.3%	1.5%	1.6%	2.4%	2.4%
Miscellaneous goods and services	4.1%	4.1%	4.3%	4.2%	3.9%	4.0%	3.9%	4.2%	4.2%	4.2%
Pocket-money	1.2%	1.4%	1.6%	1.7%	1.6%	1.9%	2.0%	1.8%	1.9%	1.8%
Expenditures on consumer goods and services in urban households										
Food and non-alcoholic beverages	22.0%	21.3%	20.3%	19.7%	19.0%	19.0%	19.1%	18.9%	18.2%	17.6%
Alcoholic beverages, tobacco and narcotics	2.4%	2.3%	2.2%	2.3%	2.2%	2.2%	2.2%	2.1%	2.0%	2.0%
Clothing and footwear	3.3%	3.5%	3.3%	3.1%	3.0%	2.9%	2.9%	3.0%	3.1%	3.1%
Housing, water, electricity, gas and other fuels	11.9%	10.7%	11.4%	11.8%	11.9%	12.1%	11.7%	12.0%	11.0%	10.8%
Furnishing, household equipment and routine maintenance of the house	3.3%	3.5%	3.5%	3.4%	3.1%	2.9%	2.8%	2.9%	2.9%	2.8%
Health	3.0%	2.9%	2.8%	2.9%	2.7%	2.7%	2.8%	2.8%	2.7%	2.8%
Transportation	6.2%	6.2%	6.5%	6.2%	6.2%	5.9%	6.4%	6.5%	6.0%	5.6%
Communications	3.0%	3.0%	2.9%	2.8%	2.6%	2.5%	2.4%	2.9%	2.8%	2.8%
Recreation and culture	3.3%	3.5%	3.7%	3.9%	3.7%	3.8%	3.9%	3.4%	3.2%	3.2%
Education	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Restaurants and hotels	0.8%	0.7%	0.8%	0.8%	0.9%	0.9%	1.1%	1.2%	1.7%	1.7%
Miscellaneous goods and services	2.9%	2.9%	3.0%	3.0%	2.8%	2.8%	2.8%	3.1%	3.0%	3.0%
Pocket-money	0.8%	1.0%	1.1%	1.2%	1.2%	1.3%	1.5%	1.3%	1.3%	1.3%

Source: own study based on: *Budżety gospodarstw domowych w 2006 r.*, GUS, Warszawa 2007, s. 67; *Budżety gospodarstw domowych w 2007 r.*, GUS, Warszawa 2008, s. 83; *Budżety gospodarstw domowych w 2008 r.*, GUS, Warszawa 2009, s. 99; *Budżety gospodarstw domowych w 2009 r.*, GUS, Warszawa 2010, s. 95; *Budżety gospodarstw domowych w 2010 r.*, GUS, Warszawa 2011, s. 109; *Budżety gospodarstw domowych w 2011 r.*, GUS, Warszawa 2012, s. 112; *Budżety gospodarstw domowych w 2012 r.*, GUS, Warszawa 2013, s. 105; *Budżety gospodarstw domowych w 2013 r. - precyzja*, GUS, Warszawa 2014, tab.4; *Budżety gospodarstw domowych w 2014 r.*, GUS, Warszawa 2015, s. 129; *Budżety gospodarstw domowych w 2015 r.*, GUS, Warszawa 2016, s. 129.

LEVEL AND STRUCTURE OF EXPENDITURES OF RURAL AND URBAN HOUSEHOLDS IN 2006-2015

Increase in income of most households and increase in market supply of consumption goods lead to change in structure of consumption (Tab. 2). In years 2006-2015, average consumption expenditures per capita of rural households constituted ca. 73% of urban households expenditures. In analyzed period, in both rural and urban households, decrease of share of expenditure on foodstuffs in expenditures total may be observed, as well as increase in share of expenditures on non-food goods and services. The highest share among the expenditures on consumption goods and services were those on food and non-alcoholic beverages. On average, in years 2006-2015 they constituted 30.5% and 2.5% of total expenditures in rural and urban households respectively. Their level in 2015 was lower in comparison to 2006 by 4.9 pp. for rural households and 2.5 pp. for urban households. The decreasing share of expenditures on food and non-alcoholic beverages was accompanied by decrease of percentage of expenditure for alcohol and tobacco – for rural

households from 2.4% in 2006 to 2.2% in 2015; for urban households from 2.4% to 2.2% in the same period.

In comparison to urban households, rural ones are distinguished by higher share of transportation expenditure and pocket money. Considering average share of each category in total expenditures, it may be noticed that in analyzed period rural household expenditures on recreation and culture as well as hotel and gastronomy were lower by 2.5 pp. than those of urban households. The housing expenditures were also lower in case of rural households (by 1.3 pp.), as well as expenditures on education (0.6 pp.), healthcare (0.5 pp.), communication (0.3 pp.) and clothing (0.2 pp.).

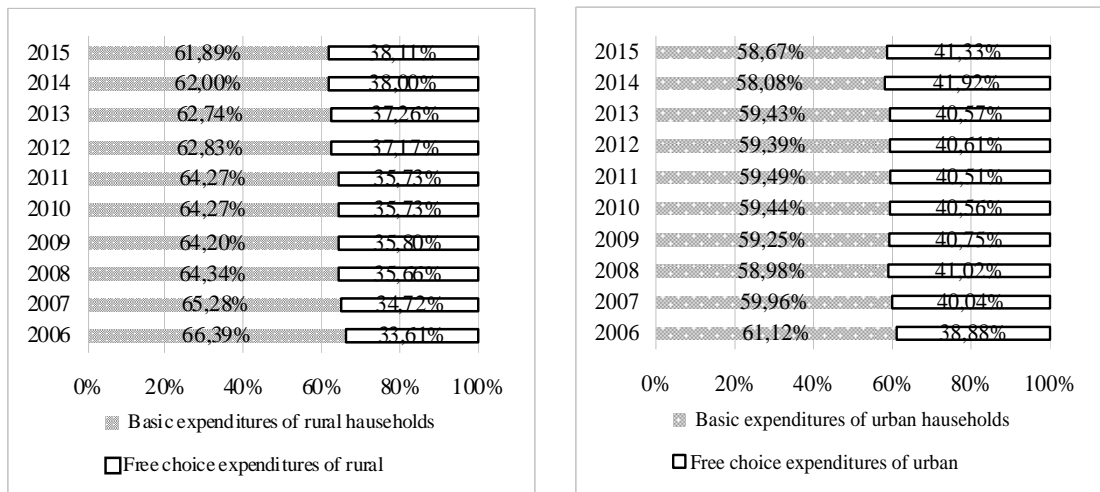


Figure 1. Share of basic and free choice expenditure in expenditures total in rural and urban households in Poland in 2006-2015

Source: see table 2

Assessing the allocation of household financial means of consumption, the share of basic expenditures and free choice expenditures in total expenditures is of importance, considering the improvement of population's level of wealth (Fig. 1). Their percentage allows for assessment of structure of satisfaction of consumption needs. High share of basic expenditures in total expenditures indicates difficulties in satisfying non-basic needs (i.e. self-development and social needs, among others in terms of free time management, education, healthcare and recreation), thus decreasing living conditions of members of the household.

In years 2006-2015, in analyzed categories of households, the share of basic expenditures in total expenditures was decreasing in favor of free choice expenditures. Rural households reported decrease by 4.5 pp. (from 66.4% in 2006 to 61.9% in 2015). Observed trend is typical for developed economies, leading in world rankings of competitiveness and innovativeness. The higher the share of free choice expenditures in total expenditures, the higher the share of self-development and social needs in need satisfaction structure. The trend observed in Polish households is therefore positive and desirable for improvement of quality of living, particularly for decreasing the disproportions between rural and urban households. Its persistence may be inferred by analyzing correlation (Pearson correlation coefficient) between income and expenditures.

Table 3. Correlation coefficient between disposable income level and changes in share of specific expenditure categories in total expenditures of rural and urban households in Poland in 2006-2015

Category of expenditure	Pearson correlation coefficient	
	rural households	urban households
basic expenditures	-0.9511	-0.7887
free choice expenditures	0.9511	0.7887
food and non-alcoholic beverages	-0.9846	-0.9253
fixed expenditures	0.5146	0.5915
social service expenditures	0.6106	-0.5808

Statistically significant values of correlation coefficients ($\alpha=0,05$) in table were marked in bold.

Source: own study based on: table 1; *Budżety gospodarstw domowych w 2006 r.*, GUS, Warszawa 2007, s. 67; *Budżety gospodarstw domowych w 2007 r.*, GUS, Warszawa 2008, s. 83; *Budżety gospodarstw domowych w 2008 r.*, GUS, Warszawa 2009, s. 99; *Budżety gospodarstw domowych w 2009 r.*, GUS, Warszawa 2010, s. 95; *Budżety gospodarstw domowych w 2010 r.*, GUS, Warszawa 2011, s. 109; *Budżety gospodarstw domowych w 2011 r.*, GUS, Warszawa 2012, s. 112; *Budżety gospodarstw domowych w 2012 r.*, GUS, Warszawa 2013, s. 105; *Budżety gospodarstw domowych w 2013 r.-precyzja*, GUS, Warszawa 2014, tab.4; *Budżety gospodarstw domowych w 2014 r.*, GUS, Warszawa 2015, s. 129; *Budżety gospodarstw domowych w 2015 r.*, GUS, Warszawa 2016, s. 129.

In Poland, in years 2006-2015 (Tab. 3) the dependency between level of disposable income per person in household and share of basic expenditures in expenditures total was linear, strongly negative (very strongly in case of rural households, reasonably strong in case of urban households) and statistically significant. However, correlation of changes in level of disposable income and share of free choice expenditures in expenditures total was positive (strong and significant from statistical point of view). Obtained results allow for assumption that, in years 2006-2015, increase in income of Polish urban and rural households affected living conditions of members of the household, determined as decreasing share of basic expenditures and increasing shares of free choice expenditures in expenditures total.

Dependencies between income level and percentage of fixed expenditures and expenditures on social services in expenditures total were not statistically significant. Their positive and high correlation (except for social service expenditure in urban households) indicate positive changes occurring in structure of consumption of Polish households. Presumably, as, saturation of Polish households with industrial goods increases, the share of expenditures on services in expenditures total will gradually increase, as may observed in highly developed economies. Relative legitimacy of the above statement is confirmed by analyzed correlation between level of income and share of expenditures on foodstuffs in expenditures total. This correlation was strong, negative and statistically significant for both rural and urban households. This confirms relevance of Engel's law in regard of Polish households.

CONCLUSIONS

Analysis of asymmetry and allocation of consumption funds available to rural households in relation to those of urban households in Poland in 2006-2015 allows to declare the following:

1. Average disposable income and consumption expenditures per capita in rural households were lower than those of urban households by 30% and 27% respectively.
2. Level and structure of income of rural households is inherently different than those in urban ones. Changes occurring in share of each source of income should be particularly emphasized. The share of contract work in rural households increased (9% in 2006 to 14% in 2015), whereas employment in individual farms decreased (from 67% to 65% respectively). Share of social security transfers remained on the same level and was higher by 4 pp. than that in urban households.

3. Share of basic expenditures in expenditures total decreased in both rural and urban households. In rural households, these expenditures constitute ca. 64% on average and were higher than those of urban households by 6.4 pp..
4. Share of expenditures on food and non-alcoholic beverages in expenditures total was decreasing. The trend is confirmed by strong negative correlation with disposable income.

In years 2006-2015, increase in income translated into increase in free choice expenditure by smaller degree. Presumably, this may be a result of differences between income levels in rural and urban households. Among other reasons, smaller availability of cultural institutions, various forms of recreation, education and healthcare to rural households can be mentioned. Equally important are differences in models of living and preferences of household members. Scale of decrease in share of basic expenditures and increase in share of free choice expenditures in expenditures total in rural households was smaller than that observed in urban households, however it still indicates positive transformations occurring in structure of consumption, promoting improvement of consumption quality.

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THE DIVERSIFICATION AND DETERMINANTS OF LABOUR PRODUCTIVITY IN FURNITURE INDUSTRY IN THE EU COUNTRIES

Abstract. The main goal of the study was to analyse the level and diversification of labour productivity in furniture industry in the EU countries. The analysis was based on the statistics published by EUROSTAT. It enabled analysis of the entire furniture manufacturing sector as well as analysis according to the size of enterprises measured with the number of employees. The research revealed considerable differences between the EU countries in labour productivity measured with value added. In general, the highest labour productivity was noted in the furniture industry in the old EU member-states, whereas the countries which joined the EU after 2003 were characterised by the lowest productivity. Apart from that, the regression model revealed that the technological equipment used by employees was the factor causing the greatest diversification in the furniture industry in the EU.

Key words: labour productivity, furniture industry, EU

INTRODUCTION

Labour productivity is commonly considered to be one of the most important indicators characterising developmental processes in the economy of each country. Its growth reduces costs, increases the supply of less expensive goods and services, develops the market and increases the purchasing power and in consequence, it increases the wealth of society [Landmann 2004]. In view of these premises we can say that regardless of specific socioeconomic conditions research on labour productivity should always remain the main focus of science and practice.

The main goal of this study was to analyse the level and diversification of labour productivity in the furniture manufacturing sector in the EU countries. The EU furniture industry is an important sector on a global scale because it makes a quarter of the global furniture production [The EU Furniture, 2014] and successfully competes on world markets. Contemporary challenges that need to be faced by the economic systems in the EU countries give special significance to the problem of labour productivity, which results from two main premises. Firstly, low labour productivity is a fundamental barrier blocking access to the pathway of intensive growth in the economic systems which are undergoing transformation. Secondly, changes in the labour productivity level have considerable influence on the dynamics and costs of the processes of integration both on a European and global scale.

MATERIAL AND METHODS

The analysis of labour productivity in the furniture industry in the EU countries was based on data published by EUROSTAT in the form of structural business statistics referring to individual branches of the industry and presented according to the size of enterprises (Annual..., 2016; Industry by..., 2016).

In order to assess the level of diversification of labour productivity in the furniture industry in the EU the category of gross value added per employee and per full-time employee was used. This formula of a measure of labour productivity is considered to be the most adequate because it reflects labour productivity in the context of creation of new values.

Apart from that, deterministic and econometric methods were applied to analyse diversification in labour productivity. In the deterministic approach considerations were based on a

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bivariate decomposition model of labour productivity. In this model labour productivity was analysed as a function of two basic variates, i.e. capital outlay productivity and the amount of capital outlay per employee. These variates were also used as the basis for the construction of an econometric model, which enabled determination of their significance, direction and influence on labour productivity.

RESULTS AND DISCUSSION

THE LEVEL AND DIVERSIFICATION OF LABOUR PRODUCTIVITY IN THE FURNITURE INDUSTRY IN THE EU COUNTRIES

Table 1 shows the data concerning total labour productivity and labour productivity according to the size of enterprises in the furniture manufacturing sector in selected EU countries in 2014. The analysis showed that labour productivity in the furniture industry of the selected EU countries (EU-20) was strongly diversified both when it was taken as a whole ($V=70.8\%$) and when it was divided into categories according to the size of enterprises ($V=58.1-62.1\%$)⁸. Apart from that, the data in Table 1 show that the ranking of labour productivity in the furniture industry divides the set of countries under analysis into two groups. One group consists of the old EU member-states (except Portugal), where labour productivity is significantly higher (€27,600-60,000). The other group consists of the new EU member-states, where labour productivity in the furniture industry is very low (€6,000-14,800). The scale of differences in this aspect can be clearly noticed by making a comparison of extreme labour productivity levels in the ranking. Labour productivity in the furniture industry in Denmark (€60,000), Sweden (€5,800) and Belgium (€51,600) was 7-10 times greater than in Hungary (€10,600), Romania (€8,300) and Bulgaria (€6,000).

If we analyse the diversification of labour productivity according to the size of enterprises, we can see that in general (EU-20) the larger the enterprise is, the higher labour productivity is. As results from the statistics in Table 1, labour productivity in the largest furniture manufacturing enterprises (250 or more employees) was nearly 90% greater than in microenterprises (1-9 employees) and 17-48% greater than in the other enterprise size categories. This means that there is a strong correlation between the enterprise size and labour productivity. The strength of the correlation is confirmed by a very high value of the correlation coefficient, i.e. $R=0.988$.

Apart from the UK and Slovakia, in the vast majority of the countries under analysis we could observe an increase in labour productivity along with the growth of the enterprise ($R=0.718-0.997$). There was not much diversity in labour productivity of the British furniture industry analysed according to the size of enterprises. The greatest labour productivity was noted in microenterprises (€53,400). In consequence of these conditions the correlation between labour productivity and the size of enterprises in the UK was not significant. This fact is confirmed by a very low value of the linear correlation coefficient, i.e. $R=0.004$. In Slovakia the lowest labour productivity was observed in the largest (€11,300) and the smallest enterprises (€6,900). In other enterprise size categories there was higher labour productivity but it did not vary much (€12,000-15,000). Like in the UK, the furniture industry in Slovakia was not characterised by a positive and statistically significant correlation ($R=0.204$) between the size of enterprises and labour productivity.

⁸ Due to the lack of complete data to make an analysis according to the size of enterprises Table 1 includes information concerning the 20 EU countries for which there were data available.

Table 1. Total labour productivity in the furniture industry in selected EU countries in 2014 and labour productivity according to the size of enterprises (gross value added per employee¹ – thousand euros).

UE countries	Total	The size of the company measured by number of employees									
		1-9		10-19		20-49		50-249		250 i więcej	
		thous.€	% ²	thous.€	% ²	thous.€	% ²	thous.€	% ²	thous.€	% ²
Denmark	60,0	30,5	50,8	46,8	78,0	47,2	78,7	59,5	99,2	80,6	134,3
Sweden	56,8	44,6	78,5	50,1	88,2	61,0	107,4	60,4	106,3	61,6	108,5
Belgium	51,6	37,8	73,3	49,6	96,1	54,7	106,0	56,6	109,7	81,3	157,6
United Kingdom	48,6	53,4	109,9	42,0	86,4	43,3	89,1	50,4	103,7	50,2	103,3
Germany	47,9	28,6	59,7	33,1	69,1	40,3	84,1	53,1	110,9	63,2	131,9
Netherlands	47,8	37,4	78,2	52,1	109,0	54,2	113,4	58,1	121,5	65,3	136,6
Austria	45,1	33,1	73,4	38,1	84,5	48,1	106,7	56,3	124,8	55,5	123,1
France	42,7	31,8	74,5	44,9	105,2	45,3	106,1	43,1	100,9	53,8	126,0
Finland	40,5	30,3	74,8	39,3	97,0	39,9	98,5	44,2	109,1	50,2	124,0
Italy	38,8	23,9	61,6	35,6	91,8	43,2	111,3	49,1	126,5	57,1	147,2
Spain	27,6	18,2	65,9	25,6	92,8	34,4	124,6	37,1	134,4	51,9	188,0
Portugal	15,6	9,5	60,9	13,2	84,6	17,3	110,9	20,2	129,5	22,3	142,9
Poland	14,8	4,7	31,8	10,4	70,3	14,6	98,6	14,4	97,3	19,4	131,1
Czech Republic	14,2	10,6	74,6	10,7	75,4	13,0	91,5	18,0	126,8	17,8	125,4
Lithuania	13,4	5,0	37,3	6,5	48,5	9,4	70,1	11,7	87,3	19,0	141,8
Croatia	12,2	7,2	59,0	12,2	100,0	11,5	94,3	14,5	118,9	13,8	113,1
Slovakia	12,2	6,9	56,6	14,6	119,7	11,7	95,9	15,3	125,4	11,3	92,6
Hungary	10,6	6,5	61,3	10,3	97,2	10,3	97,2	10,9	102,8	15,0	141,5
Romania	8,3	6,1	73,5	6,5	78,3	6,5	78,3	7,6	91,6	10,3	124,1
Bulgaria	6,0	2,7	45,0	4,1	68,3	5,7	95,0	7,6	126,7	8,9	148,3
EU-20	30,9	21,4	69,6	27,3	88,6	30,6	99,3	34,4	111,7	40,4	131,3
V (%) ³	59,1	70,8	23,9	62,1	18,1	60,7	13,3	58,1	12,1	59,9	15,4

¹ The total number of employees was used as a category due to the lack of data on the number of full-time employees in individual enterprise size categories, ² The mean labour productivity (percentage) in the furniture sector in a particular country, ³ V – coefficient of variation (percentage)

Source: own elaboration based on Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E), EUROSTAT, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en.

DETERMINANTS OF LABOUR PRODUCTIVITY IN THE FURNITURE INDUSTRY IN THE EU COUNTRIES

The procedures of disaggregation (decomposition) of different economic parameters are commonly applied in analytical practice. They enable multidimensional cause-and-effect analysis of different aspects of the phenomenon in question [Bednarski 1997, Skoczylas 2007 Hawawini & Viallet, 2007]. As far as the labour productivity index is concerned, this procedure leads to the following bivariate and alternative cause-and-effect equations:

$$LP = \frac{GVA}{E} = \frac{GVA}{A} \times \frac{A}{E} \quad LP = AP \times TR$$

$$LP = \frac{GVA}{E} = \frac{GVA}{O} \times \frac{O}{E} \quad LP = OP \times OE$$

where:

LP – labour productivity, GVA – gross value added, E – the number of employees, A – assets, AP – assets productivity, TR – labour-related technological resources, O – capital (financial) outlay, OP – capital outlay productivity, OE – capital outlay per employee.

As results from the equations shown above, labour productivity can be considered as a product of assets productivity ($AP = GVA/O$) and employees' technological equipment ($ETE = A/E$), or alternatively, as a product of outlay productivity (GVA/O) and labour-related equipment measured with capital outlay (O/E). This means that diversification in labour productivity could be attributed to varying values of these factors. Apart from that, these equations enable dynamic analyses, which can be used to determine the causes of variation in labour productivity.

Due to the character of statistics published by EUROSTAT the factor analysis of labour productivity in the EU furniture industry was based on the second variant of equations, i.e. the variant including capital outlay in relation to gross value added and the number of employees⁹. Apart from that, in order to identify differences in this aspect the furniture manufacturing sectors in individual EU countries were divided into four groups, allowing for the mean outlay productivity (45.9%) and labour-related equipment (€77,600) counted as total. Table 2 and Fig. 1 show the results of this two-dimensional classification.

As results from the analysis of data in Table 2, the largest group (group A) consists of 12 countries, chiefly from Central and Eastern Europe. The furniture industry in these countries is characterised by very low value of labour-related equipment (€38,200) and significantly lower than average capital outlay productivity (37.6%). Very low values of these factors result in the lowest labour productivity level – €14,300 on average, i.e. as much as 61% less than the mean level. In this group labour productivity is particularly low in Romania (€8,600) and Bulgaria (€6,600). The cause of low labour productivity in these countries is very poor technological equipment rather than low outlay productivity. In Romania and Bulgaria the value of labour-related technological equipment, measured with the value of capital outlay per full-time employee amounted to €22,200 and €18,400, respectively, which was about four time less than the average value (€77,600) in the entire group of countries under study.

The second group (group B) consists of six EU countries (Denmark, the Netherlands, Germany, the United Kingdom, Luxembourg, Austria). In these countries labour productivity in the furniture industry was significantly greater (€61,000) than average (€35,800) both due to the relatively high outlay productivity (57.1%) and high value of labour-related equipment (€110,800). The furniture sectors in Denmark and the Netherlands stand out in this group. As results from the data in Table 2, the furniture industry in these countries was characterised by the highest labour productivity, i.e. €83,700 and €75,300, respectively. It resulted from a very high level of labour-related technological equipment (€163,300 and €144,900) rather than high outlay productivity.

The furniture industry in Belgium, Italy, Sweden, France and Finland (Group C) was also characterised by high productivity. However, in contrast to group B, high labour productivity chiefly resulted from a very high value of labour-related equipment (€150,600) rather than outlay productivity, which was slightly below average (40.3% vs 45.9%).

⁹ The category of full-time employees was used because in comparative analyses it better reflects the labour productivity level achieved.



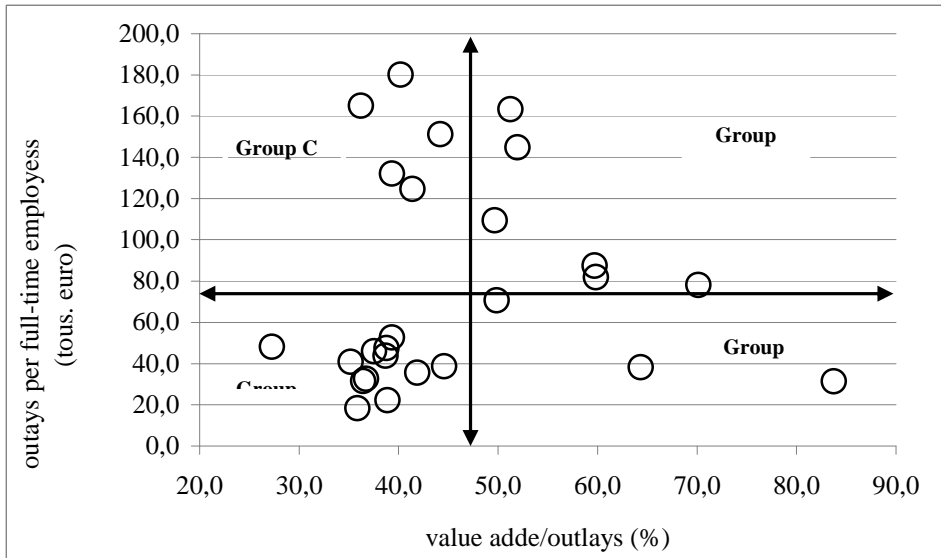
Table 2. Labour productivity in the furniture industry in selected EU countries in 2014 according to outlay productivity and labour-related equipment.

Groups	UE countries	Capital outlay productivity (value added/capital outlay in %)	Work technical devices (capital outlay per 1 full-time employees, thous.€)	Labour productivity (value added per 1 full-time employees, thous.€)
A	Greece	39,3	52,7	20,7
	Slovakia	27,3	48,1	13,1
	Czech Republic	38,8	47,6	18,5
	Poland	37,6	45,9	17,3
	Estonia	38,7	43,8	17,0
	Lithuania	35,2	40,8	14,4
	Portugal	44,6	38,7	17,3
	Croatia	41,9	35,6	14,9
	Hungary	36,7	32,6	12,0
	Latvia	36,4	31,5	11,5
	Romania	38,9	22,2	8,6
	Bulgaria	35,9	18,4	6,6
	Average	37,6	38,2	14,3
B	Denmark	51,3	163,3	83,7
	Netherlands	52,0	144,9	75,3
	Germany	49,7	109,4	54,3
	United Kingdom	59,7	87,4	52,2
	Luxembourg	59,8	81,9	49,2
	Austria	70,1	78,2	54,8
	Average	57,1	110,8	61,6
C	Belgium	40,2	180,1	72,4
	Italy	36,2	165,0	59,8
	Sweden	44,2	151,2	66,8
	France	39,4	132,1	52,0
	Finland	41,4	124,6	51,6
	Average	40,3	150,6	60,5
D	Spain	49,9	70,7	35,3
	Cyprus	64,3	38,3	24,7
	Malta	83,8	31,4	26,3
	Average	66,0	46,8	28,8
Total		45,9	77,6	35,8

Source: own elaboration based on Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E), EUROSTAT, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en.

The last and smallest group consists of Spain, Cyprus and Malta (Group D), where labour productivity in the furniture industry was generally low (€28,800). On the one hand, this level was determined by relatively high outlay productivity. On the other hand, it resulted from very poor technological equipment. As results from the data in Table 2, in this group outlay productivity was significantly greater (66.0%) than average (45.9%). However, on average the capital outlay per full-time employee amounted to only €46,800, i.e. about 40% less than the total value in the countries under study.

Fig. 1 The relationship between outlays productivity and the value outlays per 1 employee in the furniture industry the European Union in 2014



Source: own elaboration based on table 2

The aforementioned correlations between labour productivity and outlay productivity (X_1) as well as employees' technological equipment (X_2) underwent econometric verification. As results from the data in Table 3, variables X_1 and X_2 are very highly accountable for variability in labour productivity (98%). The regression model parameters (b) show that an increase in the value of each factor under consideration caused an increase in labour productivity. However, it is necessary to stress the fact that as can be seen from the values of standardised regression coefficients (β), the amount of outlay per employee is of primary significance to labour productivity growth ($\beta=0.933$). This value is more than three times greater than the value of outlay productivity ($\beta=0.289$).

Table 3. The regression model parameters for labour productivity in the furniture industry in the EU countries.

Specification	β	Standard error	b	Standard error	t(22)	p
Constant	-	-	-23,14	3,44	-6,72	0,000
X_1	0,289	0,035	54,54	6,77	8,05	0,000
X_2	0,933	0,035	0,437	0,016	25,92	0,000
$R^2 = 98,1$, $F(2,22)=612,25$ $p<0,000$, the standard error of estimate: 3,38						

Source: own elaboration

SUMMARY

Labour productivity in the furniture industry in the EU countries is strongly diversified. The highest labour productivity can be observed in furniture enterprises in Denmark, the Netherlands, Belgium and Sweden, where the amount of value added per full-time employee reached €66,800-83,700 (2014). On the other hand, the lowest labour productivity was chiefly noted in the furniture manufacturing enterprises in Central and Eastern European countries, where one full-time employee generated only €8,600-18,800 worth of value added. Poland is among the countries with low labour productivity. In the Polish furniture industry labour productivity amounts only to the average productivity in the EU.

The analyses based on the deterministic model proved that labour productivity in the furniture industry was strongly conditioned by outlay productivity and employees' technological equipment. High labour productivity, which was characteristic of Denmark, the Netherlands, Belgium and Sweden, was strongly correlated with high outlay productivity and a high value of employees' technological equipment. On the other hand, there is an opposite situation in Central and Eastern European countries, including Poland. Very low labour productivity in the furniture industry corresponded to both low outlay productivity and a low value of employees' equipment. However, from the point of view of the strength of this correlation, employees' technological equipment is of primary significance to labour productivity growth. As results from the regression model parameters, the relative strength of the influence of the increase in the value of employees' technological equipment on labour productivity is about three times greater than the strength of the increase in outlay productivity. This means that furniture manufacturing enterprises in Central and Eastern Europe need to increase their investment outlay considerably. Otherwise, further increase in labour productivity does not seem very realistic.

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ECONOMIC ASPECTS OF EDUCATION AND TOURISM ACTIVITY OF MIĘDZYCHÓD FOREST DISTRICT

Abstract: The paper presents educational and tourist activities conducted by Międzychód Forest District, as a case study. Data on financing the educational activity of society and tourism infrastructure in the years 2011-2014 were analyzed. The research has shown that the only source of funding this activity was the own resources of the forest district. In addition, the economic benefits of the educational activity of the society conducted by the forest district were estimated.

Key words: ecotourism, forestry education, hiking in the woods, financing of natural and forestry education.

INTRODUCTION

Forests have always played a significant role in human life, but over time the importance of these areas has changed. Forests take on a variety of functions, not only a timber supplier for the society. Although still the main source of income from forest management is the profit from the sale of wood, forest managers (in Poland the organization that manages these areas is *Lasy Państwowe* [the State Forests]) are looking for new sources of financing. One of them is tourism and recreation industry, which is developing dynamically in recent years [Mandziuk, Janeczko 2009]. The fact that forests are open to the public is evidenced by their rich tourist infrastructure. Hiking, biking, horse riding, skiing and water skiing are also available for tourists. State Forests also provides its accommodation facilities available in recreation centers, forest education centers, guest rooms and hunting lodges. In addition to a higher standard accommodation, there are some camping facilities, the facilities of the most "spartan" conditions [Pigan 2009].

Developing tourism in forest areas, it must be borne in mind that this development must be consistent with the concept of sustainable tourism, multifunctional forestry and sustainable forest management [Józefacka 2009]. As a sense of ecological awareness has grown in society, this trend can also be noted in tourism. Undoubtedly, the forest areas are suitable for a variety of forms of tourism and recreation such as sylvotherapy, natural cognitive tourism, Nordic walking, hiking, biking, horse riding, hunting and others. One of such forms that can be developed in forested areas is ecotourism. It is eco-friendly and active tourism, based on close contact with nature, in which attention is paid to preservation of natural values and responsible use of them, the development of ecotourism is strongly connected with the simultaneous ecological education of the society [Referowska-Chodak 2009] and it can be widely propagated in forest areas.

ECOTOURISM AS A FORM OF TOURISM IN FOREST AREAS

Ecotourism is one of the most dynamically developing forms of modern tourism.

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In 2005 Tourism Network rated ecotourism as one of the fastest growing sectors in the tourist industry, with an annual growth rate of 5% in the entire world, representing 6% of the world gross domestic product and 11.4% of all consumer spending. According to the international Ecotourism Society (TIES), its share in the global tourism market is 10-12% [Graja-Zwolińska, Uglis 2010].

The concept of ecotourism is simple. Different areas of the natural environment attract tourists, and because there are numerous economic effects of tourism for a local community, this encourages governments and local authorities to fight harmful activities that destroy nature [Kaczmarek 2010]. There have been published a lot concerning this throughout the world over the last years, both in scientific journals and in publications of ecotourism organizations. Many new insights into the definition of ecotourism, which is also sometimes called natural, green, ecological or responsible tourism, have been presented in the subject literature.

In 1990 a new definition of ecotourism was introduced by TIES, as a responsible travel to natural areas that aims to protect the environment and maintain the well-being of local communities. D. Zaręba [2008] defines ecotourism as a form of sustainable tourism that contributes in an active way to the protection of the natural environment and brings economic benefits and the improvement of the quality of life in local communities in the most attractive naturally and culturally corners of the world.

It is also important to emphasize the significant role ecotourism plays in protecting the environment, and increasing the ecological awareness of both tourists and residents. Local communities, seeing the interest of visitors in the region, are beginning to appreciate local natural resources and participate in their protection. The interest in this form of tourism plays a significant role in shaping public support for existing and planned protected areas, without which they often have no chance of survival or existence. In addition, it is seen in ecotourism the source of raising funds to support protection programs, park maintenance, as well as publishing maps and information and educational brochures [Kijowska 2009].

Forests are becoming more and more desirable resting place, which can be explained by the beneficial effects of the forest environment on humans [Jalinik 2016, Dudek 2017]. These areas have several functions, including recreation and health, aesthetics, education and inspiration, ludic and relaxation, functional and sport. People who have a rest in the woods appreciate silence, calmness and fresh air [Sikora, Wartecka-Ważyńska 2017].

Nowadays can be observed a significant development of the tourist and educational function in the forest areas. Forests are one of the natural tourist attractions, and for many visitors they are the destination of their tourist trips. This trend in society can become an additional source of income not only for forest districts but also for a local economy because of costs incurred by visitors who travel to a forest for educational and recreational purposes.

Forests have a lot to offer visitors, as they have a very extensive and varied range of tourist products, including:

- natural values of forest complexes;
- splendid tree stands, fruit of the forest floor, the peculiarities of flora and fauna, the forms of nature conservation and many more;
- cultural values of forest complexes;
- historic forester's lodges, forest technology and memorabilia exhibition rooms, old hill forts, cemeteries, monuments and war bunkers;
- tourist infrastructure;
- accommodation facilities (training and recreation centers, hunting lodges, and guest rooms), educational facilities (environmental and natural educational centers, forest chambers, and forest classrooms), forest paths and hiking trails, camping sites, parking places, recreation glades, viewing platforms, etc.;

- foresters and their work – dresses, traditions and tools related to the profession of a forester, interesting events, cyclical cultural and entertainment events, etc.;
- the gifts of people and objects made of them – wood, bark, conifer needles, resin, fruits, mushrooms, herbs, skin, antlers, and roots;
- publications and promotional materials about forests and foresters – books, albums, guide books, maps, folders, videos, brochures, etc. [Buraczewski 2007].

However, to conduct educational and tourist activities in forest areas, the infrastructure should be prepared and maintained, and the offer for visitors and tourists should have been prepared, which requires adequate financial resources.

PURPOSE AND RESEARCH METHODOLOGY

The aim of the study is to analyze the financial expenditures incurred on educational and tourist activities by Międzychód Forest District. The research was carried out in October 2015, and the data was obtained for the years 2011-2014. The study also included reports on the educational activity of Lasy Państwowe for the years 2011-2014, the source material was the data obtained from the previously prepared survey questionnaire. The literature on the subject has also been reviewed.

CHARACTERISTICS OF THE RESEARCH AREA

Międzychód Forest District covers an area of 28.4 thousand hectares, of which the forest area is of 27.6 thousand hectares. Sylvan habitats dominate in the forest district, which account for over 84% of the forest area, and pine is a primary forest species. These areas are an attractive place for mass relaxation, as here can be found clean water of the lakes of Międzychódzko-Sierakowskie Lakeland, many recreational centers, fishing grounds and a lot of forest fruits. In the forest district, there are excellent conditions for conducting a variety of educational activities. In its area, there are many forms of nature conservation such as Natura 2000 sites, rare and protected plant and animal sites, nature reserves, ecological areas, protected landscape areas, numerous natural monuments, Pszczew Landscape Park [<http://miedzichod,Szczecin.lasy.gov.pl/lasy-nadlesnictwa#.WHER4NLhDcs>; 07.01.2016].

More than 70% of the area of Międzychód Forest District (20 883 ha) is an area of Forest Promotional Complex “Noteć Forest”. It is the largest of 25 such complexes in Poland. Its area is 137.3 thousand ha and it is in Noteć forest. The Forest Promotional Complex is situated within three Regional Directorates of State Forests, covering seven forest districts: Krucz, Potrzebowice, Wronki (RDSF in Piła), Oborniki, Sieraków (RDSF in Poznań), Karwin and Międzychód (RDSF in Szczecin) [Fronczak 2007].

Educational activity in Międzychód Forest District has been ongoing for years. In 2006, it was recognized in the Service Quality Competition and awarded with the “Best in Poland” Certificate. The opening of the Ecological Education Center in Mokrzec in 2010 and the creation of a post for a person who is involved in education means the development of this activity [*Education Program for Forestry ...*, 2014]. The forest education position is directly subject to the chief forester, and his or her duties include running the Environmental Education Center in Mokrzec and conducting educational and promotional activities.

A wide range of thematic classes is offered in Międzychód Forest District. There are a lot of teaching aids and an accompanying network of educational facilities encourage children, young people and adults to use this offer.

For educational and tourist purposes the following are used:

- Mokrzec Ecological Educational Center and an educational shed at this center;
- forest pathways: “Beaver’s Nook” and in Kaplin forest nursery;
- bicycle paths: “In the footsteps of Radusz”, “Wanda mine”, and “National Insurrection Trail 1769-1919”;
- the nature reserve “Kolno Miedzichodzkie”.

In addition, parking places, camping sites, a vantage point, hiking trails (for hiking, biking and horse riding) were prepared for tourists. The above attractions, as well as the natural and anthropogenic values of Noteć Forest provide excellent conditions for all forms of recreation and education.

RESEARCH FINDINGS

Considering the sources of financial resources necessary for the proper functioning of every forest district, it is important to note that the main source of income is the proceeds from the sale of timber. Międzychód Forest District sources annually about 143.5 thousand m³ of wood, which in its majority goes to companies dealing with its further processing. Money raised this way is spent on the realization of educational projects of the society. It is worth emphasizing that the educational activity of a forest district can also be financed from external funds (the state budget, national and regional environmental protection and water management fund, and EU funds)

In the years 2011-2014 the main source of financing educational activities and the maintenance of educational and tourist facilities located in the forest district was its own resources. The amount of this financing in the analyzed period totaled 271 thousand PLN (Figure 1).

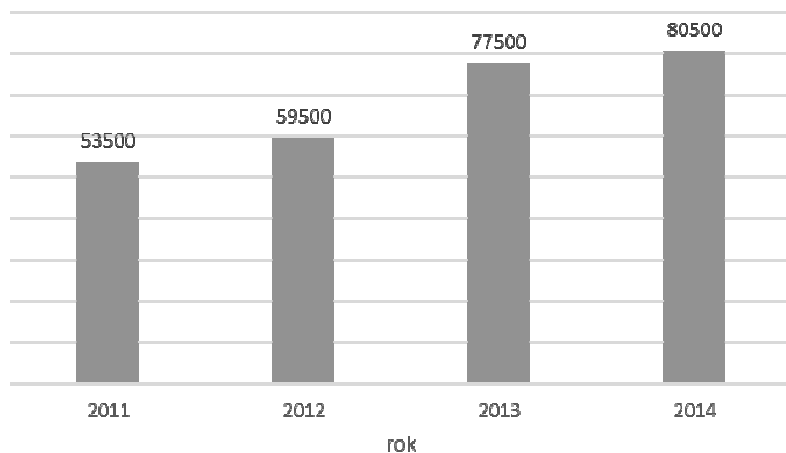


Figure 1. Expenditures on educational and tourist activities.

Source: own elaboration.

It is worth noting that the amount spent on this activity in 2011 was close to the average for one forest district in the Forest Promotional Complex "Noteć Forest", while in 2014 the amount spent was higher by more than 50% compared with the average for one district in the FPC [Chrzanowski 2012, 2015].

By analyzing the data for each element of the expenditure in 2014, it was found that the most cost-consuming elements were the maintenance of parking lots (33 thousand PLN), activities connected with competitions, lectures and educational projects (22.3 thousand PLN), and creating and maintaining teaching facilities (18.2 thousand PLN). The important items in the expenditures were also maintenance of tourist (20.5 thousand PLN) and recreation facilities (6 thousand PLN), and the creation and maintenance of natural forest paths (2.6 thousand PLN).

The educational activity of the society implemented by Międzychód Forest District covered various forms. During the period under review, a total of 971 classes were conducted, with over 86 000 participants. In addition, according to estimates of the forest district, between 2 and 2.5 thousand tourists visit its territory every year, who use provided tourist infrastructure.

When examining expenditures on environmental education, it should be emphasized that they constitute costs of the district, but on the other hand, they contribute to providing economic benefits for the local economy. An individual model of travel expenses was used to estimate the benefits provided by Międzychód Forest District. If an average cost of travelling of one participant was 20 thousand PLN [according to Bartczak et al 2008] it indicates that the forests in Międzychód Forest District generated in the analyzed period a net stream of recreational and tourist benefits of over 1.7 million PLN, which gives an average annual amount of over 431 thousand PLN. The increasing turnout of people interested in the offer of the surveyed forest district will contribute to even higher economic benefits generated by Międzychód Forest District in the coming years.

CONCLUSIONS

One of the most significant trends observed in modern tourism is the return to nature, and the ideal place to do so is the forest area. Forest have many natural values that appeal to both nature lovers and tourists alike.

The conducted research confirmed that such values are undoubtedly possessed by the forest areas of Międzychód Forest District. This is evidenced by the growing number of participants in forest and nature education and tourists. Tourists who visit the places prepared by the Forestry District and participate in the classes can learn how to travel responsibly to natural areas. On the other hand, the local community, seeing the interest of visitors in the region, can appreciate local resources and actively participate in their protection.

In the period under review, the main source of funding for education and maintenance of educational and tourist facilities located in the discussed forestry district were the own funds of the district. The existing infrastructure and all activities were financed from this source.

Tourism is not only a cost for the forestry district, but it also brings benefits for the local economy. Diverse types of facilities providing tourist services are established and run within the area of the discussed Forest District and its surroundings.

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ANALYSIS OF SPATIAL RELATIONSHIPS BETWEEN LEVELS OF SUSTAINABLE DEVELOPMENT OF GREATER POLAND DISTRICTS

Abstract: The purpose of this paper is to rank the Greater Poland districts using 2015 data and to perform the spatial autocorrelation analysis based on the developed synthetic measures of sustainable development. Based on a selected set of diagnostic variables, a proprietary synthetic measure of sustainable development was created. The use of a synthetic measure, which describes the objects with a single aggregated value rather than with a series of variables, enabled the measurement of the multidimensional differentiation between sustainable development levels, and allowed to rank the objects. The survey covered 35 districts of the Greater Poland province. The TOPSIS method was employed, and the spatial autocorrelation analysis was based on the (local and global) Moran's *I* statistics.

Keywords: sustainable development, spatial autocorrelation.

INTRODUCTION

Since the industrial revolution, economy has been developing faster than the social and environmental spheres. Due to growing threats to human existence caused by excessive consumption and pollution of natural resources, specific reports¹⁵ have been published since the 1960s to warn of the destructing human activities and their possible consequences, giving rise to the sustainable development concept. Sustainable development was supposed to be a way of harmonizing the progressing economic growth and the enhancements to the natural environment. Today, because of the essence of this problem, references to that principle are made in multiple strategic¹⁶ and political documents (in that context, Polish authors often emphasize that sustainable development assumptions were found to be one of the basic principles underpinning the national political system and were addressed in many ways, including in Article 5 of the Constitution of the Republic of Poland).

It appears self-evident that sustainable development, whether considered on a micro- or macroeconomic level, is a popular topic among economists and has nowadays become a quite broadly described paradigm. However, as regards Poland, the author of this paper believes there is a shortage of empirical analyses of spatial relationships between specific local government units (e.g. districts) in terms of sustainable development levels. Therefore, this paper attempts to identify the spatial relationships between synthetic sustainable development measures at the district level. The survey covered all of the 35 districts of the Greater Poland province. As sustainable development is an umbrella term, this study used TOPSIS-based taxonomic measures which describe the items under consideration with a single, aggregated figure rather than with multiple characteristics, making the analysis easier. The next step was the analysis of spatial autocorrelation (based on the developed proprietary measures of sustainable development) in order to determine the strength of spatial relationships between the districts in terms of the subject matter of this study. The main criterion for selecting the variables was their completeness and availability for all items under

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¹⁵ In this context, the following should be mentioned: the 1968 U Thant's report ("Man and his environment") and "The limits to growth," a report published in 1972 by the Club of Rome, discussing the future fate of humankind.

¹⁶ The sustainable development concept was reflected in documents such as the "Poland's energy policy by 2030," "National transport policy for 2006-2025," or the "Poland's climate policy: policies for greenhouse gas emissions in Poland by 2020."

consideration in 2015. The source of data related to specific subsystems of sustainable development was the Local Data Bank of the Central Statistical Office.

THE SUSTAINABLE DEVELOPMENT CONCEPT

Scientific papers and various legal acts provide different definitions of sustainable development by placing emphasis on various aspects of this interdisciplinary category. That term was introduced during the Stockholm UN conference in 1972. A definition often referred to in the relevant literature is the one formulated for the purposes of the “Our Common Future” 1987 UN report. Accordingly, sustainable development is a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs [United Nations, 1987]. Also, R.K. Turner and D.W. Pearce note that the concept of sustainable development is directly related to that of inter-generative justice. They believe sustainable development means that the next generation should not be “worse off” in development terms than the current one. This means leaving the next generation with a stock of capital assets that provide them with the capability to generate at least as much development as is achieved by the current generation [Turner, Pearce, 1992]. B. Poskrobko [1997, p. 7-20] defines sustainable development as running business, developing and exploiting the potential of the environment, and organizing social life in a manner that ensures dynamic development of qualitatively new production processes, sustainable use of natural resources, together with an improvement and, subsequently, maintenance of high living standards. In the Poland’s Sustainable Development Strategy by 2025, this term is associated with a development that is “determined by the ecological space while being safe and advantageous to humans, to the environment and to the economy because of the assumed synergy between economic, environmental and social aspects.”

Also, sustainable development may be considered as a certain set of characteristics such as balance, self-sustainability and durability. In that context [Fiedor, Kociszewski, p. 170-171]:

- balance means (in the structural aspect) maintaining adequate proportions between the socio-economic need for development and the environmental protection needs,
- self-sustainability means creating provisions and incentives for further development,
- durability means that none of the development components should attenuate during the development process.

W. Florczak specifies the following common features provided for in numerous definitions of sustainable development: rejecting the zero-growth concept in order to reconcile the environmental and socio-economic issues; interactions between development economic, environmental, demographic and social aspects of development; emphasizing the need for the involvement of the entire society in the implementation process of sustainable development principles; the need to analyze the impact of today’s decisions on the well-being of future generations; the distributive justice principle; emphasizing the role of intangible aspects of the quality of human life [Florczak 2011, p. 287-288].

It could be assumed with no major reservations that the definitions of the contemplated concept, as clearly outlined in the literature, mainly focus on three aspects. Because the authors often emphasize the environmental aspects, the natural approach may be identified. Also, an economic approach is adopted which lays emphasis on the need to run environmentally-friendly businesses. When defining this term, authors also address the need to improve the population’s quality of life and to create a new social life system. Therefore, the social approach to the definition of sustainable development may be identified, too. According to the sustainable development concept, a certain balance between the aforesaid aspects (dimensions) should be sought.

ORDERING AND GROUPING GREATER POLAND DISTRICTS BY LEVELS OF SUSTAINABLE DEVELOPMENT

Due to multiple aspects involved in the sustainable growth concept, it seems reasonable to use taxonomic methods based on a synthetic development measure. The use of a synthetic measure, which describes the objects with a single aggregated value rather than with a series of variables, enabled the measurement of the multidimensional differentiation between sustainable development levels in specific districts, and allowed to rank the objects.

The relevant literature fails to provide a universal list of sub-indicators used to quantify the level of sustainable development of specific geographies. With no major reservations, the following three dimensions may be covered by the analysis of sustainable development: the economic dimension (including the economic and social infrastructure, and the employment structure); the social dimension (including demographic issues, health and culture); the environmental dimension (including forest resources, water and air quality) [cf. Borys T., 2011, p. 75-81; Central Statistical Office, 2011].

As a result of a relevant and formal analysis of variables, 35 sub-indicators were proposed which reflect the levels of sustainable development split into 3 dimensions:

- the environmental dimension: OS1: municipal and industrial wastewater treated vs. total volume of wastewater; OS2: share of population served by treatment plants in the total population; OS3: afforestation rate; OS4: particulate matter emissions by particularly noxious plants per 1 sq. km; OS5: emission of gaseous pollutants by particularly noxious plants per 1 sq. km; OS6: area of walking and leisure parks per 1 sq. km; OS7: share of green areas in the total area; OS8: water consumption per person;
- the social dimension: S1: population density; S2: population growth rate per 1,000 population; S3: infant deaths per 1,000 live births; S4: graduates of junior high schools per 1,000 population; S5: share of apartments equipped with central heating; S6: share of apartments served by gas networks; S7: number of books per 1,000 population; S8: library members per 1,000 population; S9: population per library; S10: population per cinema seat; S11: doctors per 10,000 population; S12: hospital beds per 1,000 population; S13: number of apartments per 1,000 population; S14: number of kindergarten pupils per 1,000 children aged 3 to 5; S15: number of passenger cars per 1,000 population; S16: traffic accidents per 100,000 population;
- the economic dimension: G1: employees per 1,000 population; G2: share of employees in the working-age population; G3: hard-surfaced municipal roads in the district per sq. km; G4: sewage network length per sq. km; G5: water supply network length per sq. km; G6: share of commercial enterprises in the total number of operators registered in the REGON system; G7: permanent marketplaces per 1,000 population; G8: hotel beds per 1,000 population; G9: social foundations, organizations and associations per 1,000 population; G10: output sold per person¹⁷; G11: CAPEX in enterprises per person.

All sub-variables covered are indicators (rather than absolute values). This is supposed to somehow restrict the distortions resulting from the fact that some objects (districts) demonstrate certain characteristic features (e.g. a significantly larger population or area than other ones). In the second phase, the initial list of variables was subject to verification including the discriminatory capacity and volume of variables (degree of correlation with other variables¹⁸). Such analyses require that specific observations demonstrate adequate variation because a non-diversified variable is of limited analytical value. The classic coefficient of variation was used to measure the diversification of specific diagnostic variables.

¹⁷ The data relates to enterprises and operators with more than 9 employees.

¹⁸ As two highly correlated variables deliver similar information, it is recommended to eliminate one of them.

For the purposes of this paper, it was assumed that the set of potential variables reflecting the sustainable development level would exclude the characteristics which demonstrate a coefficient of variation below a critical threshold arbitrarily set at 10% (such characteristics are considered to be *quasi-fixed*). Beside variation, an important criterion for the selection of variables is their correlation. To assess the information value, the inverse correlation matrix (a method for the discrimination of features depending on the correlation matrix entries) was used. The inverse correlation matrix was calculated for each thematic sub-group. As the next step, where necessary, the variable with the highest diagonal entry, above the threshold set arbitrarily ($r^*=15^{19}$), was eliminated. Afterwards, the inverse correlation matrix was recalculated (for a reduced correlation matrix), and the diagonal entries were checked to see if they exceed the fixed threshold value. That procedure was continued until all diagonal entries were below or equal to that threshold. The above initial set of diagnostic characteristics was reduced due to low differentiation of variables by eliminating OS1, S5, S14, S15. In turn, based on the inverse matrix entries, the following variables were eliminated from the set of potential decision variables: OS5, S1, S9, S10 and G3. Having considered all criteria for the selection of variables, 26 variables were qualified to the ultimate diagnostic set. The nature of each of them was specified (stimulating effect / inhibiting effect / neutral effect). The stimulating variables (from the perspective of the aspect under consideration, high values are desired) included: OS2, OS3, OS6, OS7, OS9, S2, S4, S6-S8, S11-S13, G1, G2, G4-G11. Other ones were classified as inhibiting variables. None of the variables was neutral.

Table 1. Synthetic measure of sustainable development (SMSD) for Greater Poland districts (as at 2015)

District	SMSD	Rank	Group	District	SMSD	Rank	Group
chodzieski	0,4395	7	II	pilski	0,4217	19	III
czarn.-trzcian.	0,4011	25	III	pleszewski	0,4129	22	III
gnieźnieński	0,3933	26	III	poznański	0,4568	4	II
gostyński	0,4415	5	II	rawicki	0,4275	13	II
grodziski	0,4374	8	II	ślupecki	0,3715	33	III
jarociński	0,4223	17	III	szamotulski	0,4307	12	II
kaliski	0,3630	34	IV	średzki	0,4220	18	III
kępiski	0,4251	16	III	śremski	0,4110	23	III
kolski	0,3428	35	IV	turecki	0,3885	28	III
koniński	0,3723	32	III	wągrowiecki	0,3845	29	III
kościański	0,3832	30	III	wolsztyński	0,4179	20	III
krotoszyński	0,4323	11	II	wrzesiński	0,4412	6	II
leszczyński	0,3923	27	III	złotowski	0,4034	24	III
m.Kalisz	0,5100	3	I	DIFFERENTIATION			
m.Konin	0,4374	9	II	Minimum	0,3428		
m.Leszno	0,5357	2	I	Maximum	0,6972		
m.Poznań	0,6972	1	I	Average	0,4259		
międzychodzki	0,4263	15	II	Median	0,4220		
nowotomyski	0,4369	10	II	Standard deviation	0,0600		
obornicki	0,4265	14	II	Coeff. of variation	14,08%		
ostrowski	0,4165	21	III	1 st quartile	0,3428		
ostrzeszowski	0,3828	31	III	3 rd quartile	0,6972		

Source: own study based on the Local Data Bank of the Central Statistical Office.

¹⁹ Diagonal entries of matrix R^{-1} fall into the interval $[1, \infty)$.

One of the main requirements imposed by taxonomic methods on final diagnostic variables is their comparability (the addition postulate). With a view to ensure the comparability of characteristics, a standardization-based normalization process was performed.

To arrange the districts by sustainable development levels, the classic TOPSIS (*Technique for Order Preference by Similarity to an Ideal Solution*) was used. Unlike in the Hellwig's development pattern (commonly used by scientists), the synthetic measure is created based on Euclidean distance both from the pattern and from the anti-pattern. The smaller is the distance from the pattern (and the greater is the distance from the anti-pattern), the higher is the value of the synthetic variable (for a broader description, see Hwang, Yoon, 1981).

The calculated synthetic development measures reflect the districts' standing in 2015 compared to other areas. Based on the synthetic development measures, the districts were ranked by sustainable development level. As shown by the calculations, Greater Poland districts demonstrate quite moderate differentiation in terms of sustainable development levels (which is reflected by several factors, including low values of the coefficient of variation (14.08%) and of standard deviation (0.06)). Note also the narrow interquartile range which also confirms the relative low differentiation of districts in terms of the subject matter of this analysis. As regards 75% of districts, the synthetic measure of sustainable development was not above 0.4357 with a maximum and minimum at 0.6972 and 0.3428, respectively. Also, the synthetic measure demonstrated right-side asymmetry (the coefficient of skewness was 2.96). This means the values equal to or below the SMSD arithmetic mean were dominating. The maximum-to-minimum ratio for the synthetic measure was slightly above 2.03.

The highest levels of sustainable development were identified in urban districts (Poznań, Leszno, Kalisz). A distinctive feature of urban districts is the large disproportion between the synthetic measure of sustainable development in the city of Poznań (0.6972) and the city of Leszno, ranked second, where the SMSD based on 2015 data was lower by more than 30% (0.5357). Another observation are the very low ranks of districts located in the immediate vicinity of urban districts: the Konin district (32nd in the SMSD ranking), the Kalisz district (ranked 34th) and Leszno district (ranked 27th)²⁰. It seems that this pattern could be related to the phenomenon referred to as the "big city shadow." Municipal districts are the focal points for a large part of specific components of the entire region's socio-economic potential (including economic operators, significantly better quantitative and qualitative features of the social and economic infrastructure), contributing to lowering the sub-indicators of sustainable development in the corresponding land districts. The lowest levels of the synthetic measure of sustainable development were recorded in districts located mainly at the eastern border of the province which form a large continuous area. Starting from north-east, these are: Wągrowiec district (ranked 29th), Gniezno district (26th), Słupca district (33rd), Konin district (32nd), Koło district (35th), Turek district (28th), Kalisz (34th) and Ostrzeszów district (31st).

Based on synthetic measures obtained with the use of TOPSIS, the districts covered were grouped into four classes by the level of sustainable development, using the threshold method: I: $m_i \geq \bar{m} + c \cdot s_m$; II: high values of the development measure, with $\bar{m} \leq m_i \leq \bar{m} + c \cdot s_m$; III: low values of the development measure, with $\bar{m} - c \cdot s_m \leq m_i \leq \bar{m}$; IV: very low values of the development measure, with $m_i < \bar{m} - c \cdot s_m$; s_m means the standard deviation of the development measure; c is a constant greater than or equal to 1.

Three urban districts, Poznań, Leszno and Kalisz, were classed into the highest sustainable development group. Compared to other ones, that group demonstrates much more advantageous

²⁰ Except for the Poznań district, ranked 4th.

values of sub-indicators. This primarily includes variables referring to the saturation of specific districts with the social infrastructure (doctors and hospital beds per inhabitant) and economic infrastructure (length of the sewage and water supply networks per sq. km). The second group are districts where the sub-indicators of sustainable development, in most cases, go beyond the average levels, however to a lesser extent than in the first group. This group includes twelve districts which, except for the city of Konin, form two continuous, quite large areas. The first (and the smaller) area is composed of three districts: Krotoszyn district, Rawicz district and Gostyń district. In turn, the second one covers eight districts located (mostly) in the western and central part of the province, namely: Chodzież district, Grodzisk district, Międzychód district, Nowy Tomyśl district, Oborniki district, Poznań district, Szamotuły district and Września district. The third and the largest group (18 districts) is composed of districts with sub-indicators that are usually close to or below the average. The lowest group includes two districts: Kalisz and Koło. It demonstrates particularly low indicators as regards the share of apartments served by gas networks, the density of the sewage network or the number of doctors per 10,000 population (this is especially true for the Kalisz district where that very indicator was 0.86 in 2015, compared to the province average level of 2.91).

SPATIAL AUTOCORRELATION ANALYSIS

Relationships with a both socio-economic and environmental nature very often exist between neighboring local government units. In this analysis, sub-variables related to the sustainable development level often go beyond the conventional administrative borders of the areas under consideration, for reasons which include mobility of the population, linear nature of many infrastructural facilities, and migration of (gaseous or other) pollutants. As a consequence, correlation may exist between neighboring territories. Therefore, spatial autocorrelation should be covered by the analysis of spatial differentiation of sustainable development levels. What is especially important in this context, is the presence of some of kind of sustainable development clusters: large continuous areas which demonstrate high levels of sustainable development. The analysis of spatial relationships allows to determine the strength of relations between spatial units regarding sustainable development levels. Also, it enables the identification of groups of districts with similar levels of the feature concerned.

In such analyses, the basic step is to specify the neighborhood structures with spatial weights reflecting the scope of geospatial interactions between the measures of specific objects (e.g. based on the distance criterion or the common boundary criterion). A properly defined weight matrix should enable an objective representation of similarity between the location and identified attribute values with respect to neighboring objects within the boundaries of the area concerned [cf. Felcenloben, 2011, p. 142-143]. This paper uses the common boundary between districts as the proximity criterion.

The spatial autocorrelation analysis relies on two measure types: global and local measures. Global measures are a single-digit indicator of spatial autocorrelation or general similarity of areas. In turn, local statistics determined for each area allow for answering the question whether a district is surrounded by areas demonstrating high or low levels, or whether it is similar to or different than the neighboring districts [Kopczewska, 2007].

To verify the dependencies between the values of synthetic measures of sustainable development in specific districts and the corresponding values recorded in neighboring districts, the Moran's *I* statistics (both global and local) were calculated. To calculate the strength and nature of correlation throughout the area under consideration, the global Moran's *I* statistic was used, as it may be considered to be the basic statistic used in such analyses. It takes the following form [Sucheck, 2010]:

$$I = \frac{1}{\sum_{i=1}^n \sum_{j=1}^n w_{ij}} \cdot \frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}, \text{ with:}$$

x_i, x_j : values observed in locations i and j ($i, j = 1, 2, \dots, n$), \bar{x} : average value in all areas under consideration, w_{ij} : entries of the spatial weight matrix.

The global Moran's I statistic calculated for the synthetic measure of sustainable development was positive (0.1253) and, most importantly, statistically significant²¹. Positive autocorrelation means the existence of clusters with similar (low or high) values. For a more in-depth analysis, a dot plot of the global Moran's I statistic was produced. The slope of the regression line plotted on the graph is equivalent to the value of the global Moran's I statistic.

The next step of this study was to analyze the spatial distribution of variables throughout the territory under consideration, which is enabled by the local autocorrelation coefficients. The local Moran's I_i statistic, one of the Local Indicators of Spatial Association (LISA), was used to discover the share of the global autocorrelation for each location in the area covered by the analysis. For non-standardized variable values and for a weight matrix standardized by rows, the local Moran's I_i statistic is as follows [Suchecky, 2010]:

$$I_{i(w)} = \frac{(x_i - \bar{x}) \sum_{j=1}^n w_{ij}^* (x_j - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2}, \text{ gdzie:}$$

w_{ij} : entries of the spatial weight matrix of rank 1 standardized by rows, x_i, x_j : values observed in locations i and j ($i, j = 1, 2, \dots, n$); \bar{x} : average value in all areas under consideration.

Table 2. Values of the local Moran's I_i statistics

District	I_i	District	I_i	District	I_i	District	I_i
chodzieski	-0,06	koniński	0,85**	nowotomyski	0,03	szamotulski	0,01
czarn.-trzcian.	-0,03	kościański	-0,01	obornicki	0,00	średzki	-0,01
gnieźnieński	0,10	krotoszyński	0,00	ostrowski	0,01	śremski	0,00
gostyński	-0,06	leszczyński	-0,14	ostrzeszowski	0,27	turecki	0,74**
grodziski	0,00	m.Kalisz	-0,63	pilski	0,02	wągrowiecki	-0,03
jarociński	0,00	m.Konin	-0,27*	pleszewski	0,04	wolsztyński	0,02
kaliski	0,27	m.Leszno	-0,98	poznański	0,15	wrzesiński	-0,05
kępiński	0,00	m.Poznań	2,33	rawicki	0,00	złotowski	0,02
kolski	1,30**	międzychodzki	0,00	śłupecki	0,39		

Symbols: * statistically significant at $p < 0.05$; ** statistically significant at $p < 0.01$.

Source: own study

As shown by the values of local Moran's I_i statistics calculated for the synthetic measure of sustainable development, the values are statistically significant only in four districts: city of Konin, Koło district, Konin district and Turek district (the value of the local statistic is positive for the city of Konin, and is negative for other districts listed above). Thus, it may be concluded that the city of Konin is adjacent to an area with significantly different values of the synthetic measure of sustainable development, whereas the Koło, Konin and Turek districts are adjacent to areas with

²¹ The global statistic significance test was based on the analysis of histograms of the randomized permutation test. The hypothesis was verified based on the pseudo-significance level. The number of permutations was 999.

similar values of the synthetic measure of sustainable development. As regards other districts, values of the local Moran's I_i statistics for the variable under consideration were mostly negative. However, as they were not statistically significant, no particular attention should be paid to these results.

SUMMARY

Recently, an increase of the number of comprehensive measures of sustainable development, employed at various levels of spatial aggregation, has been observed. Despite these efforts, no widely accepted set of sub-variables was established for sustainable development at local level. Neither a method of selecting adequate weights for variables nor a methodology for developing such aggregated measures was created. Due to the multidimensional nature of this analysis, TOPSIS (a taxonomic method) was used to measure the sustainable development levels of Greater Poland districts. The analyses enabled the identification of quite moderate differences in the development levels of the territories under consideration. Based on the defined synthetic measures of sustainable development, the threshold method was used to group the districts demonstrating similar levels of the feature covered by this analysis. The highest levels of sustainable development were reported by three urban districts (Poznań, Leszno, Kalisz) while the lowest ones were recorded in the eastern part of the province. Extremely low values of the synthetic measure of sustainable development were discovered in districts located in the immediate vicinity of urban districts (including Kalisz district, ranked 34th, and Konin district, ranked 32nd). This could be related to the phenomenon referred to as "big city shadow." Urban districts are focal points for a large part of the entire region's socio-economic potential, contributing to lowering many sub-indicators of sustainable development in adjacent areas. To verify the dependencies between the values of synthetic measures of sustainable development in specific districts and the corresponding values recorded in neighboring districts, the Moran's I statistics were calculated. The value of the global Moran's I statistic calculated for the synthetic measure of sustainable development, based on 2015 data, was positive (0.1253) and statistically significant. When analyzing the values of local Moran's I_i statistics calculated for the synthetic measure of sustainable development, statistically significant values of the local Moran's I_i statistic were identified in four districts (city of Konin, Koło district, Konin district, Turek district). Only in the case of the city of Konin, the results of this study confirmed the existence of a negative, statistically significant spatial autocorrelation between the municipal district and the corresponding land district.

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EVALUATION METHOD OF REVITALIZATION WORKS IMPACT ON THE LEVEL OF LIFE IN SETTLEMENT UNITS

Abstract: The rural space is constantly undergoing change, created predominately by factors of anthropogenic character. The basic tool for improving the living conditions of the population living in rural areas, since 2015, is revitalization, defined by the provisions of the Act on revitalization from 9th October 2015. The main purpose of this paper is to present an innovative evaluation method of revitalization works impact on the level of life in settlement units, with particular regard to social, environmental, spatial-functional and technical conditions.

Key words: spatial order, sustainable development, revitalization

INTRODUCTION

Changes occurring in rural areas are the resultant of economic, social, political and cultural processes [Czapiewska 2014]. The large number of difficult-to-maintain indicators that generate rural development is the reason for the continually visible differences in the social, economic and technical activity of our rural areas. This state also deepens the fact that rural area possesses some of the original attributes and properties produced in the regular course of events, extremely difficult to transform [Liżewska, Knercer 2003].

The Act on Revitalization, introduced on 18 November 2015, provides the possibility of conducting spatial transformations by self-government units regardless of their size, scale of problems affecting the local community or sources of funding. The provisions of the Act from 9 October 2015 provide a number of practical tools supporting the preparation and normalization of the process of revitalization, requiring also the use of parameters describing the intensification of negative phenomena: social, environmental, spatial-functional and technical. The authors of this paper point out the need to include at the stage of revitalization programming process spatial principles of spatial order and sustainable management, since only that approach to the problem of revitalization can result in the minimization of social, spatial and ecological conflicts, thus improvement of the living conditions of the population living in rural areas. The main aim of the study is to present an innovative evaluation method of revitalization works impact on the level of life in settlement units, with particular regard to social, environmental, spatial-functional and technical conditions.

SUSTAINABLE DEVELOPMENT AND SPATIAL ORDER IN TERMS OF REVITALIZATION WORKS

Hans Carl von Carlowitz, who at the beginning of the nineteenth century limited the concept of sustainable development to the forest sphere, developed the fundamental principle of forest management in such a way that the annual increment of the stand was equivalent of the wood harvested from that forest. This principle, propagated by all German Forest Schools, has become a model for other modern and developing countries of Europe at that time. At present, the concept of sustainable development encompasses much broader spheres of life and according to the provisions of the Act on Environmental Protection Law is a socio-economic development in which the process of integrating political, economic and social activities takes place, preserving the natural balance and the sustainability of basic natural processes, to guarantee the ability to meet the basic needs of

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individual communities or citizens of both the present generation and future generations. Korelewski claims that the goal of sustainable development is to better satisfy the physical and psychological needs of mankind by correcting his attitude towards nature [Korelewski 2004]. A slightly different view on rural development issues is presented by Durand and Huylenbroeck [2003], which argues that the implementation of sustainable rural development is primarily linked to the promotion of alternative sources of income for rural residents. Income, thus constituting an integral part of the revitalization work.

In turn, according to Bański, the idea of sustainable development is inextricably linked to the notion of spatial order, defined by law in the Act on spatial planning and development form 27 March 2003 as shaping of space that creates a harmonious whole taking into account in the orderly relations all functional and socio-economic, environmental, cultural and compositional and aesthetic requirements and requirements. Bański [2008] argues that if the needs of the present generation are to be realized without undermining the prospects of future generations for their satisfaction, which is the basic idea of sustainable development, spatial order is an indispensable element of such development. Korelewski [2004] also claims that the concept of balanced, multifunctional development of rural areas necessary to achieve an integrated order, including spatial, economic, social, ecological and cultural order, is a measure of the work done revitalization.

REVITALIZATION "YESTERDAY AND TODAY"

Hull in 2004 pointed to the fact that the philosophical thesis underlying revitalization is the belief that biodiversity is a guarantee of the existence and further evolution of life in which there will be space for man and his world of culture and civilization. [Hull 2004]. In this statement, we can once again see the correlation between the fundamental assumptions of the concept of spatial order and sustainable development. The main idea presented in this statement applies today.

Another situation is with regard to many definitions developed at the beginning of the 20th century. For example, for the purposes of this study, the definition is presented in the Polish Language Dictionary, which specifies the concept of revitalization as: reconstruction of destroyed buildings or districts of the city [www.sjp.pwn.pl 2016.10.09]. This approach to revitalization was presented by many researchers and practitioners by 2015, by the definition of selective or fragmentary processes, usually focusing on easier to perform and providing faster but less significant effects such as renovations, maintenance, Adaptations, upgrades, renovation of buildings or reconstruction of roads.

At present the concept of revitalization has come to a legal definition and according to the provisions of the Act on revitalization from 9 October 2015, revitalization is a process of bringing out from a state of crisis the degraded areas, conducted in a comprehensive way, through integrated actions for the local community, space and economy, territorially focused, conducted by revitalization stakeholders based on the municipal revitalization program.

According to the aforementioned law, in order to develop diagnostics to assess the current state of implementation of the municipal regeneration program, the mayor or city president is obliged to conduct analyzes in which he will use objective and verifiable measures and research methods adapted to local conditions. The legislator gives a list of phenomena that should be assessed first. These include:

- social (particularly unemployment, poverty, crime, low level of education);
- economic (especially low level of entrepreneurship and poor local condition enterprises);
- environmental (in particular, exceeding environmental quality standards, the presence of life-threatening waste, human health or the environment);
- spatial-functional (especially inadequate technical and social infrastructure or poor technical condition, lack of access to basic services or poor quality, lack of urban solutions to changing function of the area, low level of communication service, shortage or poor quality of public areas);

- technical (in particular the degradation of the technical condition of buildings, including housing and non-functioning of technical solutions enabling the efficient use of buildings, in particular in terms of energy efficiency and environmental protection).

DEVELOPMENT OF THE METHOD – SELECTION OF EVALUATED PHENOMENA

In order to develop method for assessing the impact of revitalization on the standard of living of the population of settlement units, a list of 50 phenomena related to their social, environmental, spatial-functional and technical conditions was prepared. In order to develop a final list of 10 phenomena (assessment indicators), they were subjected to a survey. The surveyed group consisted of 100 people, experts in social sciences, urban planning, economics and environmental protection. Based on the analysis of the results of the surveys conducted, 10 most important phenomena affecting the quality of life of the population were selected. As a result of statistical analyzes using STATISTICA software, values of weights have been established to indicate the significance of a given phenomenon. Determining the values of weights allowed us to apply the weighted-sum method to determine the impact of revitalization works on the standard of living of the population of settlement units. In the latter part of the study, these phenomena were called evaluation indicators. Their list and weight values are as follows:

- unemployment rate, long-term unemployed young people (% share of long-term unemployed young people in total population) [0.112];
- persons receiving fixed income allowance (% share of persons receiving permanent support in the total number of residents) [0.110];
- area of developed public spaces (m²) [0.108];
- number of public facilities not accessible to the disabled (number) [0.104];
- number of roads requiring repair (km) [0.100];
- number of roads requiring repair (quantity) [0.098];
- number of closed micro enterprises (quantity) [0.096];
- the number of households burning coal-fired dwellings (quantity) [0.094];
- number of illegal garbage dumps detected (amount) [0.092];
- number of buildings requiring demolition (quantity) [0.086];

DEVELOPMENT OF MEASURES AND EVALUATION PRINCIPLES

In order to develop measures and evaluation principles for the impact of revitalization on the standard of living of the population of settlement units the point method was used. The proposed method allows to deduce all individually evaluated phenomena into one number which comprehensively expresses the overall quality of the object [Babicz-Zielińska, Rybowska, Obniska 2008]. Point scales combine the benefits of verbal scales and numerical scales. Every point of the scale has contractual numbers and the corresponding verbal term [Jędryka, Kozłowski 1986]. The precision of the results obtained depends on the correct definition of the individual quality levels, and this is the first condition for obtaining the correct results. The second condition is to train the assessment team to understand clearly the definitions of the individual features of the object.

Properly constructed point scale should meet four conditions:

- each degree of scale should correspond to a different level of quality that is relevant to the evaluator.
- each scale point (ie each level of quality) should have a clear definition of quality;
- the number of scale points should be limited and should not exceed 3 degrees;
- all features should be evaluated on a scale with the same number of points.

As part of subsequent tasks for previously developed measures, their descriptive scores have been developed. The list of ratings and scoring is as follows:

- unemployment rate, long-term unemployed young people: increase in the value of the measure (-1 point); value of the in unchanged (0 pts); drop in the value of the measure (1 point);
- persons receiving constant benefits: increase in the value of the measure (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- area of developed public spaces: decrease of measure value (-1 point); value of the measure unchanged (0 pts); increase in measure value (1 point);
- number of public facilities not accessible to people with disabilities: increase in the measure value (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- number of roads requiring renovation: increase of the measure value (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- number of newly created micro-enterprises: decrease in the value of the measure (-1 point); value of the measure unchanged (0 pts); increase in measure value (1 point);
- number of closed micro enterprises: increase in the value of the measure (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- number of households burning coal-fired dwellings: increase in the value of the measure (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- number of illegal garbage dumps detected: increase in measure value (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point);
- number of buildings requiring demolition: increase of measure value (-1 point); value of the measure unchanged (0 pts); drop in the value of the measure (1 point).

Table 1. Table of increment values

1	2	3	4	5
No	Indicator	Output value	Value on the assessment date	Calculated value (3-4)
1	unemployment rate, long-term unemployed young people			
2	persons receiving fixed income allowance			
3	area of developed public spaces			
4	number of public facilities not accessible to the disabled			
5	number of roads requiring repair			
6	Number of newly created micro enterprises			
7	number of closed micro enterprises			
8	the number of households burning coal-fired dwellings			
9	number of illegal garbage dumps detected			
10	number of buildings requiring demolition			

Source: own study

The development of measures was necessary to create a model that would serve to assess the impact of revitalization on the standard of living of the settlement population.

The assessment should be made according to the following rules:

- the gauges described in this study should be used for evaluation and presented together with the weight values in table 2 (simplified assessment sheet),

- necessary for the assessment of the data should be obtained from the municipality's authority in the area where the assessed settlement unit is located,
- first of all, fill the cells of table 1 to determine the increment value,
- increment values along with the appropriate characters are the basis for determining the values of the meters in column 4 (table 2),
- after marking the appropriate value in column 4 of table 2, this value, after multiplying by the appropriate weight col 5 (Table 2), should be entered in column 6 (Table 2)
- all calculated values in column 6 (table 2) should be summed up,
- the sum value will indicate the level of changes occurring within a given time in the area of the object being analyzed.

Table 2. Simplified card of state

1	2	3	4	5	6
No	Indicator	Measure	Measure value	Weight	4 * 5
1	unemployment rate, long-term unemployed young people	increase in measure value	1	0,112	
		value of the measure unchanged	0		
		decrease in measure value	-1		
2	persons receiving fixed income allowance	increase in measure value	1	0,110	
		value of the measure unchanged	0		
		decrease in measure value	-1		
3	area of developed public spaces	increase in measure value	1	0,108	
		value of the measure unchanged	0		
		decrease in measure value	-1		
4	number of public facilities not accessible to the disabled	increase in measure value	1	0,104	
		value of the measure unchanged	0		
		decrease in measure value	-1		
5	number of roads requiring repair	increase in measure value	1	0,100	
		value of the measure unchanged	0		
		decrease in measure value	-1		
6	Number of newly created micro enterprises	increase in measure value	1	0,098	
		value of the measure unchanged	0		
		decrease in measure value	-1		
7	number of closed micro enterprises	increase in measure value	1	0,096	
		value of the measure unchanged	0		
		decrease in measure value	-1		
8	the number of households burning coal-fired dwellings	increase in measure value	1	0,094	
		value of the measure unchanged	0		
		decrease in measure value	-1		
9	number of illegal garbage dumps detected	increase in measure value	1	0,092	
		value of the measure unchanged	0		
		decrease in measure value	-1		
10	number of buildings requiring demolition	increase in measure value	1	0,086	
		value of the measure unchanged	0		
		decrease in measure value	-1		
Very positive impact	$0,5000 \leq x \leq 1,000$	Negative impact	$- 0,500 \leq x < 0,000$	Sum	
Positive impact	$0,000 \leq x < 0,500$	Very negative impact	$- 1,000 \leq x < - 0,500$	Grade	

Source: own study

CONCLUSIONS

The entry into force of the Act on revitalization has created new opportunities for carrying out reliable revitalization works. However, the innovative approach to revitalization issues requires, the development of detailed projects for their implementation in this innovative method of assessing the effects of their implementation. The application of the method described in this paper allows:

- determine the level of change at any time interval,
- determine the level of change at any time during revitalization work,
- comparison of the level of change occurring in separate research objects, by computation to one value,
- in the case of negative evaluations of the processes under investigation, the basis for their modernization or complete abandonment of further negative changes,
- the results of the analyzes provided are valuable materials that can be used in social consultations.

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THE IMPACT OF AGRICULTURE ON THE NATURAL ENVIRONMENT ACCORDING TO ACADEMIC YOUTH

Abstract: The main aim of this study is to assess the level of awareness of the impact of agricultural production on the natural environment in a group of academic youth and to define selected socio-demographic factors determining it. The main source of data used was primary information from the author's own study. University students from the Małopolskie Voivodship were interviewed (436 persons). Statistical analysis of the researched material comprised summary statistical measurements and non-parametric χ^2 test. Conducted research demonstrates that the majority of academic youth does not even have elementary knowledge about the negative impact of agriculture on the natural environment. Only 15% of students have a high agricultural awareness level. The factors determining the level of ecological awareness in this group were gender and the place of residence. Men and inhabitants of urban areas had a higher level of knowledge about the degradation of the natural environment as a result of agricultural production.

Key words: academic youth, ecological awareness, agriculture, natural environment

INTRODUCTION

Environmental risks are not only a problem of urban agglomerations, but also of rural areas. B. Perepeczko [2012] states that there is a stereotype of exclusively environment-friendly agriculture. However, agricultural production, due to the achievements in science and technology and the lack of awareness and morality of producers, may be much more damaging to the natural environment than it used to be.

Intensive agricultural production is a serious threat for the environment and may lead to its degradation through [Bujanowicz-Harnaś 2007, Ochrona...2010, Wielogórska, Turska, Czarnocki 2011]:

- contamination of surface waters due to the incorrect use of fertilizers, in particular nitrogenous and phosphorous,
- soil and water contamination with residues of chemical plant protection products,
- incorrect wastewater management in agricultural holdings,
- intensification of different types of erosion and fertility reduction of soil;
- emission of gas substances (ammonia, methane, carbon dioxide, hydrogen sulphide) from intense husbandry or breeding of animals, into the air,
- emission of particulate substances (dust from litter, feed mills warehouses, cereal dryers, or other farm buildings) from intense husbandry or breeding of animals, into the air,
- landscape changes and extinction of particular species of fauna and flora.

Separating and determining the impact of agriculture on the natural environment is a very difficult task, due to, among other things, sector flows and a broad spectrum of dependencies [Kagan 2009]. Agricultural raw materials are used in not only agri-food processing for feed and food purposes, but also in other industry branches, such as pharmaceutical, chemical, cosmetic, textile, or energetic industries [Piwowar 2014]. On the other hand, agriculture uses goods manufactured in other sectors. It "consumes" energy carriers, machines, construction materials, mineral fertilizers, and plant protection products. The process of production of these goods alone affects the natural environment, producing particular consequences [Kagan 2011].

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According to A. Kagan [2011], in order to limit the negative impact of agriculture on the natural environment, the continuous search and implementation of pro-environment innovation is necessary. These changes should occur in agricultural holdings and in other units of the agribusiness. For this purpose, changes in lifestyle and behaviour of agricultural holdings owners and, in particular, consumers are needed. Households, impacting production means suppliers, agricultural raw materials recipients, and trade put the most effective pressure on agricultural holdings, motivating them to treat the natural environment differently. To ensure the efficiency of such actions, the consumers should be aware of the negative impact of agriculture on the natural environment.

The main aim of this study is to assess the level of awareness of the impact of agricultural production on the natural environment in a group of academic youth and to define selected socio-demographic factors determining it. Such a choice of respondents is due to the fact that the preferences and attitudes of this group will soon affect the direction of development of particular markets.

METHODOLOGY

The main source of data used was primary information from the author's own study. The research was conducted in the Q4 2016 using the PAPI method. The sample size was 436 persons. University students from the Małopolskie Voivodship were interviewed. In the 2014/2015 academic year, the number of university students in the analysed Voivodship was 182,597 [Szkoly... 2015]. Purposive sampling was used. To estimate the minimal sample size, the following formula was used [Szreder 2004]:

$$n = \frac{\frac{1}{4} \cdot N}{N \cdot \frac{d^2}{z_{\alpha/2}^2} + \frac{1}{4}}$$

where:

N — population size,

d — statistical error,

$Z_{\alpha/2}^2$ — the value of random variable Z of normal standard distribution.

The maximal value of the statistical error of the result was assumed as 5%. The necessary minimal sample size was determined as 433 persons. 450 students participated in the study. After excluding inconsistent and incorrectly filled questionnaires, data from 436 questionnaires was further analyzed.

The gender composition of the sample reflects the general population. 59% of the respondents were women and 41% were men (table 1). Almost 55% of the respondents lived in rural areas, the remaining persons lived in urban areas. Almost 15% of the studied population indicated that they lived in cities over of 100,000 inhabitants. Half of the inhabitants of rural areas lived in an agricultural households. The average area of such agricultural holdings was 7.6 ha. The smallest agricultural holding was 1 ha, the largest 70 ha. Almost 2/3 of the respondents stated that they had family members/friends working in agriculture and 53% indicated that their family members/friends worked in remaining agribusiness aggregates.

The research on the level of awareness of the impact of agricultural production on the natural environment in academic youth was one of seven parts of a research subject regarding determining the level of agricultural awareness in academic youth. The ecological awareness index (EAI) was used to measure the awareness of the impact of agricultural production on the natural

environment²⁵. The index was constructed based on the principles described by B. Birkenholz [1993]. The questionnaire he proposed allows taking the differences of agribusiness system between particular countries into account. The questionnaire had two parts. The first part contained statements requiring marking a positive (“yes”) or negative (“no”) answer or declaring a lack of knowledge (“I do not know”). The second part contained the respondent's particulars. 10 questions regarded the negative impact of agriculture on the natural environment (its impact on water, soil, and air pollution, soil erosion, landscape changes). The maximum score was 10 points, the minimum 0 points.

Table 1. The structure of the respondents (%)

Specification		Share in the sample
		(%)
Gender	Woman	59
	Man	41
Place of residence	Village	55
	City to 100 thousand residents	31
	City over 100 thousand residents	14
The respondent works on his own farm or parents' farm	Yes	23
	No	77
Acquaintances who work in agriculture	Yes	67
	No	33
Acquaintances who work in I (supply) and in III (processing) aggregates of agribusiness	Yes	46
	No	54

Źródło: own research, n=436

The statistical analysis of the studied material encompassed aggregate statistical indicators as well as the non-parametric “chi square” (χ^2) test allowing the assessment of the significance of relationship between variables if at least one of them is non-measurable. All the hypotheses were verified on the significance level $\alpha = 0.05$. Apart from the primary sources, secondary sources, which encompassed both domestic and foreign literature, were used. The results were presented in a descriptive, tabular and graphic form.

THE LEVEL OF ECOLOGICAL AWARENESS OF UNIVERSITY STUDENTS OF THE IMPACT OF AGRICULTURE ON THE NATURAL ENVIRONMENT

As stated before, the knowledge of the impact of agriculture on the natural environment is an element of citizens' agricultural awareness, which also includes the importance of agriculture, agricultural policy, animal and plant production, processing, and marketing [Meischen, Trexler 2003]. Analyzing all the required question groups, one can observe that the questions regarding the influence of agriculture on the natural environment had the smallest percentage of correct answers (only 43%). The percentages of correct and incorrect answers were identical (table 2). Almost 15% respondents chose “I do not know”. The comparison of these results with the results obtained in other European Union countries reveals that young people from Austria and Germany have a higher

²⁵ In this study, the ecological awareness and the calculated index (EAI) regards only knowledge, beliefs, and views of young people on environment degradation as a result of agricultural activities.

level of ecological awareness. The lowest level of ecological awareness is observed in young citizens of Greece, Cyprus, Romania, and Bulgaria [Ruben, Blanco 2010].

Table 2. The respondents' answers concerning basic knowledge about agriculture (%)

Specification	Correct answers	Incorrect answers	The answer "I don't know"
Importance of agriculture	70	13	17
Agricultural policy	53	19	28
Natural environment	43	43	14
Plant production	79	11	10
Animal production	91	7	2
Food processing	48	26	26
Marketing	56	15	29
Total	63	19	18

Source: own research, n=436

The average value of the ecological awareness index for this group is 4.32 points. Among the respondents, no one answered all the questions incorrectly. However, quite a high percentage of students (33%) knew the answer to only one question. Almost 35 respondents (2%) answered all the questions correctly (scoring 10 points). In order to verify the result using the χ^2 test, the results were divided into three ranges: a low level of ecological awareness (0–3 points), a medium level (4–6 points), and a high level (7–10 points). As shown on figure 1, 60% of the respondents had an average level of ecological awareness, one in four — low, and one in seven high (fig. 1).

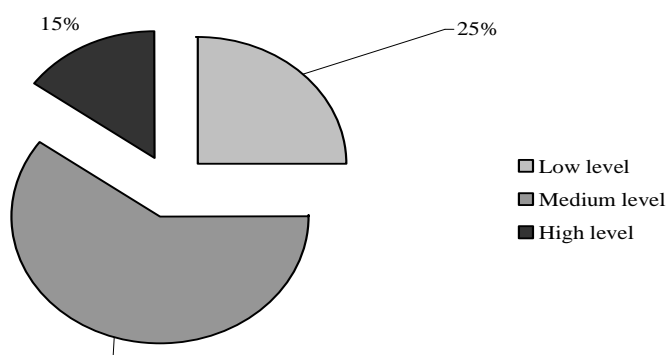


Fig. 1. Levels of the ecological awareness index for respondents (%)

Source: own research, n=436

Based on the conducted analysis, one can state that the level of knowledge about the impact of agriculture on the environment is determined by several factors, one of which is gender. Women

were characterized by a lower level of knowledge of this subject (table 3). The average result in women was 2.1 points, whereas in men it was 5.2 points. A little over 80% women had an average level of ecological awareness, the level of the remaining female respondents (19%) was low. No woman had a high index level. Therefore, in this case the χ^2 test could not be performed, as the minimal number of answers in the contingency table should be 8 [Kukuła, 2012]. In comparison, one in four men had a high level of ecological awareness.

Table 3. Respondents structure according to the level of ecological awareness (%)

Specification		Level of ecological awareness		
		Low	Medium	High
Gender	Woman	19	81	0
	Man	26	48	26
Place of residence	Village	25	62	13
	City	18	55	27
The respondent works on his own farm or parents' farm	Yes	25	54	21
	No	20	73	7
Acquaintances who work in agriculture	Yes	71	21	8
	No	73	27	0
Acquaintances who work in I (supply) and in III (processing) aggregates of agribusiness	Yes	80	15	5
	No	65	30	5

Source: own research, $n=436$

Another factor determining the awareness of the negative impact of agriculture on the natural environment is the place of residence. According to the conducted studies, the inhabitants of urban areas had a higher level of agricultural awareness. The average score of this group was 4.5 points. The inhabitants of rural areas scored 3 points less. The χ^2 test analysis showed that there are statistically significant differences in the level of agricultural awareness between the inhabitants of rural and urban areas ($\chi^2=10.8$; $df=2$), which corresponds with the results obtained by other researchers [Perepeczko, 2012]. In the case of the respondents from both urban and rural areas, the majority had an average level of ecological awareness, but there were fewer people in the third group (high level) and more people in the first group (low level) among the inhabitants of rural areas in comparison with the inhabitants of urban areas.

The statistical analysis shows that the level of agricultural knowledge also depends on whether the respondent's parents has an agricultural holding ($\chi^2=16.3$; $df=2$). 1/4 of the respondents owning an agricultural holding had a low level of ecological awareness and a little over 50% of the respondents from this group achieved an average result. The remaining persons had the highest level of awareness of negative impact of agriculture on the natural environment. According to B. Perepeczko [2012], the level of ecological awareness in farmer families correlates with the area of the holding. The highest level is observed in owners of the smallest holdings (1–2 ha) and owners of holdings over 20 ha.

In the group not related with agricultural holding management, the majority had an average awareness level (73%). The remaining respondents had either a low (20%) or a high (7%) level.

Having family members/friends working in agriculture ($\chi^2=4.8$, $df=2$) or other agribusiness system aggregates ($\chi^2=1.3$, $df=2$) does not affect the ecological awareness of an individual. The average score, both for the respondents, the family members/friends of whom work in agribusiness system aggregates (supply, agriculture, processing, and trade) and the respondents without such acquaintances was 4.1.

CONCLUSIONS

The conducted research allowed the level of ecological awareness of academic youth in the Małopolskie Voivodship to be defined and the selected factors determining it to be determined. The ecological awareness index was used for that purpose. The conducted research demonstrates that the majority of academic youth does not even have elementary knowledge about the negative impact of agriculture on the natural environment. Among all the modules constituting the agricultural knowledge index, the percentage of incorrect answers was the highest in the module concerning the impact of agriculture on the natural environment. This means that the way of teaching about the impact of agriculture on the natural environment at all levels of school as well as the methods of education of the whole society are not effective enough and insufficient. Educational actions raising the awareness of young people regarding the potential risks of agricultural production for the natural environment is needed.

The factors determining the level of awareness in this group were gender and place of residence. Men and inhabitants of urban areas had a higher level of agricultural awareness. The relation between the level of ecological awareness of a young person and having parents/family members who work in agriculture and remaining aggregate of the agribusiness was not observed.

Young people respect and protect the natural environment when they understand its processes and results of degradation. Therefore, research assessing the citizens' level of knowledge about the impact of agriculture on the natural environment should continue and the information obtained should be used to elaborate teaching programmes and planning campaigns on popularising this knowledge in the society.

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MARKET TURNOVER OF LAND AS THE BASIS OF THE EFFICIENT DEVELOPMENT OF AGRARIAN SECTOR IN UKRAINE

Abstract: Agrarian sector is of high-priority and strategic value for Ukrainian economy, which has shown positive dynamics in recent years; it is more efficient in comparison with other branches of economy and has a significant share in the export of products to the markets of the EU and other countries.

The role of AIC for Ukrainian economy and its sectorial structure is determined. The existing model of land relations and its influence on the development of agrarian sector is analyzed. It is defined that position of agrarian sector of economy of Ukraine in the future depends on the level of long-term investments, its crediting and state support of agricultural producers aiming at the maintenance of competitive positions at the world food market.

It is concluded that providing the transparent market of agricultural lands will promote the development of competition and entrepreneurship in agricultural production, creation of conditions for the formation of efficient owner in the countryside, and in conditions of lack of budget resources as well as crisis of Ukrainian banking system the provision of real opportunities for the development of long-term crediting and renewal of material and technical basis of agrarian economic sector.

Key words: land market, integration, AIC, financial support, moratorium, investment process, long-term crediting

PROBLEM SETTING

Strengthening the processes of globalization and aggravating the problems of providing food products to the world's population will require further development of the agro-industrial complex of Ukraine as a priority and strategic sector of the country's economy and its integration into the world food system.

However, the moratorium for land market in Ukraine existing for decades is a braking path to the development of small-scale enterprises which constrains the disclosure of unused potential of agrarian sector.

ANALYSIS OF RECENT STUDIES AND PUBLICATIONS

In works of Y.Hadzalo [5], I. Kyrilenko [5], Y. Lupenko [6], M.Martyniuk [6], M.Fedorov [7] etc. special attention was paid to financial support and increase of the efficiency of Ukrainian agrarian sector development, including through the development of land relations.

Taking into account a range of problems in the agrarian economic sector of Ukraine which are connected with the imperfect agrarian policy, the necessity of solving problems of development of land relations as the basis of the efficient agricultural production in conditions of increase of competition at the world market arises.

Aim of the article is to determine the role of AIC in the development of economy of Ukraine and the necessity to provide market turnover of land for activation of long-term crediting of enterprises of agrarian sector.

Ukraine is one of the leading agrarian countries which in the ranking of world exporters for 2015-2016 (according to USDA data – Ministry of agriculture of the USA) takes 1st place in export

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of sunflower oil, 3rd place – in export of barley, 4th – in export of corn, 6th – in export of wheat and seeds of oil crops and 8th place – in export of broiler meat [1].

In the sectorial structure of AIC of Ukraine the leading position is taken by agriculture which is spread all over the territory of Ukraine; its role is determined by the fact that 70% of Ukrainian territory is involved in agricultural production; agrarian products provide around 12%

of GDP; almost 70% of middle-aged workers are employed in the agrarian sector; plant growing is dominating, its share accounts for more than 70% of all agricultural products; production of AIC makes up more than 40% of commodity exports. Structure of economy in Ukraine is characterized by the largest share of the total agricultural land area – 35% (15,1 million. ha) used by households and 45,4% (19,5 million. ha) used by private agricultural enterprise. Such agricultural enterprises belong to one owner and are combined in large agro holdings cultivating around 6 million ha of agricultural lands and provide 22% of Ukrainian agricultural products, in particular exporting agrarian raw materials – cereals and oil crops. The rest 17,2% (7,3 million ha) belong to the central and local authorities (these areas are not at all processed or used not for agricultural purposes) and 2,2% (0,9 million ha) of agricultural lands are cultivated by the state agrarian enterprises [2].

Making comparison of the size of agricultural enterprises in Ukraine as compared with other countries, it should be noted that according to data for 2015 in Poland the largest amount of enterprises is up to 5 ha in size, in Germany – 20-50 ha, while in Ukraine – over 100 ha.

Thus, in the European Union there are about 27 millions of agricultural producers, 97% of which are individual (family) farms. In Poland there 2,6 millions of such enterprises. Average size of farms in Poland is 6,5 ha, in Germany - 45,7 ha, whereas in Ukraine – 117,3 ha. [3, p.22].

In Ukraine with the population of 42738 thousands people there 39,4 thousands farms, whereas in Poland with the population of 38116 thousands people there are 2391 thousands of farm units, in Germany with 82218 thousands of people there are 371 thousands of farm units respectively.

Thus the peculiarity of functioning of small-scale enterprises (farms) in Ukraine is a significantly larger area of lands of an average farm and the lowest level of density relative to the number of available population. Therefore it should be concluded that the priority of modern market relations in AIC of Ukraine is functioning of large-scale enterprises which differs from practice of the analyzed European countries and this is a restraining factor to the development of animal husbandry in Ukraine, production of different by types of agricultural products, and not only cereal and oil crops, which can be provided just by small-scale enterprises.

During the 15 years of the moratorium on the land market in Ukraine, the main form of land relations is lease agreements with shareholders, of which 4.7 million was concluded for the total area of 16.6 million hectares and 56 thousand contracts of agricultural land for a total area of 2.5 million hectares.

At the same time, the rental fee received by the owners of shares remains too low.

Thus, according to the World bank project “Monitoring of land relations” realized in Ukraine for 2 years within which data of State Statistics Committee of Ukraine, Tax service and State Service of Ukraine for Geodesy is accumulated, share owners in 2016 received only 845,6 hrn of rent from one hectare of leased land [4, p. 17].

Despite of the efficiency of agro industrial production in Ukraine over the past years, world leadership of the industry in exporting certain types of agricultural products existing land relations through the moratorium restrain the disclosure of unused potential of the agrarian sector of the economy, further efficient agricultural development in the conditions of European integration and the growth of the competitiveness of the countries, and also do not promote the development of social infrastructure in the countryside due to lack of the real owner namely a small-scale producer.

The simplest calculations, based on comparable yield capacity, prove that 3.3 billion of dollars is not well received annually or 43 billion of dollars is the aggregate result of 2004 from the

moratorium action. Besides, the moratorium has led to significant structural distortions in the agrarian sector. They are manifested in the formation of ultra-large agrarian formations, the ten largest of which have about 3 million hectares of land in their use, receiving monopoly rent, constantly increasing their land bank [4, p.16].

The analysis of the current tendencies in the formation of order in the agrarian sector of Ukraine shows that the inhibition of the development of the land reform has frozen the interrelated synergetic factors in the development of the agrarian sphere, which led to the formation of a specific pattern of agricultural activity - from the extremely large producers who perceive certain risks in the development of land reform to farmers, private peasant farms and other small producers, for which the state did not create conditions for self-development. Such a situation led to the progression of monopoly, inhibition of the small producer, one-sided export-oriented agro-industrial production, distortion of the competitive environment [5, p.5].

Thus the existing model of land relations on one hand promotes the amounts of export of cereals and oil crops and stable currency earnings, on the other hand it has a range of disadvantages among them: the rental market is characterized by local monopolies; Ukrainian legislation contributes to exaggeration of crop rotation with oil crops; uneven social infrastructure; the predominance of the raw material structure of the AIC that does not generate the added value; the country staying outside the land market without receiving taxes and fees from land transactions and not having the capacity to provide rural development and investment incentives.

Martyniuk M.P. emphasizes on the damage which the moratorium on land purchase and sale has on the social sphere and stresses that "decline of population of Ukraine is mainly connected with its agricultural share, which has been reduced for the last 16 years by 2,9 million people or 18,1%, which by 60% exceeds the rate of urban population shortening "[4, p.17].

Thus, in our opinion moratorium is a breaking mechanism of the development of small-scale and medium entrepreneurship in the countryside which should become the driver of economic activity, employment of rural population and development of rural territories. Blocking the functioning of a transparent land market by the legislation does not allow it to fulfill its basic functions, including determining the real value of land plots, promoting the efficient use of land, ensuring mobility of land use as a factor of production, due to changes in the structure of production and the possibility of alternative use of resources.

The absence of a market turnover of agricultural lands reduces the possibility of attracting additional financial resources to the agricultural sector of the economy, where the share of provided loans is only 1.7% of the total amount of the loans granted to the economy.

Only the land market will be able to revive crediting of enterprises in the agrarian sector of the economy, and one of the possible consequences of the introduction of free circulation of land - is the possibility to give land on bail. In a broad context, for Ukraine the recognition of land capital as an object of land circulation has already become the determining factor, which will force everyone to treat land not only as a productive resource but also as a powerful financial factor that will ensure the functioning of all factors of production in a single market environment, Including land resources [5, p.9].

The experience of the developed countries, current trends in the development of agriculture and rural areas of Ukraine clearly indicate that the introduction of market turnover of agricultural lands should be preceded by the creation of favorable conditions for the development of the agrarian economy, especially in matters of sound taxation, effective market mechanisms for state support to agrarian entrepreneurship, and mortgage lending, the formation of market infrastructure, the prevention of monopoly manifestations, a significant limitation of agrarian market toning; maximal promotion of the development of production and service cooperatives, agricultural risk insurance and other components of market development [5, p.6].

In opinion of Lupenko Y.O. [6, p.9] factors restraining the formation and functioning of market turnover of agricultural lands are "the delay in formation of normative-legal basis concerning problems of market turnover of agricultural lands, incompetence of its infrastructure; lack of modern data of state land inventory by forms of ownership and business entities; absence of a mechanism for consolidation of land plots and its scientific-methodical and institutional and legal support; incompetence of a state regulation system in relation to the formation and functioning of the market circulation of agricultural lands".

The state should play a decisive role in regulating the land market. It should possess the right to restrict the market turnover of land plots, to withdraw them in case of misuse and control of the pricing process in the organized land market, especially at the initial stages of its introduction [7, p.55].

In world practice, various models of land market introduction are known, the study of which will enable the use of individual elements, since it is impossible to completely copy someone's model. Thus, in Poland the maximum area of land that can be owned by one owner is 300 hectares, in Germany - 450 hectares. In addition, there is a requirement for professional training and farmer experience in these countries.

In Germany, where the agricultural land market was introduced in several stages of about 10 years, according to the rules currently in force, the buyer has to live or move to a place of a purchase of a plot of land for farming [4, p. 20].

In order to protect the interests of the Ukrainian producer, preservation of the peasant's structure the subjective part of the buyers of agricultural land should be limited solely to Ukrainian citizens who have experience in agriculture and (or) appropriate education, the intention to independently conduct agricultural activities and live within the territorial community, where the land plot is located [6, p. 12].

The presence of various models of land relations in world practice proves that Ukraine should create such a model that will promote the national interests and needs of the country. Now there is a necessity for the state to provide financial support of the small-scale producer capable of providing domestic needs of the population of the country in food and employment in the countryside, promoting rural development, protection and efficient use of lands.

National interests in the conditions of integration processes are to increase profitability and export growth by transforming the state from the exporter of raw materials to the exporter of the processed agricultural products.

CONCLUSIONS

Thus, agriculture is a high-priority and strategic branch of Ukrainian economy, agrarian sector of economy has shown positive dynamics in recent years; it is more efficient in comparison with other branches of the economy and has a significant share in the export of products to the markets of the EU and other countries.

The present requires not only consolidation of the obtained results of the development of the agro-industrial complex, but also ensuring a qualitative leap in its development and preservation of competitive positions at the world food market.

Position of agrarian sector of economy in future depends on the level of long-term investments, its crediting and state support of agricultural producers.

Providing the transparent market of agricultural lands will promote the development of competition and entrepreneurship in agricultural production, creation of conditions for formation of efficient owner in the countryside, and in conditions of lack of budget resources as well as crisis of Ukrainian banking system the provision of real opportunities for the development of long-term crediting and renewal of material and technical basis of just small-scale enterprises, which need state support.

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THE EFFICIENCY OF PRODUCTION OF OAK TIMBER FOR THE DOMESTIC MARKET

Abstract: The article discusses the efficiency of production of timber and sawn products. The study was based on sawing data obtained from medium-size sawmills processing hardwood. The data covers a full calendar year. The article presents the results of sales of edged and unedged sawn products made from oak-wood of WC0 and WD classes. Round wood for processing was acquired from the 'State Forests' National Forest Holding. The indicators of the efficiency of production of timber and sawn products for sale on the domestic market were verified and compared. The research showed that the average efficiency of production of unedged timber was higher than the efficiency of production of edged assortments. The indicators were verified on wet assortments produced by means of the single wood-sawing technology (sharp-edged).

Keywords: oak-wood, timber, qualitative classification, efficiency

INTRODUCTION

The sawmill industry is a dynamically developing branch of the Polish wood sector. A large part of its production goes to the European market in its broad sense. It is the second largest industry after the furniture industry. The increasing demand for round wood, especially high quality wood, causes the prices of some wood types to rise systematically both in Europe and in Poland. In consequence, there are higher prices of finished and semi-finished products (Jarvinen, 2014), but these prices grow much more slowly than the prices of raw material. We can observe a slow but steady increase in the technological level of Polish hardwood processing enterprises. There is also noticeable improvement in the technological equipment used for production. However, the modernisation of production departments in Poland is much less advanced and slower than in wood processing enterprises in Western Europe. Polish enterprises do not have such a wide range of wood processing machinery. Nevertheless, they tend to achieve high values of efficiency and economic indicators in elemental sawmill processing (Ratajczak et al. 2010, Dietz & Krzosek 2004).

It is necessary to increase automation of the technological process and modernise elements of the wood processing chain in small and medium sawmills, which are unquestionably predominant on the Polish market (Gotycz et al. 2008, Ratajczak et al. 2011). It will let them maintain competitive prices and good quality of their products.

When we analyse the relation between the income from the sales of sawn assortments and the prices of round wood, we can estimate the cost-effectiveness of processing. According to one of the methods, the most important and basic indicator of cost-effectiveness is the price relations of sawn products, presented as the function of the efficiency of raw material referred to its purchase value. The dimensional and qualitative parameter of round wood is taken into consideration as well.

Improvement of the production process is particularly important for elemental hardwood processing. The most important element of the process is to make the highest quality products possible and to maintain high material efficiency. It is also important to shorten the process of

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production of sawn materials and to extend their life. Standardised specification of products and better quality control during the production process result in higher profitability of enterprises. New, more efficient methods of making semi-finished products, including wood cutting methods, improve wood material processing.

Research on the level of production after changes in the sawmill industry in Poland has shown that most enterprises which improved their position on the market made innovative investments by modernising or purchasing new machinery. New production trends and the demand for new assortments increased the assortment of individual enterprises (Ratajczak et al., 2010). This situation resulted from systematic improvements in methods of work and production organisation.

The modernisation of sawmills in Poland is a gradual process. It depends on economic and technological factors related with the business activity. The use of high-efficiency auxiliary machine tools, such as multi-blade circular saws, is an important element of improvement of wood processing. They increase productivity considerably when they are used for cutting prisms. The degree of mechanisation between work stations is regarded as an element of innovativeness. It increases productivity and the quality of products (Lis 2012).

The development of the sawmill industry and modernisation of individual enterprises noticeably increases the efficiency of production of sawn materials. The automation of the wood processing line reduces employment per 1 m³ of material processed (Hruzik 2006, Strykowski 2015).

AIM AND RANGE OF STUDY

The aim of the study was to determine the influence of the assortment of sawn materials on variation in the efficiency of processing oak-wood of lower quality classes. The methodological assumptions were verified upon the merchandise turnover on the domestic market referred to products made in small and medium sawmills.

The study involved analysis of oak-wood processing during a full calendar year. The qualitative and quantitative variation in the production of sawn materials was verified. The research also included a comparison of the factors influencing variation in the material type, quality and quantity as well as basic wood processing indicators.

METHODOLOGY

Measurements of the volume of timber and other sawn materials were made in manufacturing enterprises, according to the Polish standard PN-EN 1309-1:2002 Round Wood and Timber – Dimension Measurement – Part 1: Timber. Sawn products were classified according to assortments, dimensions and quality.

Wood was cut with disc and frame saws. Next, it was measured and classified. This procedure increased productivity and improved the use of material. Group measurements reduced workers' participation in the creation of round wood and timber quality. The sawing analysis was based on long logs and other logs of the third and fourth quality classes (WC0 and WD) and the first and second thickness classes. The processing efficiency indicator was calculated from the value of raw material, which was a key factor of elemental processing. The following formula was used (after Wieruszewski et al. 2008):

$$E(p) = (\Sigma Vw * Cw + \Sigma Vz * Cz + \Sigma Vo * Co \Sigma Vs * 100) / (Cs + Tr) [\%] \quad (1)$$

where:

$E(p)$ – the efficiency indicator

V_w – the volume of processed products for sale on the domestic market,

C_w – unit prices of products,

V_z – the volume of woodchips,

C_z – the contractual conversion price of woodchips,

V_o – the volume of waste and sawdust,

C_o – the conversion price of waste and sawdust,

V_s – the volume of raw material,

C_s – the price of raw material,

Tr – the cost of transport of raw material.

RESULTS

Table 1 contains data referring to oak wood sawing during a full calendar year, assuming that the annual volume of wood processed is about 10,000 m³. The research proved that the volume of wood processed in individual months of 2016 was stable. There was a slight drop in production in the summer months and at the beginning and end of the year.

Table 1. The structure of oak wood sawn in 2016

Thickness [mm]	The thickness of the obtained sorts - share in months [%]												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
Qb 22	0,00	5,22	0,17	0,00	0,00	0,00	0,00	0,00	3,51	0,00	0,00	0,00	8,90
Q 28	5,83	0,00	5,80	7,43	7,83	4,85	6,36	4,62	1,54	6,13	4,89	4,93	60,21
Q 38	0,55	0,00	0,51	0,30	0,00	0,64	0,00	0,00	0,47	0,10	0,53	0,00	3,09
Q 70	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01
95x95/133x133	0,28	0,00	0,00	0,39	0,39	0,00	0,81	0,40	0,40	0,40	0,00	0,21	3,29
135x235	0,00	0,00	0,29	0,00	0,00	0,84	0,40	0,00	0,00	0,12	0,00	0,00	1,65
150x150	0,00	0,00	1,38	0,00	1,29	0,00	0,00	0,00	0,39	0,77	0,37	1,15	5,35
160x260	0,43	0,79	1,07	1,58	0,12	0,00	1,26	0,48	0,67	0,81	0,14	0,97	8,31
240x240	0,00	0,00	0,40	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,40
Unedged timber, medium length	0,52	0,59	0,82	0,96	0,95	0,70	0,87	0,61	0,86	0,69	0,59	0,63	8,79
Total	7,60	6,60	10,4 4	10,6 6	10,5 9	7,03	9,69	6,11	7,84	9,02	6,52	7,89	100

Source: the author's compilation based on enterprises' documentation

The annual analysis (Table 1) showed that the greatest volume of wood was processed in the spring months (March, April and May). The largest amount of sawn materials was produced at that time – about 1,660 m³ of timber, whereas the annual volume of production amounted to 5,240 m³. During the full financial year the decrease in production was caused by downtimes and holidays at the end of the year.

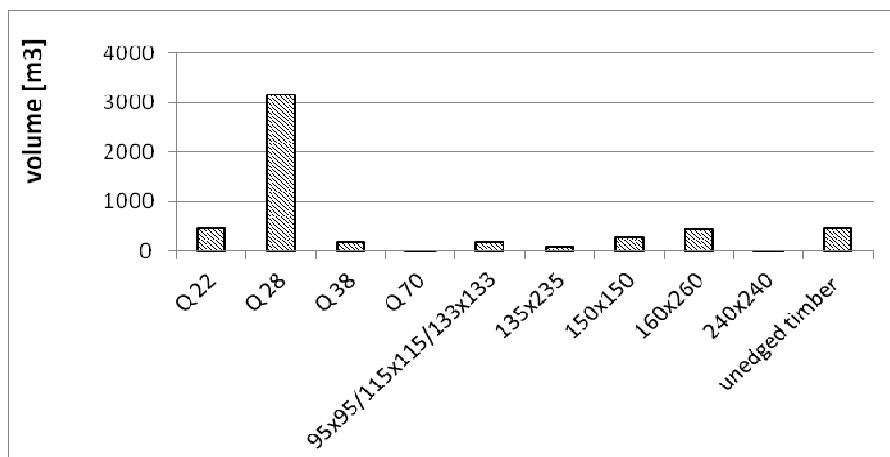


Fig. 1. The annual production of sawn oak-wood assortments

Source: the author's compilation based on enterprises' documentation

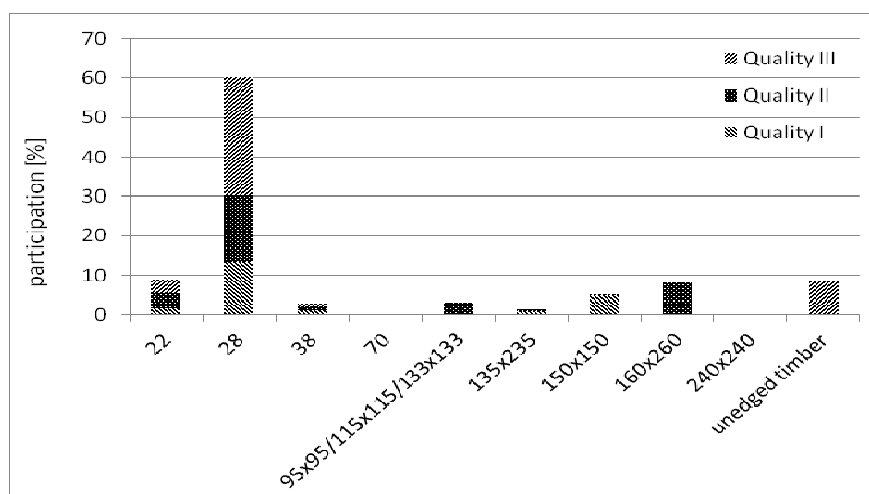


Fig. 2. The annual production of oak timber by quality class

Source: the author's compilation based on enterprises' documentation

Unedged assortments were chiefly produced from oak-wood. Their share amounted to about 81%. 28-mm-thick timber was a considerable part of the assortment. It was produced by single sharp-edged sawing. The annual analysis of the results of sawing oak-wood into timber showed the predominance of 28-mm-thick timber as the main sawn products (Fig.1). Square-sawn timber sized 160 x 260mm was the largest group of edged oak-wood assortments (8%). The qualitative analysis of the sawing of long logs and other logs of the third and fourth quality classes (WC0 and WD) and the first and second thickness classes showed the highest share of the third quality class timber (43%). Only about 23% of sawmill products were categorised as the first quality class. As far as unedged oak timber is concerned, products of the third quality class amounted to about 43%, whereas the share of the first quality class products amounted to about 16%. About 995 m³ of edged

oak timber was produced. The share of the first quality class products amounted to about 7%, whereas the second quality class products amounted to about 12% of all sawn materials.

SALES PRICES OF SAWN MATERIALS

Figures 4-5 show verified average purchase prices of round oak-wood (Fig. 3) and sales prices of edged and unedged sawn products in 2016. Round oak-wood is the most valuable product in Poland. It is predominant in auction sales. In 2016 the transaction prices ranged widely from 337 to 2,270 zlotys/m³. The average price was 896 zlotys/m³.

Fig. 4 shows the average prices of unedged assortments according to different thicknesses and quality classes. During the period under study the value of wet sawn products ranged from 1,000 to 3,000 zlotys/m³. The greater the thickness and quality class of timber was, the higher the price of 1m³ was. Fig. 5 shows the average prices of edged hardwood timber on the local market.

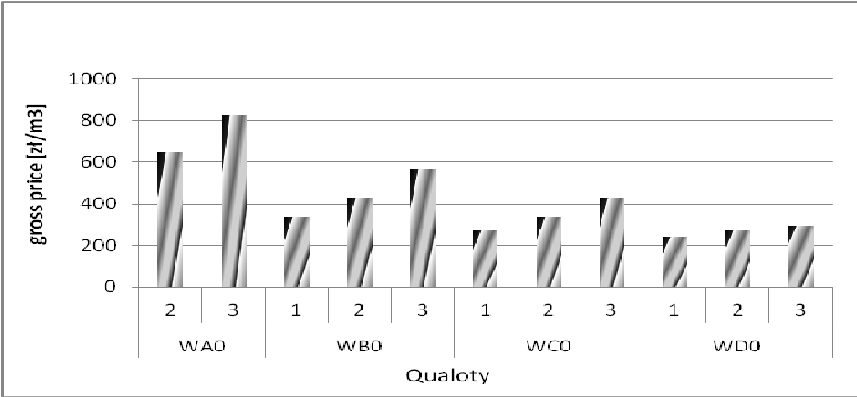


Fig. 3. The prices of oak-wood according to thickness and quality classes

Source: the author's compilation based on enterprises' documentation

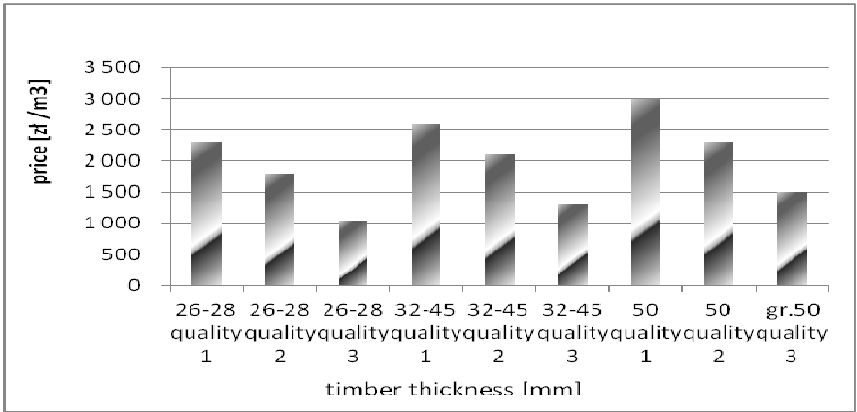


Fig. 4. The price of unedged oak timber on the local market

Source: the author's compilation based on enterprises' documentation

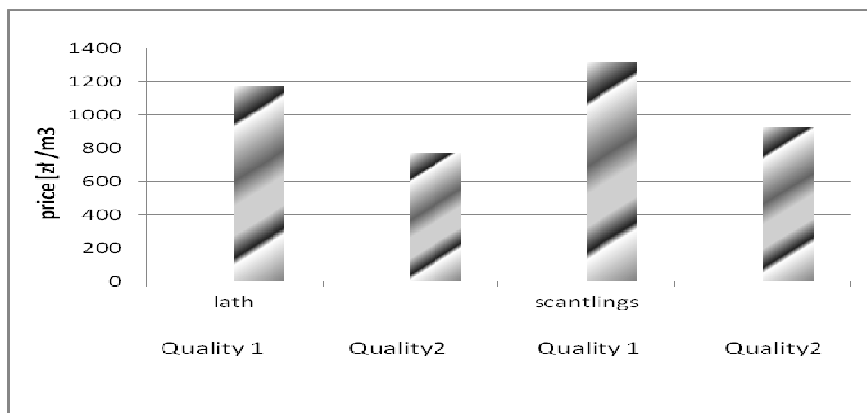


Fig. 5. The price of edged oak timber on the local market

Source: the author's compilation based on enterprises' documentation

The gross values were divided into quality classes and assortment groups. Fig. 6 shows the efficiency of production of unedged timber for sale on the domestic market. The highest efficiency of oak-wood processing was noted in the first quality class of sawn materials. It ranged from 140% to 182%. The lowest efficiency was noted in the third quality class, where it ranged from 63% to 80%. The average efficiency was 121%. The weighted average, which depended on the price of timber and quality class of elements, amounted to 115%.

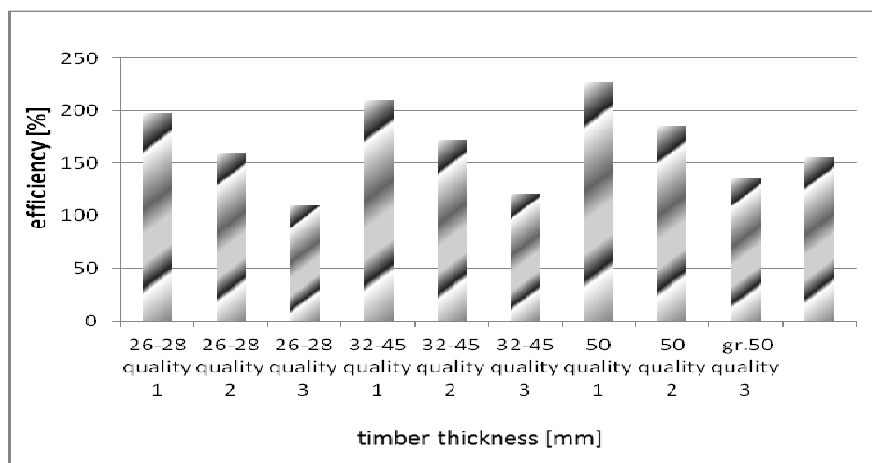


Fig. 6. The efficiency of production of unedged oak timber for sale on the domestic market

Source: the author's compilation

The results show that it is necessary to search for possibilities to increase efficiency. Higher efficiency might be achieved by increasing the share of timber of higher quality classes in the total amount of oak-wood processed. It is particularly important due to the considerable increase in the prices of round wood and low increase in the prices of timber.

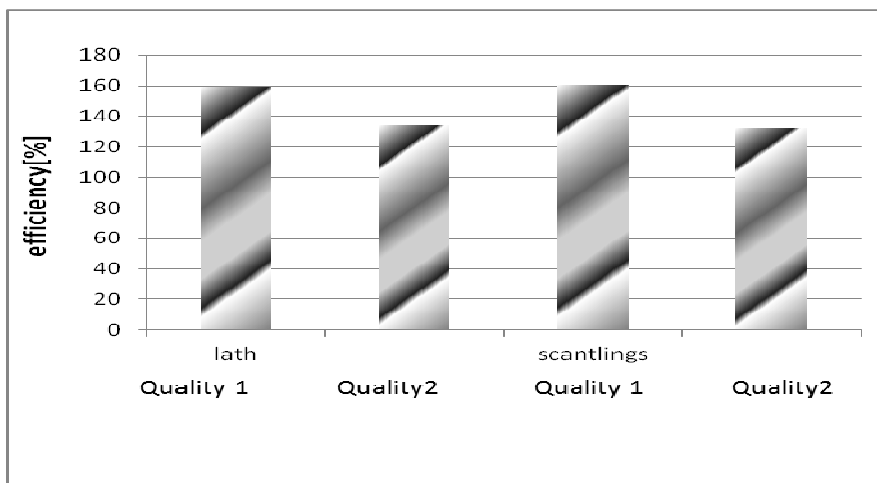


Fig. 7. The efficiency of production of edged oak timber for sale on the domestic market

Source: the author's compilation

Fig. 7 shows variation in the efficiency of production of edged oak-wood elements for sale on the domestic market. The efficiency of production of square-sawn oak timber and logs ranged from 134% to 152%. The average efficiency, which depended on the price of timber and quality class of sawn elements, amounted to 133%. The weighted average was only slightly greater – it exceeded 136%.

There were low values of production efficiency indicators both in edged and unedged timber. This situation resulted from the insufficient qualitative efficiency of sharp-edged processing. Additionally, this model of sawing causes loss in processing. The loss may significantly reduce the qualitative use of sawn products. It is also significant that the processing of round wood of lower quality classes influences the efficiency indicators of sawn materials.

SUMMARY

The analysis of the manufacturing process of low-processed sawmill products was based on the indicators of sawing domestic oak-wood into edged and unedged materials. The analysis led to the following conclusions:

- Unedged products were chiefly made from thin oak-wood assortments processed by single sawing.
- During the full financial year under analysis the production was more intensive in the early months. The production of sawn oak-wood materials was at a steady level in the consecutive months.
- The analysis of the domestic market showed that there was the highest demand for thicker unedged timber. In consequence, this product was more expensive. Simultaneously, the first quality class had a lower share in the total amount of round wood processed in sawmills.
- The share of edged timber was significantly lower (about 19%), but its quality was higher. However, the higher quality did not translate into higher efficiency indicators. The average efficiency in this class amounted to 133%, whereas the weighted average was 136%.

- The decreasing efficiency of processing was affected by the increasing prices of round wood and the incompatible sales value of sawn assortments, which did not rise proportionally. The average weighted efficiency of production of unedged timber amounted to 115%. The maximum production efficiency of the first class assortments of the thickness of 40-55 mm amounted to 182%.
- Variation in the efficiency of processing round wood into edged and unedged products is caused by variation in the demand, division into assortments, availability of raw material and selection of the sawing technology. The processing of unedged timber is much more efficient. There is higher demand for this product on the market due to the fact that it can be used in different branches of the wood industry.

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THE ROLE OF THE ENERGY MANAGEMENT SYSTEM IN THE IMPLEMENTATION OF THE PRINCIPLES OF THE CIRCULAR ECONOMY

Abstract: The purpose of this study is an attempt to find an answer for the research question: "Does the implementation of the energy management system determine the increase in the organizational effectiveness and enable the implementation of the principles of the circular economy?" The article describes the role of the energy management systems in improving management processes in an organization. References are made to principles of the circular economy. Moreover, the development prospects of standardized management systems are presented with particular emphasis on the energy management system according to the ISO 50001 standard requirements. The results of the primary and secondary data analysis have proved that a well-planned and implemented energy management system contributes to achieving many significant benefits, including: improving energy efficiency, reducing energy costs by reducing its consumption, reducing greenhouse gas emissions, introducing proper supervision of the organization's energy management system, ensuring compliance with energy efficiency legislation requirements, enabling integration with other management systems as well as improving the organization's image among stakeholder groups. The energy management system is an important tool supporting the process of efficient energy use in any organization and the implementation of principles of the circular economy.

Key words: Efficiency, organization development, energy management, energy management system (EMS), circular economy.

INTRODUCTION

The problem of the energy organizational effectiveness is a very interesting issue and is still in a focus of research. Its importance is especially essential for the economic practice due to the fact that the increase in energy efficiency is a key objective of every organization.

An increasing number of organizations notices problems associated with the energy use. The improvement of the organization energy efficiency obtained by skillful energy management is a priority of the state energy policy.

It is to ensure their survival and development that organizations should focus on the implementation of new organizational solutions relating to specific aspects of their operations, including the energy management. There is a growing interest in solutions proposed in the ISO 50001 standard on the Polish market. The energy management system contributes primarily to improving energy efficiency and reducing energy costs as well as enables organizations to implement principles of the circular economy. The requirements of the ISO 50001 standard enable organizations to implement principles allowing integrating energy efficiency into management practices.

THE ESSENCE OF THE ENERGY MANAGEMENT SYSTEM

Nowadays, an energy management system is implemented and certified on the basis of requirements of the PN-EN ISO 50001:2012 standard: energy management systems. Requirements

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with guidance for use (ISO 50001: 2011 Energy management systems. Requirements with guidance for use).

The standard can be implemented in all organizations whose aim is to meet the requirements of the energy policy and convince stakeholders of their implementation.

The ISO 50001 standard covers the requirements for implementing and continuously developing energy management systems in terms of energy efficiency and consumption in an organization.

The ISO 50001 standard has been developed to simplify the integration of the energy management system (SME) with other management systems. It is obtaining a certificate confirming implementation of an energy management system according to the ISO 50001 standard by an organization that provides contractors with the guarantee that the organization applies the best practices in energy management. Moreover, the purpose of the standard is to support the organization in evaluating and prioritizing while implementing new energy efficient technologies.

According to the requirements of the PN-EN ISO 50001: 2012 standard, energy management systems. Requirements with guidance for use, an organization should:

- Implement and continuously improve EMS-es to achieve better energy outcomes,
- Carry out and document an energy planning process,
- Identify, implement and have access to all applicable legal and other requirements which the organization is obliged to fulfill and which are related to the organization's energy consumption and use as well as its energy efficiency,
- Analyze the use and consumption of energy on the basis of measurements and other data as well as identify areas of significant energy use as well as prioritize energy efficiency improvements to improve the energy outcome,
- Define energy outcome indicators and the methodology for their determination and updating,
- Define, implement and maintain energy goals and targets,
- Identify and plan activities related to the significant energy use,
- Take measures to improve energy outcome and operational control while designing new, modified or renewed facilities, equipment, systems and processes which may have a significant impact on its energy consumption,
- In the case of purchases of energy services, products and equipment which have or may have a significant impact on energy use, the organization should: inform suppliers that the purchase is partially assessed on the basis of the energy outcome; the organization should also define and implement evaluation criteria for use, consumption and energy efficiency in relation to the planned or expected time of their operation,
- Ensure that key performance characteristics which determine the energy outcome are measured, monitored and analyzed at scheduled intervals,
- Assess the compliance with legal and other requirements, which the organization has undertaken to comply with, at scheduled intervals,
- Carry out audits at scheduled intervals to ensure that the EMS is consistent with the planned energy management arrangements, energy objectives and targets,
- Conduct a review of inconsistencies or potential inconsistencies, identify their causes, assess the need for action to ensure that inconsistencies do not occur or repeat and take appropriate measures in this regard.
- Keep records of corrective and preventive actions and review the effectiveness of corrective and preventive actions taken,
- The senior management should review the EMS at scheduled intervals to ensure that it remains adequate and effective [ISO 50001, 2011].

In order to determine the effectiveness and consistence of the energy management system as well as corrective and preventive measures, audits of the EMS should be carried out.

The PN-ISO 50003: 2017 standard: Energy management systems. The requirements for the units carrying out audits and certification of energy management systems determine requirements for competences, consistency and impartiality in relation to audits and certification of energy management systems (EMS-es) of the entities providing these services. It is in the ISO 50003 standard that the audit process and competence requirements of the personnel involved in the certification process of the energy management system have been determined.

THE STATE AND PROSPECTS FOR THE DEVELOPMENT OF ENERGY MANAGEMENT SYSTEMS IN THE WORLD

It was by the end of 2015 that 11,985 energy management system certificates had been granted according to the requirements of the ISO 50001 standard in the world. According to the data contained in the ISO Survey report, it was in 2015 that the increase in the number of certificates confirming compliance with the requirements of the ISO 50001 standard by 77% compared to 2014 (6765 certificates) could be noted [ISO 2015 Survey]. The table 1 presents the number of certificates per ISO standard worldwide in 2004-2005.

Table 1. The number of certificates according to the ISO standards, in the world in the years 2014-2015

Standard	The number of certificates in 2015	The number of certificates in 2014	Annual increase / decrease
ISO 50001	11985	6765	5220
ISO 9001 **	1033936	1036321	-2385
ISO 14001***	319324	296736	22588
ISO 27001	27536	23005	4531
ISO 22000	32061	27690	4371
ISO/TS 16949	62944	57950	4994
ISO 13485	26255	26280	-25
ISO 22301	3133	1757	1376
ISO 20000-1	2778	-	2778

Source: own study, 2017 based on The International Organization for Standardization – ISO Survey Of Certifications 2015, 2016.

The largest increase in the number of certificates confirming compliance with the ISO 50001 standard in 2015 compared to the previous year was recorded in Europe: by 84.7%.

The highest number of certificates confirming compliance with the ISO 50001 standard in 2015 was granted in Germany - 5931, United Kingdom - 1464, France - 500, Italy - 470, India - 405, Spain - 390, China - 262, Taipei, Chinese - 262, Austria - 220, Thailand - 138.

Among the five industrial sectors for the ISO 50001 certificates 2015, there can be distinguished: Basic metal & fabricated metal products, Food products, beverages and tobacco, Rubber and plastic products, Chemicals, chemical products & fibers, Electrical and optical equipment.

By the end of 2015, 74 certificates confirming the correct functioning of the energy management system in organizations were granted in Poland.

Błąd! Nieprawidłowy odsyłacz do zakładki: wskazuje na nią samą. presents the number of the environmental management system certificates in the world issued according to the ISO 14001

standard in 2011-2015. The figure shows that the number of energy management system certificates increased more than 26 times between 2011 and 2015. Since 2011 until 2015, a continuous increase in the number of certificates could be observed. This is due to the fact that the improvement of organization energy efficiency obtained by skillful energy management is a priority of the state energy policy. Implementation of an energy management system promotes energy management policy, strengthens thinking in terms of energy efficiency and, above all, reduces energy expenditure.

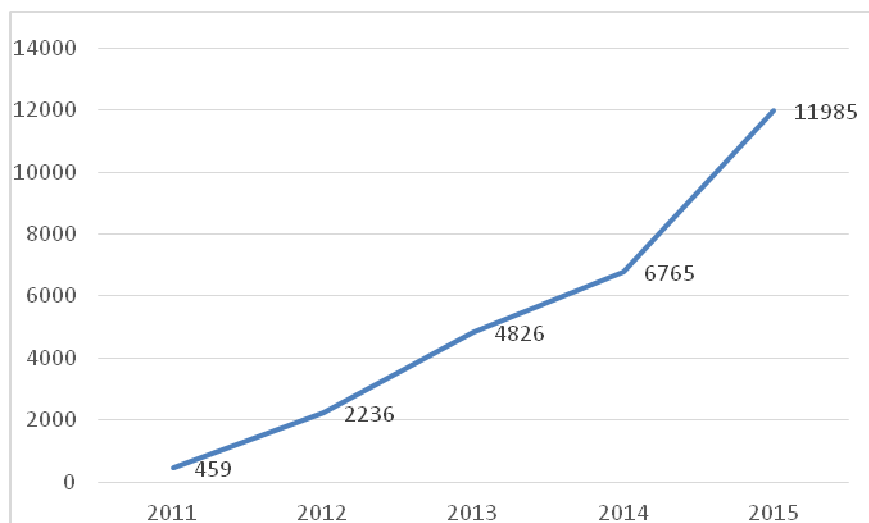


Figure 2. The number of certificates according to the ISO 50001 standard in the world in the years 2011-2015

Source: own study, 2017 based on The International Organization for Standardization – ISO Survey Of Certifications 2015, 2016.

PRINCIPLES OF THE CIRCULAR ECONOMY MODEL

The world economy is currently largely based on the linear "take, use and throw away" principle, which involves three stages:

- Acquisition of raw materials;
- Processing raw materials into finished product;
- Utilization of used products.

Acquisition of raw materials often involves the excessive use of rare natural resources, which may result in many negative consequences for the environment. The dominant model of production is the mass production using a large amount of raw materials and energy. The disposal of used products, especially electronic equipment, often becomes an insurmountable problem.

According to experts, such over-exploitation of resources coupled with energy-intensive production contributes to the increase in raw materials' and consequently consumption goods' prices [Grilli, Yang, 2013].

Therefore, as far as possible, organizations should apply principles of the circular economy, which leads to rational use of resources through a systematic approach to management. The implementation of the principles of the circular economy is based on a comprehensive look at processes carried out in an organization, starting from design stage through creation and delivery of

consumer products or services which are user-friendly, health-friendly, easy to use and organization of the convenient collection and disposal of waste products.

The circular economy is a complete opposite of the linear economy. The principles of the circular economy are focused on the design of a waste-free, closed circuit which assumes the reuse of used products which may become new products in the same or another form. The implementation of circular economy principles leads to reduced demand for raw materials and, consequently, to the complete elimination of the problems associated with waste management. It does not mean only new requirements within the scope of the comprehensive management approach but is also an opportunity to enhance the innovativeness of the solutions applied.

"The industrial revolution has created a production system which:

- Emits millions of tons of toxic materials to air, water and soil every year;
- Requires thousands of complicated rules to protect people and natural systems against excessive intoxication;
- Produces materials so dangerous that they will require constant vigilance from future generations;
- Generates gigantic quantities of waste;
- Destroys diversity.

According to Michael Braungart, one of the authors of the concept "cradle to cradle": "... it is not enough to do" less bad ", it should be done something that brings real effects ...".

The development of the circular economy was influenced by many concepts, including the following:

- Regenerative design: the concept developed by an American landscape architect John T. Lyle. He began to develop the concept of the "regenerative design", which was supposed to be applied to all systems, in 70s of the 20th century. It gave the basis for the development of the other concepts [Cole, 2012].
- Performance Economy: initiated by Walter Stahel, an architect and economist. It was in the report for the European Commission titled: "The Potential for Substituting Manpower for Energy" (1976) co-authored with Genevieve Reday that he presented a vision of a closed-circuit economy and its impact on job creation, economic competitiveness, resource saving and waste prevention [Stahel, 2012].
- Bionic: Jane Beynous presented a revolutionary look at bionics as a technical and ecological science in her book titled: "Biomimicry Innovation inspired by nature" (1997), depicting the most well-known bionic solutions in the literature and implemented for commercial applications. Bionics was initiated already in the 1930s. The pioneers of bionics can be considered: George Cayley, Michael Kelly, Otto Lilienthal, Gaston Biot or Igo Etrich. However, it was Jane Beynous who introduced bionics as a technical-ecological science presenting commercially-available bionic solutions. An example is a Bionic Mercedes, whose shape and skeleton is modeled on a fish of the Ostraciidae family, which, despite its unusual appearance, is characterized by a low air resistance indicator, which is extremely desired in aerodynamics; Shinkansen - Japanese train, traveling at speeds of over 200km/h. At such high speeds, the biggest problem was aerodynamic noise from the train and other components such as pantograph, lines, poles, etc. The problem of the noise arising while leaving a tunnel was solved by modeling the front of the train in the shape of a kingfisher body, which does not cause a splash while diving - does it silently [Benyus, 1997].
- Industrial ecology: "Industrial ecology is the science concerning materials and energy flows in industrial systems." This approach aims at creating a closed loop of the process, in which waste serves as raw material for others by focusing on interconnections between operators

within the "industrial ecosystem", thus eliminating undesirable by-products. The trend initiated by Robert Frosch and Nicholas E. Gallopoulos in "Managing Planet Earth," published in "Scientific American" (1992) [Frosch, Gallopoulos, 1989].

- Blue Economics: initiated by a former CEO of eCover and Belgian businessman prof. Gunter Pauli. The concept assumes that "it is with the means available in cascade systems that waste from a single product becomes a raw material for a new flow", which gives not only healthy, ecological but also cheaper products than the ones coming from the existing production systems [Pauli, 2010].
- Cradle to Cradle is a concept and certification protocol developed by prof. Michael Braungart and William McDonough. It is a design philosophy that perceives all materials used in industrial and commercial processes as raw materials divided into two main categories: technical and biological [McDonough, Braungart, 2010].

The report, developed by the Ellen McArthur Foundation and the McKinsey & Company titled "Towards Circular Economy", 2012, became a key document for the circular economy. ... The circular economy is based on systematic thinking (understood as scientific understanding of the way how the world works) in relation to people and their relationships with their surrounding ecosystems, material resources, energy, money and finances. The circular economy also deals with how these aspects affect humans, how the "living system" works ... [MacArthur, 2012].

Towards the Circular Economy: reports prepared by the Ellen McArthur Foundation and developed by the McKinsey & Company, published from January 2012, are a kind of economically-business guidelines for transforming organizations' activities into the circular economy model.

Studies on practical solutions related to the implementation of the circular economy have also become a priority of the Horizon 2020 research program [<http://www.2020-horizon>].

IMPLEMENTATION OF THE CIRCULAR ECONOMY PRINCIPLES AND IMPROVEMENT OF ENERGY EFFICIENCY OF ORGANIZATIONS (CASE STUDIES)

Implementation of principles of the circular economy becomes a necessity for organizations which want to compete on European markets.

The circular economy is not limited to protection of the environment. The aim of the implementation of the circular economy principles is to design, create and provide consumers with products or services, which are safe for their users in terms of health, ease of use as well as organization of the convenient collection and disposal of waste products.

The implementation of an energy management system (EMS) according to the requirements of the PN-EN ISO 50001: 2012 standard and its continuous improvement contributes to achieving better energy performance by the organization. The requirements contained in the standard show the principles of integrating energy efficiency into management practices, which in turn enables organizations to implement the principles of the circular economy, which has now become one of the key policies of the European Union. The implementation of the EMS makes managers aware that the energy management is an important part of management in an organization. The energy management system is an important tool supporting the process of efficient energy use in any organization and the implementation of principles of the circular economy.

The energy policy set by the organization's top management is an obligation for improving the energy outcome and is intended to be the basis for defining and reviewing energy targets. It is widely available for individual employees and therefore it contributes to increasing their awareness within the scope of the energy efficiency as well as it gives them the opportunity to comment and improve ideas for energy management in their organization.

The practical experience of organizations and theoretical studies show that it is possible to implement environmentally friendly production while achieving tangible economic benefits, not only for organizations themselves, but also for individual stakeholder groups.

The implementation of the "Cradle 2 Cradle" concept in the Desso company brought the following benefits:

- EBIT increase in the carpet section by 9% in 2010;
- 32% reduction in energy consumption between 1998 and 2010 in the Desso factory in Waalwijk;
- Reduction of CO₂ emissions by 50% in 2010/2011;
- Total energy self-sufficiency by 2020.

The implementation of the "Cradle 2 Cradle" concept in the AGC company brought the following benefits:

- AGC has reduced water consumption by over 70% over the past 15 years. In the same period, the degree of water pollution decreased by 60%;
- Composition of products which is safe for people. For example, if a given substance is included in the REACH Regulation, AGC strives after optimizing the composition of the product by seeking safer and healthier alternatives;
- Glass is 100% recyclable. Up to 30% of the glass produced by AGC is made from recycled raw materials.

The implementation of the "Cradle 2 Cradle" concept in the Ford Motor Company in Rouge River brings savings of about \$ 35,000,000 per year; among the benefits, the following ones can be distinguished:

- Extension of lifetime of roofs by two times, reduction of maintenance costs - the green "coating" protects against UV rays;
- Reduction of costs associated with interior heating/cooling, as the green "coating" is a perfect insulation;
- Reduction of waste disposal costs: it was in the normal process that all the rainwater from the plant surface had to be subjected to an expensive purification process. Now the green "coating" purifies the water naturally and it may go straight to the river; moreover, production principles minimizing production waste have been implemented [<http://www.c2ccertified.org/innovation-stories>].

CONCLUSION

Experience of organizations shows that the involvement in environmental issues has become an important variable to be taken as part of modern competition strategies. The improvement of the organization energy efficiency obtained by skillful energy management is a priority of the state energy policy.

In the face of the increasing dependence of organizations on energy supplies, it is important to examine and determine directions for the development and modernization of energy infrastructure, which will enable to achieve a high level of supply of heat energy, cold, electricity and "mobile" energy in the long run. Improvement of the energy infrastructure is a key process in improving Poland's energy security.

It is also important to recognize the need for new energy solutions that are part of the EU regulations, including those contained in the winter package and in line with the principles of the circular economy, which has become one of the key EU policies.

The integrated climate and energy plans of individual member states are an important pillar in energy policy. Therefore, while addressing energy security challenges, we must focus on ensuring security of supply, energy efficiency, decarbonisation: reduction of CO₂ and the share of renewable energy sources (RES) and R&D, innovation and competitiveness.

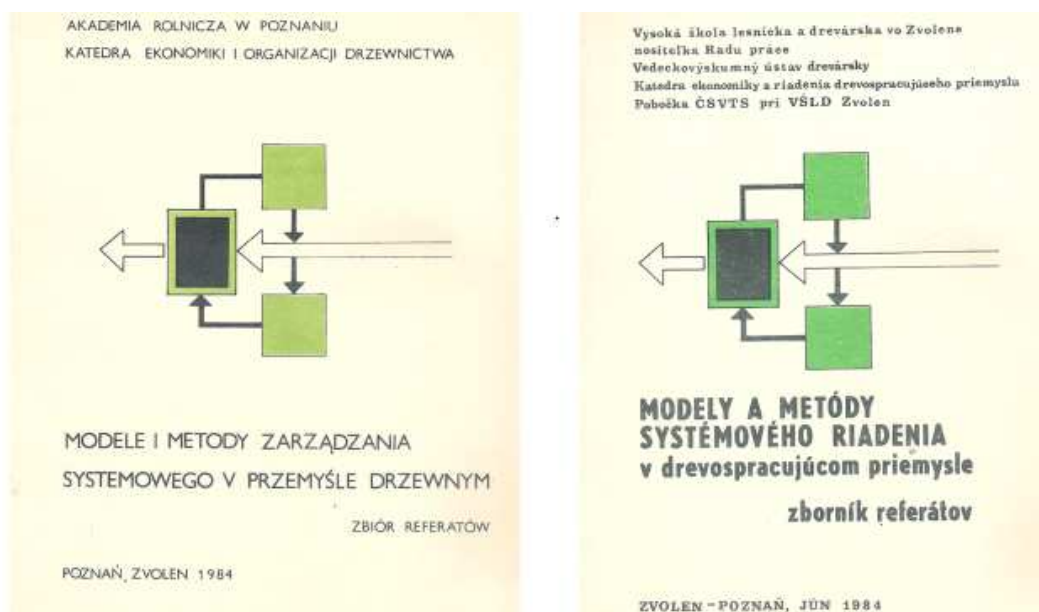
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APPENDIX 1

INTERCATHEDRA

Konieczność wydania wspólnego czasopisma wynikała z potrzeby rozwijania i zacieśniania wzajemnych kontaktów naukowych i dydaktycznych katedr zajmujących się problemami ekonomicznymi w drzewnictwie: Katedry Ekonomiki i Organizacji Drzewnictwa Akademii Rolniczej w Poznaniu oraz Katedry podnikového hospodářstva (Katedry Ekonomiki Przedsiębiorstwa) Wysokej školy lesníckej a drevárskej vo Zvolene (Wyższej Szkoły Leśnej i Drzewnej w Zwoleń – wówczas Czechosłowacja). Systematyczna wymiana naukowa i dydaktyczna rozpoczęła się w latach 70-tych XX wieku. Referaty ze wspólnych, najpierw sporadycznie organizowanych konferencji naukowych, odbywających się na przemian w Poznaniu i Zwoleń - publikowane były w postaci zbiorów referatów (rys. 1). Od roku 1984 konferencje dwustronne przekształciły się w spotkania międzynarodowe. Zaczęto wydawać zbiorniki referatów międzynarodowych (rys. 2).



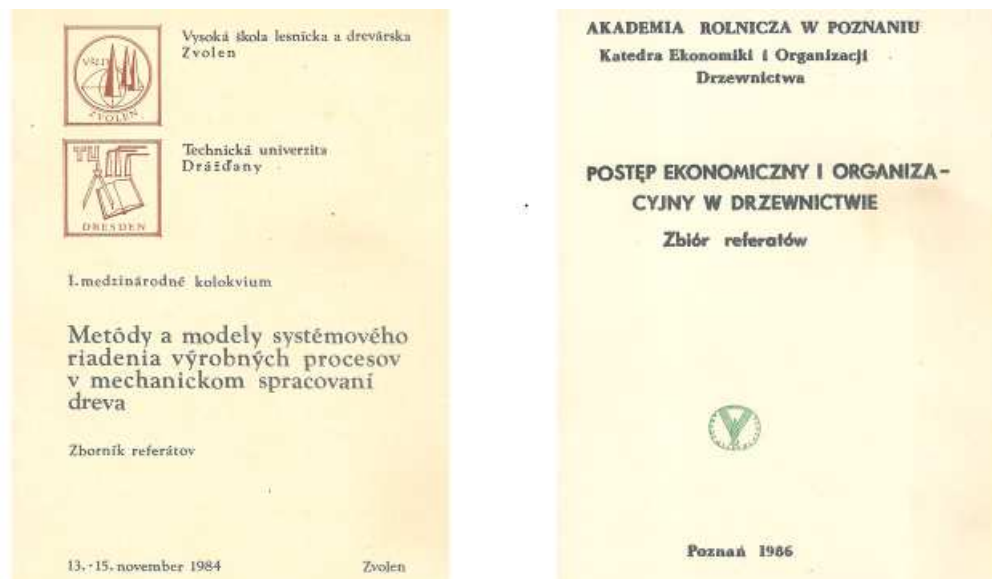
Rys. 1. Zbiory referatów ze wspólnych konferencji naukowych Katedr z Poznania i Zwoleń – wydane w 1984 roku

W 1990 roku podjęto decyzję o rozpoczęciu emisji międzynarodowego czasopisma naukowego Intercathedra (rys. 3), połączonego z międzynarodowymi konferencjami naukowymi – „Forum Ekonomiczne – Economic Forum- Ekonomicke fórum”. Pierwsza taka konferencja odbyła się w 1990 roku w Zwoleń. Kolejne spotkania naukowe odbywały się na przemian w Poznaniu i w Zwoleń (rys. 4). Bywały niekiedy częściej niż raz w roku. Do 2010 roku Intercathedra drukowana była w formacie A4: 21 x 29,7 cm.

W 1996 roku na konferencji naukowej „Forum Ekonomiczne 96” w Leśnym Zakładzie Doświadczalnym w Zielonce koło Murowanej Gośliny - powierzono wydawanie rocznika

Intercathedra Katedrze Ekonomiki i Organizacji Drzewnictwa z Poznania i organizowanie przez nią corocznych konferencji „Forum Ekonomiczne” (rys. 5).

W 1997 roku patronat nad czasopismem objęła międzynarodowa sieć naukowa IATM - International Association for Technology Management. Pod auspicjami IATM, oprócz międzynarodowego czasopisma naukowego Intercathedra, wydawane były tematyczne książki naukowe (rys. 6).



Rys. 2. Zbiory referatów z międzynarodowych konferencji naukowych organizowanych przez Katedry w Poznaniu i Zwoleniu



Rys. 3. Intercathedra wydana w Zwoleniu w latach 1990 i 1992



Rys. 4. Intercathedra wydana w Poznaniu w roku 1993 i Zwoleniu w lutym 1994



Rys. 5. Konferencja Forum Ekonomiczne 96 w Zielonce i Intercathedra 1996



Rys. 6. Niektóre książki naukowe opublikowane pod auspicjami sieci naukowej International Association for Technology Management

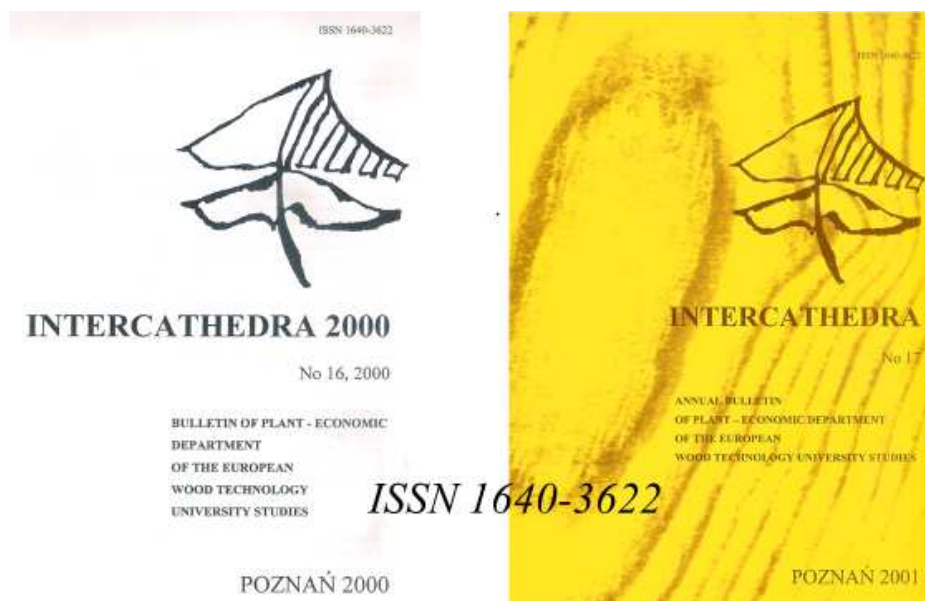
W 1997 roku zdecydowano, że konferencje naukowe Forum Ekonomiczne – Economic Forum odbywać się będą corocznie w połowie września w Ośrodku Dydaktycznym Siemianice Leśnych Zakładów Doświadczalnych Uniwersytetu Przyrodniczego w Poznaniu w Laskach koło Kępna (rys. 7). Przed każdą konferencją naukową w Laskach ukazywały się kolejne roczniki Intercathedry.

Sterowanie jakością w przemyśle drzewnym *Quality steering in Woodworking Industry*



Rys. 7. Konferencja Forum Ekonomiczne 97 w Laskach i Intercathedra 1997

W roku 2000 nadano rocznikowi symbol ISSN. Do 1999 roku wydania oznaczane były symbolami ISBN. Od 2001 rocznik naukowy wydawany jest w charakterystycznym, żółtym kolorze z brązowym zarysem słoików drewna na jego przekroju stycznym (rys. 8).



Rys. 8. Intercathedra 2000 i 2001

W 2003 roku Intercathedra trafiła do wykazu czasopism ocenianych przez Komitet Badań Naukowych. Uzyskała wtenczas kategorię KBN B/C, którą systematycznie zwiększała. W tabeli 1 zamieszczono oceny Intercathedry, zawarte w kolejnych edycjach „Ujednoliconego wykazu czasopism punktowanych” - Ministerstwa Nauki i Szkolnictwa Wyższego.

Tabela 1. Wskaźniki czasopisma Intercathedra w poszczególnych latach

Rok	Punkty MNiSW
2016	10
2015	10
2014	10
2013	10
2012	8
2011	8
2010	6
2009	4

Źródło: opracowanie własne na podstawie kolejnych List czasopism punktowanych MNiSW

Od 2006 roku, oprócz wydania papierowego, ukazuje się Intercathedra również w formie elektronicznej – początkowo na płytach CD, później – w internecie. Ten sposób prezentacji, znacznie tańszy w wydaniu od postaci książkowej, znakomicie ułatwia też archiwizowanie materiałów i usprawnia poszukiwanie potrzebnych treści. Od 2008 roku wersja elektroniczna czasopisma zamieszczana jest na stronie internetowej Uniwersytetu Przyrodniczego w Poznaniu - www.up.poznan.pl/intercathedra. Znajdują się tam aktualnie roczniki 2004 - 2010 oraz kwartalniki 2011 – 2017 (rys. 9). Kwartalniki Intercathedry ukazują się w zmniejszonym formacie 17 x 24 cm. Zachowały kolor i strukturę rocznika.



Rys. 9. Ostatnia konferencja Forum Ekonomiczne w Laskach (2012) oraz kwartalniki Intercathedry pierwszego (2011) i ostatniego rocznika (2017)

Liczne z opublikowanych prac zrealizowane zostały w ramach współpracy naukowej katedr ekonomiki i organizacji uniwersytetów z Belgradu, Bratysławy, Brna, Koszyc, Krakowa, Ljubljany, Lwowa, Poznania, Pragi, Preszowa, Skopje, Sopronu, Trnawy, Warszawy, Zagrzebia, Jihlavy, Żyliny, Zlinu, Olsztyna, Zielonej Góry. Część z nich opracowano na podstawie referatów prezentowanych na międzynarodowych konferencjach Forum Ekonomiczne.

Międzynarodowe konferencje Forum Ekonomiczne, których organizatorem była Katedra Ekonomiki i Organizacji Drzewnictwa odbywały się corocznie, przez 16 lat, przeważnie w Laskach k/Kępna. Na spotkania przybywało każdorazowo po około 40 przedstawicieli jednostek naukowych z Chorwacji, Słowacji, Czech, Ukrainy, Polski, Niemiec, sporadycznie z innych krajów. Licznie reprezentowany był krajowy przemysł drzewny oraz instytucje zrzeszające firmy z różnych branż przetwarzania drewna (Polska Izba Gospodarcza Przemysłu Drzewnego, Stowarzyszenie Producentów Płyt Drewnopochodnych, Stowarzyszenie Producentów i Eksporterów Palet Drewnianych w Polsce, Polski Komitet Narodowy EPAL, Stowarzyszenie Dom Drewniany, BASTEX – Wolman i inne). Należy przy tym podkreślić, że wśród uczestników konferencji w wielu latach zdecydowanie dominowali obcokrajowcy.



Konferencje skupiały się każdorazowo na innym problemie, ważnym dla technologii drewna i procesów ekonomicznych w gospodarce, istotnym dla integracji leśnictwa i drzewnictwa. Forum Ekonomiczne było zawsze okazją do bezpośrednich dyskusji i wymiany doświadczeń naukowców zajmujących się problemami ekonomiki leśnictwa i drzewnictwa w krajach uczestników. Stwarzały cykliczne nasze spotkania dobre warunki do poszukiwania kompleksowych rozwiązań trudnych problemów ekonomiki i zarządzania przedsiębiorstwami leśnymi i przemysłu drzewnego.

30 września 2017 międzynarodowy kwartalnik naukowy *Intercathedra*, w wyniku likwidacji Katedry Ekonomiki i Organizacji Drzewnictwa, przestaje być wydawany przez tą jednostkę organizacyjną Uniwersytetu Przyrodniczego w Poznaniu.

Wojciech Lis

APPENDIX 2

KATEDRA EKONOMIKI I ORGANIZACJI DRZEWNICTWA

Przez pierwszych 11 lat działalności badawczej, naukowej i dydaktycznej (1962 – 1973) Katedra Ekonomiki Drzewnictwa Wyższej Szkoły Rolniczej w Poznaniu (pierwotna nazwa jednostki organizacyjnej - tabela 1) była zlokalizowana w budynku Wydziału Leśnego – w Collegium Cieszkowskich, przy ul. Wojska Polskiego 71c. Dwa pokoje, dwóch pracowników: doc. dr hab. Zdzisław Jakubowski, mgr inż. Andrzej Matuszewski (tabela 2) oraz problematyka dydaktyczna i badawcza przejęte zostały z Zakładu Planowania Gospodarczego. Zakład ten powstał w Wyższej Szkole Rolniczej w 1951 roku. Formalnie zatwierdzony Zarządzeniem Ministra Szkół Wyższych z dnia 23 listopada 1954 (Dz. U. M. Sz. W. nr 11 poz. 72) z ważnością od 1 września 1953 roku. Wymienionym aktem prawnym utworzono przy Katedrze Ekonomiki Leśnictwa, obok istniejącego już Zakładu Ekonomiki Leśnictwa – kolejne zakłady: Administracji i Rachunkowości Leśnej, Historii i Geografii Gospodarczej Leśnictwa, Planowania Gospodarczego.

Tabela 1. 55 lat Katedry Ekonomiki i Organizacji Drzewnictwa

Okres		Nazwa jednostki organizacyjnej	Okres		WYDZIAŁ	Okres		Siedziba	Okres		Kierownik
od	do		od	do		od	do		od	do	
1962	1970	Katedra Ekonomiki Drzewnictwa Wyższej Szkoły Rolniczej w Poznaniu (8)	1962	2007	TECHNOLOGII DREWNA (45)	1962	1973	Collegium Cieszkowskich Wojska Polskiego 71c (11)	1962	1994	prof. dr hab. Zdzisław Jakubowski (32)
01.10.	31.08.										
1970	1972	Katedra Ekonomiki i Organizacji Drzewnictwa Wyższej Szkoły Rolniczej w Poznaniu (2)									
01.09.	30.09.		01.10.	31.07.					01.10.	30.09.	
1972	1996	Katedry Ekonomiki i Organizacji Drzewnictwa Akademii Rolniczej w Poznaniu (24)	2007	2017	EKONOMICZNO - SPOŁECZNY (10)	1973	2017	Budynek Wydziału Technologii DREWNA Wojska Polskiego 38/42 (44)	1994.	1995	dr hab. inż. Wojciech Lis prof. nadzw. (23)
01.10.	03.07.										
1996	2008	Katedra Ekonomiki i Organizacji Drzewnictwa Akademii Rolniczej im. Augusta Cieszkowskiego w Poznaniu (12)									
04.07.	10.04.		01.08	30.09.		01.09.	30.09.		01.10.	30.09.	
2008	2017	Katedra Ekonomiki i Organizacji Drzewnictwa Uniwersytetu Przyrodniczego w Poznaniu (9)	11.04.	30.09.							

Tabela 2. Pracownicy naukowcy Katedry Ekonomiki i Organizacji Drzewnictwa

Lp.	Tytuł (stopień) naukowy	Okres pracy naukowej w Katedrze		Okres pracy w Uczelni	
	imię i nazwisko	rozpoczęcie	zakończenie	rozpoczęcie	zakończenie
1.	prof. dr hab. Zdzisław Jakubowski	01.10.1962	30.09.1994	21.10.1947	20.02.1995
2.	dr inż. Andrzej Matuszewski	01.08.1963	30.09.2000	01.06.1958	30.09.2000
3.	mgr Tadeusz Brodowski	01.09.1967	30.09.1975		
4.	dr Zygmunt Witkowski	01.05.1968	30.09.1998		30.09.1998
5.	doc. dr hab. Jerzy Chudobiecki	01.09.1970	31.10.1980	01.10.1952	23.07.1984
6.	dr inż. Jan Chudobiecki	01.10.1972	30.09.2017		
7.	dr inż. Marek Szczesny	01.10.1972	28.02.1990		
8.	dr hab. inż. Wojciech Lis, prof. nadzw.	01.09.1973	30.09.2017		
9.	dr inż. Małgorzata Owczarzak	01.10.1974	30.06.1996		08.12.2001
10.	dr inż. Marek Tabert	14.12.1974	30.09.2017		
11.	mgr inż. Andrzej Białowicz	01.10.1975	30.09.1983		
12.	mgr inż. Danuta Sopa	15.12.1976	30.09.1986		30.09.1992
13.	dr inż. Wojciech Meixner	16.10.1979	30.09.2008		
14.	dr inż. Elżbieta Mikołajczak	01.10.1997	30.09.2017		
15.	dr inż. Katarzyna Mydlarz	17.11.1997	30.09.2017		
16.	dr inż. Włodzimierz Popyk	01.10.1998	30.09.2017		
17.	mgr Joanna Ochman - Nowicka	01.10.2000	15.10.2008		
Dokto- ranci	mgr inż. Zygmunt Stanuła	01.10.2011	WTD	10.12.2014	WL
	mgr inż. Zbigniew Malinowski	01.10.2014	WTD		

Poprzedniczką Katedry Ekonomiki Leśnictwa była istniejąca od 1921 roku Katedra Administracji i Rachunkowości Leśnej Uniwersytetu Poznańskiego. Jej pierwszym kierownikiem był prof. Stefan Studniarski. Po II wojnie światowej Katedra została reaktywowana w 1945 roku. Nosiła wówczas nazwę Katedry Ekonomii i Polityki Leśnej. Jej kierownikiem był wtedy prof. dr hab. Tadeusz Molenda. W 1950 roku nazwę jednostki zmieniono na Katedrę Ekonomiki Leśnictwa. W Katedrze pracował między innymi mgr inż. Zdzisław Jakubowski. Zatrudniony został 21 października 1947 roku. Początkowo jako asystent – wolontariusz – pod kierunkiem prof. dr Witolda Staniewicza; od 1 października 1949 roku – został młodszym asystentem, od 1 sierpnia 1950 roku – starszym asystentem. Od 1 września 1952 roku dr inż. Zdzisław Jakubowski pracował jako adiunkt w wymienionej Katedrze. Kierownikiem Zakładu Planowania Gospodarczego był do 31 stycznia 1957 roku prof. dr hab. Tadeusz Molenda. Od 1 lutego 1957 do 15 października 1958 roku Zakładem kierował prof. dr Witold Staniewicz – specjalista w zakresie polityki gospodarczej.

Później kierownikiem został ponownie profesor Molenda – pełnił tę funkcję do roku 1963. W Zakładzie Planowania Gospodarczego zatrudnieni byli, między innymi: dr inż. Zdzisław Jakubowski – adiunkt i od 1 czerwca 1958 roku – mgr inż. Andrzej Matuszewski – asystent.

W 1970 roku – wraz ze zmianą formy organizacyjnej Wydziału Technologii Drewna z katedralnej na instytutową – zmieniono nazwę jednostki na Katedrę Ekonomiki i Organizacji Drzewnictwa Wyższej Szkoły Rolniczej w Poznaniu (pierwsza zmiana nazwy – tabela 1).

1 września 1970 roku pracownikiem Katedry Ekonomiki i Organizacji Drzewnictwa został doc. dr hab. Jerzy Chudobiecki, specjalista z zakresu towaroznawstwa drzewnego (tabela 2). Poprzednio docent Chudobiecki był pracownikiem Katedry Obróbki i Obrabiarek Drewna Wyższej Szkoły Rolniczej w Poznaniu.

W dniu 1 października 1972 roku nazwę poznańskiej wyższej uczelni rolniczej zmieniono na: Akademia Rolnicza w Poznaniu. Od tego czasu jednostka nosiła nazwę: Katedry Ekonomiki i Organizacji Drzewnictwa Akademii Rolniczej w Poznaniu (druga zmiana nazwy – tabela 1).

Do 1973 roku Katedra Ekonomiki i Organizacji Drzewnictwa Akademii Rolniczej w Poznaniu zajmowała wspomniane wyżej pomieszczenia w Collegium Cieszkowskich. Zatrudniała w roku akademickim 1972/1973 roku (tabela 2): 1 profesora (prof. dr hab. Z. Jakubowski), 1 docenta (dr hab. J. Chudobiecki), 1 adiunkta (dr inż. A. Matuszewski), 2 asystentów (mgr T. Brodowski, mgr Z. Witkowski) i 2 asystentów – stażystów (mgr inż. J. Chudobiecki, mgr inż. M. Szczesny).

Po przeniesieniu w 1973 roku do budynku Wydziału Technologii Drewna przy ul. Wojska Polskiego 38/42 ówczesna Katedra Ekonomiki i Organizacji Drzewnictwa AR im. Augusta Cieszkowskiego w Poznaniu (nazwę Uczelni, przez dodanie patrona, zmieniono 4 lipca 1996 roku - trzecia zmiana nazwy – tabela 1) zajmowała pomieszczenia na III piętrze segmentu A budynku WTD przy ul. Wojska Polskiego 38/42. Zajął 10 pokoi 305 – 315 i salę dydaktyczną 316. Zatrudniono wówczas, od 1 września 1973 na stanowisku asystenta – stażysty mgr inż. Wojciecha Lisa. W latach 1974 – 1979 (tabela 2) zatrudniono na stanowisku asystenta – stażysty kolejnych 5 osób – absolwentów Wydziału Technologii Drewna (mgr inż. M. Owczarzak, mgr inż. M. Taberta, mgr inż. A. Białowicza, mgr inż. D. Sopę, mgr inż. W. Meixnera).

W roku akademickim 1993/1994 działalność naukowo – badawczą i dydaktyczną pod kierunkiem prof. dr hab. Zdzisława Jakubowskiego prowadzili: 1 profesor nadzwyczajny (dr hab. inż. W. Lis) i 6 adiunktów ze stopniem doktora (J. Chudobiecki, A. Matuszewski, W. Meixner, M. Owczarzak, M. Tabert, Z. Witkowski). Od 1 października 1994 roku, w związku z przejściem profesora Jakubowskiego na emeryturę, kierownikiem Katedry został dr hab. Wojciech Lis – prof. nadzw.,

Z dniem 01.08.2007 nastąpiło wyłączenie Katedry ze struktur Wydziału Technologii Drewna i przeniesienie jej w strukturę nowo utworzonego wówczas Wydziału Ekonomiczno - Społecznego. 11 kwietnia 2008 r., między innymi wskutek utworzenia nowego wydziału o profilu społecznym, do powstania którego przyczyniła się również postawa pracowników KEiOD, nazwa Uczelni została

zmieniona na Uniwersytet Przyrodniczy w Poznaniu, a nazwa Katedry na: **Katedra Ekonomiki i Organizacji Drzewnictwa Uniwersytetu Przyrodniczego w Poznaniu** (czwarta zmiana nazwy – tabela 1).

W 55 letniej historii Katedra zmieniała nazwę 5-krotnie. Jedna tylko (pierwsza w 1970 roku) zmiana nazwy wynikała ze zmiany struktury organizacyjnej macierzystego wydziału (Technologii Drewna), a cztery – związane były ze zmianą nazwy Uczelni.

W Katedrze w roku akademickim 2016/2017 zatrudnionych było 4 adiunktów (dr inż. J. Chudobiecki, dr inż. E. Mikołajczak, dr inż. K. Mydlarz, dr inż. M. Tabert), 1 starszy wykładowca (dr inż. W. Popyk) (tabela 3). Oprócz nauczycieli akademickich Katedra zatrudniała w ostatnim roku swego działania 1 pracownika naukowo - technicznego – mgr Dagmarę Kubską –Matysiak.

Tabela 3. Nauczyciele akademicki w roku akademickim 2016/2017

IMIĘ I NAZWISKO	TYTUŁ I STOPIEŃ NAUKOWY	STANOWISKO	FUNKCJA
Wojciech Lis	dr hab. inż.	prof. nadzw.	kierownik katedry
Jan Chudobiecki	dr inż.	adiunkt – ½ etatu	
Elżbieta Mikołajczak	dr inż.	adiunkt	
Katarzyna Mydlarz	dr inż.	adiunkt	
Włodzimierz Popyk	dr inż.	starszy wykładowca	
Marek Tabert	dr inż.	adiunkt	

30 września 2017 Kierownik Katedry dr hab. W. Lis przeszedł na emeryturę. Katedra z tym dniem została zlikwidowana. Część jej pracowników oraz majątek zostały włączone do Katedry Prawa i Organizacji Przedsiębiorstw w Agrobiznesie na Wydziale Ekonomiczno - Społecznym. Katedra przekazała, na zakończenie swej pracy: 8 pokoi 305 – 313, salę komputerową 314 i salę dydaktyczną 316.

W okresie 55 lat (1962 - 2017) swej pracy (na Wydziale Technologii Drewna i na Wydziale Społeczno – Ekonomicznym) - Katedra zatrudniała 17 pracowników naukowo – dydaktycznych (tabela 2). W 2017 roku, przy likwidacji jednostki – pracowało sześciu z nich (tabela 3).

Katedra Ekonomiki i Organizacji Drzewnictwa w Poznaniu prowadziła działalność dydaktyczną – wychowawczą, badawczą i kształciła kadry naukowe w zakresie dyscypliny naukowej: ekonomika, organizacja, zarządzanie, marketing dla potrzeb szeroko rozumianego drzewnictwa, czyli dla przemysłu drzewnego i dla przemysłu celulozowo – papierniczego. Porównywalną działalność akademicką realizuje w Polsce jedynie Zakład Organizacji, Ekonomiki i Projektowania Zakładów Przemysłu Drzewnego Katedry Technologii, Organizacji i Zarządzania w Przemśle Drzewnym Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie (bez specjalności w zakresie chemicznej technologii drewna).

Ekonomika drzewnictwa – podstawowy przedmiot nauczania w całym właściwym okresie działalności Katedry – od podjęcia samodzielnej pracy w 1962 roku do jej likwidacji w 2017, był systematycznie doskonalony, modernizowany i uwspółcześniany. W zakresie drugiego z przedmiotów wykładanych w roku 1962/1963 – Planowanie i organizacja produkcji - przesunięto treści z zagadnień związanych z preferowanym wtenczas planowaniem produkcji na zagadnienia zarządzania (w tym: kierowanie przedsiębiorstwem, rachunek kosztów i wyników, zarządzanie kadrami, bilansowanie, zarządzanie inwestycjami i finansowanie działalności) oraz problemy organizacji produkcji i pracy w przedsiębiorstwach związanych z przemysłem drzewnym i celulozowo – papierniczym. Pojawiały się przedmioty zupełnie nowe – Programowanie

ekonomiczne – ukierunkowane na zagadnienia zastosowania technik informatycznych i użytkowych programów komputerowych w organizacji i zarządzaniu, w tym zarządzaniu inwestycjami i ocenie ekonomicznej efektywności przedsięwzięć gospodarczych, Marketing, Biurowość i rachunkowość - by wymienić najważniejsze z nich.

Rada Wydziału Technologii Drewna nadała autorom prac naukowych, których promotorami byli pracownicy Katedry: 24 stopnie naukowe doktora, w tym 10 osób to pracownicy naukowci Katedry, 14 osób – spoza Katedry, w tym – 2 osoby to pracownicy naukowci Wydziału Technologii Drewna. Pracownicy Katedry opracowali ponadto kilkanaście recenzji rozpraw doktorskich. Profesor Zdzisław Jakubowski był autorem kilku recenzji dotyczących nadania stopnia naukowego doktora habilitowanego oraz recenzji dorobku naukowego o nadanie tytułu naukowego profesora nadzwyczajnego i o nadanie tytułu profesora zwyczajnego, a dr hab. Wojciech Lis - recenzji habilitacyjnych i recenzji wydawniczych do rozpraw habilitacyjnych – w Polsce i na Słowacji. Wykaz doktoratów wykonanych pod kierunkiem dra hab. W. Lisa zawiera tabela 4.

Tabela 4. Doktoraty opracowane pod kierunkiem dra hab. W. Lisa

Doktorant	Tytuł rozprawy doktorskiej	Jednostka, która nadała stopień w przewodzie doktorskim	Nadanie stopnia
Leszek Wanat	Rynek drzewny w Polsce – potencjał i pozycja konkurencyjna	Uniwersytet Przyrodniczy w Poznaniu Wydział Ekonomiczno - Społeczny	15.01. 2016
Katarzyna Mydlarz	Analiza czynników technicznych i ekonomicznych warunkujących rozwój drewnianego budownictwa szkieletowego w Polsce	Uniwersytet Przyrodniczy w Poznaniu Wydział Technologii Drewna	26.06. 2008
Wojciech Karlikowski	Wpływ procesów przerobu drewna okrągłego na efektywność produkcji tartaku	Akademia Rolnicza w Poznaniu Wydział Technologii Drewna	10.10. 2003
Elżbieta Mikołajczak	Organizacja i ekonomiczne aspekty wykorzystania makulatury jako substytutu drewna	Akademia Rolnicza w Poznaniu Wydział Technologii Drewna	23.11. 2001
Włodzimierz Popyk	Analiza działań dostosowawczych w sferze rynku wyrobów tartacznych do wymagań Unii Europejskiej	Akademia Rolnicza w Poznaniu Wydział Technologii Drewna	26.02. 1998

Katedra Ekonomiki i Organizacji Drzewnictwa nie ma wydzielonych formalnie jednostek organizacyjnych (zakładów, pracowni). W latach 1975-1978 w ramach Katedry działały dwa zespoły naukowe – dydaktyczne:

~ Zespół Naukowo – Dydaktyczny Programowania Rozwoju Przemysłu Drzewnego (kierownik: prof. dr hab. Zdzisław Jakubowski),

~ Zespół Naukowo – Dydaktyczny Organizacji i Zarządzania Przedsiębiorstwami Przemysłu Drzewnego (kierownik: dr inż. Andrzej Matuszewski).

W początkowym okresie działalności Katedra Ekonomiki Drzewnictwa wydawała własnymi środkami nieperiodyczne wydawnictwo: „Zagadnienia Ekonomiki Przemysłu Drzewnego”. Wydano 2 roczniki, opublikowano 6 prac oryginalnych, przy nakładzie numeru 100 egzemplarzy i objętości 5 arkuszy wydawniczych. Później – wspólnie z Katedrami o podobnym profilu z krajów Europy Środkowej i Wschodniej – Katedra Ekonomiki i Organizacji Drzewnictwa wydaje kwartalnik naukowy Intercathedra o zasięgu międzynarodowym. W roku 2017 ukazał się 33 rocznik. Informacje o Intercathedrze zawarte są w odrębnym opracowaniu.

Dr hab. inż. Wojciech Lis jest członkiem komitetów redakcyjnych kilku czasopism naukowych: „Przemysł Drzewny”, „Journal of Agribusiness & Rural Development”, a także naukowych czasopism zagranicznych: „Manažment Priemyselnych Podnikov” (Słowacja), „Word & Information Systems” (Czechy), „Acta Facultatis Xylologie Zvolen” (Słowacja) oraz „Acta Oeconomica Univesitas Selje” (Węgry-Słowacja).

Katedra zgodnie ze swoją specjalnością:

- rozwijała badania naukowe, doskonaliła działalność dydaktyczną w zakresie ekonomiki drzewnictwa, organizacji i zarządzania w przedsiębiorstwach przemysłu drzewnego, biurowości i rachunkowości, finansów, zarządzania inwestycjami, marketingu, programowania ekonomicznego, towaroznawstwa drzewnego i obrotu towarowego,
- kształciła pracowników nauki do samodzielnej pracy naukowej i dydaktycznej,
- popularyzowała wyniki własnych badań i wdrażała je do praktyki gospodarczej,
- uczestniczyła w organizowaniu seminariów naukowych, w doskonaleniu kadr kierowniczych sektora leśno – drzewnego, dr hab. Wojciech Lis jest aktywnym działaczem – członkiem Prezydium Zarządu Głównego Stowarzyszenia Inżynierów i Techników Leśnictwa i Drzewnictwa w Warszawie oraz ekspertem Komisji Leśno – Drzewnej Lasów Państwowych.

Działalność badawcza była realizowana w formie badań własnych, statutowych, ekspertyz, badań prowadzonych we współpracy z zagranicą oraz w ramach projektów badawczych finansowanych przez Komitet Badań Naukowych (grantów KBN).

Badania własne uwzględniały specyfikę branżową drzewnictwa. Miały charakter koncepcyjno – metodyczny o ściśle powiązanej ze sobą problematyce. Wspomagane były badaniami weryfikacyjnymi prowadzonymi na danych modelowych i rzeczywistych. Wyniki badań publikowano jako prace zespołowe i indywidualne w czasopismach krajowych o zasięgu międzynarodowym („Roczniki Akademii Rolniczej w Poznaniu”, „Przemysł Drzewny”, w mniejszym zakresie: „Gospodarka Materiałowa”, „Przegląd Organizacji”, „Ekonomika i Organizacja Pracy”, „Prace Komisji Technologii Drewna PTPN”, „Folia Forestalia Polonica”, „Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie”, „Annals of Warsaw Agricultural University – Forestry and Wood Technology”, „Prace Naukowe Akademii Ekonomicznej w Katowicach”, „Wydawnictwo Naukowe Politechniki Lubelskiej”, „Zeszyty Problemowe Postępów Nauk Rolniczych”, „Prace ORED” i w czasopismach zagranicznych („Holztechnologie”, „Möbel und Wohnraum”, „Drevo”, „Poradnikova Organizace”, Manažment Priemyselnych Podnikov, wydawnictwa naukowe Uniwersytetów Technicznych w Zvoleniu, Trnawie, Zagrzebiu, Lwowie, Żylinie, Koscicach, Zlinie, Preszowie). Wyniki prac przedstawiono na specjalistycznych konferencjach naukowych krajowych i zagranicznych, organizowanych między innymi przez Polskie Towarzystwo Ekonomiczne, Polskie Towarzystwo Leśne, Polskie

Towarzystwo Logistyczne, Towarzystwo Naukowe Organizacji i Kierownictwa, Stowarzyszenie Inżynierów i Techników Leśnictwa i Drzewnictwa, Lasy Państwowe, liczne organizacje branżowe.

Upowszechnianie wyników badań odbywało się przez publikowanie monografii, wykorzystywanych także jako baza dydaktyczna w realizowaniu programu studiów na Wydziale Technologii Drewna, a później również na Wydziale Ekonomiczno – Społecznym. Popularyzowanie badań naukowych prowadzono w ramach cykli wykładów i seminariów dla kadry kierowniczej i dla służb funkcjonalnych przedsiębiorstw przemysłu drzewnego (zwłaszcza meblarskiego i tartaczego). Obejmowało też publikacje popularyzatorskie w czasopiśmie (np. „Przemysł Drzewny”, „Rynek Drzewny”, „Przegląd Papierniczy”, „Las Polski”, „Sylwan”, „Przegląd Leśniczy”, „Gazeta Przemysłu Drzewnego”, „Gazeta Drzewna”).

W badaniach naukowych Katedry znalazły swoje odzwierciedlenie najważniejsze problemy ekonomiczno – organizacyjne polskiego przemysłu drzewnego. Badania były ukierunkowane na wypracowanie systemu zarządzania i organizacji umożliwiającego zwiększenie ekonomicznej sprawności funkcjonowania i konkurencyjności organizacji gospodarczych drzewnictwa w Polsce w warunkach współpracy w ramach Unii Europejskiej i do jej standardów, zgodnych ponadto z wymaganiami Międzynarodowego Funduszu Walutowego i Banku Światowego, finansujących niektóre z przedsięwzięć restrukturyzacyjnych.

Projekty badawcze finansowane ze środków Komitetu Badań Naukowych – granty KBN:

1. Lis W., Tabert M., Błażczak P.: Modelowanie przepływu produkcji w przedsiębiorstwie przemysłu meblarskiego. Projekt badawczy nr 7 0895 91 01, realizowany w latach 1991 - 1992.
2. Lis W.: Restrukturyzacja i przekształcenia własnościowe w polskim przemyśle meblarskim ze szczególnym uwzględnieniem prywatyzacji kapitałowej. Projekt badawczy nr 7 S204 022 06, realizowany w latach 1994 - 1996.
3. Lis W., Boruc J., Tabert M., Popyk W.: System wspierania małych i średnich przedsiębiorstw przemysłu drzewnego w związku z wymaganiami Unii Europejskiej - aspekty ekonomiczne i technologiczne. Projekt badawczy KBN 7 T08E 032 18 (decyzja KBN - 1387/T08/2000/18, nr umowy w AR – 3/2000/IG), Warszawa, 2000-2001.
4. Lis W., Mikołajczak E.: Technologiczno – organizacyjne aspekty wykorzystania makulatury jako substytutu drewna. Projekt badawczy KBN 6 P06L 007 21 (decyzja KBN 0820/P06/2001/21, umowa AR 45/2001/IG), Warszawa, 2001-2002. Projekt promotorski.
5. Lis W., Ochman – Nowicka J.: Konkurencyjność polskich przedsiębiorstw meblarskich na rynku europejskim – aspekty technologiczne i marketingowe. Projekt badawczy KBN 2 P06L 007 27 (decyzja KBN 0832/P06/2004/27, umowa AR 64/2004/IG), Warszawa, 2004-2006. Projekt promotorski.

Projekty badawcze realizowane we współpracy z zagranicą:

1. Lis W., Matuszewski A., Chudobiecki J.: Instrumentalizacja systemu zarządzania w polskich przedsiębiorstwach przemysłu drzewnego dla wzmocnienia ich konkurencyjności. Projekt badawczy 9359/DZ/96 realizowany we współpracy ze Słowacją w ramach projektu KBN C/5011/96.
2. Lis W., Matuszewski A.: Instrumentalizacja systemu zarządzania w polskich przedsiębiorstwach przemysłu meblarskiego dla wzmocnienia ich konkurencyjności. Projekt badawczy Z/542/97 realizowany we współpracy ze Słowacją w ramach projektu KBN C/5011/96.

3. Lis W., Matuszewski A.: Implementacja systemu elastycznego planowania i budżetowania w przemyśle meblarskim dla podniesienia efektywności i konkurencyjności przedsiębiorstw. Projekt badawczy 15/3/98 realizowany we współpracy z Chorwacją.
4. Lis W., Mydlarz K., Popyk W., Meixner W.: EU survey of education, training and skills in and around the wood sector. Projekt badawczy DG ENTR/I/3/JW EUW E&T 1 (2005) Education & Training Survey of the EU Wood sector.
5. Lis W., Zając S., Gołos P., Laskowska K., Jodłowski K., Popyk W.: Economic integration of urban consumers' demand and rural production. Country Report for the Phase one of the Action "State-of-the-art". Projekt badawczy COST E30/2006-2007.
6. PREFERWOOD "Survey of consumer attitudes towards wood products". Polish – Slovak Research and development cooperation. Bilateral cooperation Department of Economics and Wood Industry Management, Poznan University of Life Sciences in Poland and Department of Marketing, Trade and World Forestry, Technical University in Zvolen (Slovakia). Realizacja 2010-2011. Ministerstwo Nauki i Szkolnictwa Wyższego. Departament Spraw Europejskich i Współpracy Międzynarodowej. Projekt: Analiza zachowań konsumentów i popytu na wyroby z drewna - „Współpraca z zagranicą – współpraca dwustronna”: MNiSW-DSM-WWM-183-1341-8/MS/10. Kierownik tematu - dr hab. inż. Wojciech Lis, prof. nadzw., wykonawca ze strony polskiej – dr inż. Włodzimierz Popyk
7. The Strategic Project In Trans-national Commercial Activities In Research & Innovation, Clusters and In SME- Networks, StartDust of the Balic Sea Region Programme 2007-2013 (wykonawca – dr inż. Włodzimierz Popyk)

Projekty badawcze interdyscyplinarne:

1. Lis W., Schroeder G.: Ocena oddziaływania przemysłu drzewnego na środowisko w aspekcie interdyscyplinarnym na przykładzie tartaku w Laskach. Interdyscyplinarny projekt badawczy o charakterze międzyuczelnianym AR - UAM, Poznań, 1997 – 1998.
2. Lis W., Schroeder G., Mikołajczak E.: Możliwość energetycznego wykorzystania odrzutów z przerobu makulatury – aspekty ekologiczne i ekonomiczne. Interdyscyplinarny projekt badawczy o charakterze międzyuczelnianym AR – UAM (8/TD/25/WJ/03). Poznań, 2003 – 2004.
3. Lis W., Schroeder G., Mikołajczak E.: Ekologiczne wykorzystanie odpadów w przemyśle celulozowo - papierniczym. Międzyuczelniany projekt badawczy AR – UAM (5/25/WI/04). Poznań, 2004 – 2005.
4. Lis W., Schroeder G., Tabert M.: Ekonomiczne i technologiczne aspekty rosnącego udziału syntetycznych materiałów chemicznych w wyrobach przemysłu drzewnego. Interdyscyplinarny projekt badawczy o charakterze międzyuczelnianym AR – UAM - 10/25/WI/06. Poznań, 2006-2007.

Katedra była inicjatorem i współorganizatorem współpracy międzynarodowej katedr ekonomiki i organizacji drzewnictwa uczelni wyższych z krajów Europy Środkowej i Wschodniej. Od 1974 roku współdziałała ściśle z Katedrą Ekonomiki Przedsiębiorstwa Uniwersytetu Technicznego w Zwoleń (wówczas Czechosłowacja). Nieco krócej, trwała współpraca z Katedrą Marketingu, Handlu i Światowego Leśnictwa tegoż Uniwersytetu w Zwoleń. Kontakty naukowe obejmowały wzajemne konsultacje, koordynację wspólnych problemów badawczych, publikowanie wyników badań, krótkotermimowe staże i wymianę pracowników. Wyniki badań były prezentowane podczas seminariów i publikowane w formie zbioru referatów. Prowadzona była wymiana

programów nauczania, pomocy dydaktycznych, literatury, standaryzacja zakresu i poziomu wiedzy wymaganej na egzaminach z przedmiotów kierunkowych, realizowanych przez Katedry.

Od 1989 roku do współpracy włączyły się katedry zajmujące się problematyką ekonomiczną, organizacyjną, zarządzaniem na studiach uniwersyteckich drzewnictwa w innych krajach Europy Środkowej i Wschodniej. Organizowane były spotkania przedstawicieli tych katedr (Beograd, Ljubljana, Zvolen, Zagreb, Sopron, Trnava, Lwów itd). Spotkania katedr z Ljubljany, Zabrzebia, Poznania, Warszawy, Krakowa, Sopronu, Brna, Zwolenia, Trnawy, Ziliny, Zlina, Presova były cykliczne. Brali w nich udział również przedstawiciele katedr z Belgradu, Sarajewa, Skopje, St. Petersburga i Sofii. Spotkania poświęcone były aktualnym zadaniom wynikającym z działalności badawczej i edukacyjnej oraz współpracy z praktyką gospodarczą drzewnictwa.

W roku 1997 Katedra Ekonomiki i Organizacji Drzewnictwa przy współudziale katedr zagranicznych powołała sieć naukową IATM - INTERNATIONAL ASSOCIATION FOR TECHNOLOGY MANAGEMENT. Sieć ta realizuje współpracę naukową katedr zajmujących się zagadnieniami ekonomiki, organizacji, zarządzania, marketingu i pokrewnymi w drzewnictwie. W skład IATM wchodzi jednostki - katedry zajmujące się wymienioną wyżej problematyką - z Poznania, Zwolenia, Zagrzebia, Warszawy, Krakowa, Trnawy, Zlina, Żyliny, Koszyc, Brna, Zlina, Preszowa oraz innych ośrodków naukowych polskich i zagranicznych. Od 1999 roku dr hab. Wojciech Lis, prof. nadzw. jest Prezydentem IATM. Pod auspicjami sieci naukowej IATM wydawane jest, między innymi, czasopismo naukowe Intercathedra. Od 1996 roku dr hab. Wojciech Lis, prof. nadzw. sprawuje funkcję przewodniczącego Komitetu Redakcyjnego Intercathedry. Siedzibą Redakcji jest Katedra Ekonomiki i Organizacji Drzewnictwa AR w Poznaniu.

W opracowaniu wykorzystano materiały archiwalne dra A. Matuszewskiego.

Reasumując: działalność naukowa, dydaktyczna, organizacyjna i w zakresie kształcenia kadr naukowych Katedry Ekonomiki i Organizacji Drzewnictwa trwała 55 lat. W tym okresie 5-krotnie zmieniała jednostka organizacyjna oficjalną swą nazwę, a 2-krotnie: siedzibę, miejsce w strukturach wydziałowych Uczelni, kierownika. Pracownicy naukowcy wykształcili liczne kadry studentów: licencjatów, inżynierów, magistrów, magistrów – inżynierów, promowali doktorów. Opracowali recenzje habilitacyjne i profesorskie. Krajowe i zagraniczne. Próbowali zmieniać, doskonalić naukę i praktykę w zakresie ekonomiki drzewnictwa i nauk pokrewnych.

Współpracownikom dziękuję za ponad 44 lata wspólnej działalności. Życzę sukcesów osobistych. Życzę satysfakcji z dokonań naukowych. Życzę życzliwych ludzi na ich drodze naukowej.

Wojciech Lis

