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THE CHANGE IN THE FOREST LAND SHARE IN COMMUNES THREATENED BY SUBURBANISATION AND THE SUSTAINABLE DEVELOPMENT PRINCIPLE

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Summary

The aim of the paper is to examine the scale of the depletion of forest lands in the areas bordering on the capitals of Polish voivodeships. The analysis of the communes around studied urban centres allows for the assessment of the local governments' spatial development policy with reference to forest lands. The paper shows how local authorities prevent these lands from disappearing and how closely this task is related to the usage of the spatial information instruments such as land use plans (spatial development plans).
In the paper the index of the loss of forest land has been used. It estimates the percentage of the forest land that constitutes forest land intended for deforestation in land use plans with reference to the total area of forest land registered in a commune in 2013. Out of the 148 communes that border on capitals of voivodeships only 34 were qualified for the research, namely those with index of forest land depletion higher than its average value for Poland. One of the conclusions of the research is that areas particularly threatened by the loss of forest lands are those that border on Warsaw, Łódź and Lublin.

Keywords

land use plan • forest land • change in the use of forest area • forest land loss indicator • urban sprawl • sustainable development

1. Introduction

In recent years Polish urban agglomerations are undergoing constant changes in the structure of land use. As the European Environment Agency (EEA) indicated in its report of 2006, in the last twenty years the built-up areas in many European countries increased by 20%, whereas the population grew only by 6% [EEA 2006]. The growing urbanisation is a direct effect of urban sprawl or in other words of the interference in landscape with no link to the increase of population. The growth of cities to their adjacent areas leads to: the emergence of low density populated areas, the division of commercial and residential services and work place, insufficient quality of road network to newly urbanized areas and the dominance of car transport [Ewing et al.

2002]. Uncontrolled growth of cities is equivalent to their incoherent current growth resulting from the development of private transportation and the motivation of more and more people to have a semi-detached or a detached house in suburban areas.

As the literature on this subject suggests, the uncontrolled growth of cities influences the surrounding landscape in that it leads to excessive use of forest and agricultural land and green areas [Brueckner 2001, CASA 2002, Travisi and Camagni 2005, EEA 2006]. The pressure on the areas surrounding the city centres means that indicators for assessment of suburbanisation processes have to be identified. Some of the indicators are created to show the suburbanisation impact on forest or agricultural land use [Hasse and Lathrop 2003, Rudel at al. 2005] and they help in the implementation of fact-based policies. The spatial development policy based on facts can give an accurate assessment of whether the area should be implemented with new functions by the local authorities. By using statistical data together with expertise one can judge if the changes in land use result directly from the social-economic changes in a commune (gmina) or if they are a part of greenfield development policy favouring urban sprawl. Scientific analyses should become a foundation for local authorities and a base for taking right decisions that ensure that communes develop in a sustainable way and help in environmental planning.

The negative phenomena in the urban areas are a consequences of the fact that the administrative boundaries no longer reflect the physical, social, economic, cultural and environmental conditions of development of the cities, which means that local authorities of the adjacent communes must react and change their attitude when it comes to management of the basic units of territorial division [Unia Europejska 2011]. Unconstrained urbanisation in the areas surrounding the biggest cities in Poland has an undeniable impact on the social, economic, spatial, cultural and environmental spheres [Bieńkowska 2013]. As to the latter, it needs to be emphasized that the core's influence on the surroundings is also linked to the impact on the landscape of the rural and urban-rural communes or towns bordering on major cities [Wójcik 2006, Mrozik et al. 2012, Wójcik 2013a, b, Kowalewski 2013, Mrozik and Wiśniewska 2013], which in many cases runs counter to the idea of sustainable development. Imposing restriction on urban sprawl must be implemented in the form of deliberate actions of local authorities and consist in well thought-out urbanisation of not built-up areas and focus on already developed areas and places defined in the local law as building sites [Bieńkowska 2013].

The aim of the article is to examine the problem of shrinking forest lands in the areas bordering on the capital of the voivodeships. Thanks to the analysis of communes situated around these urban agglomerations it will be possible to assess the spatial policy of local authorities with regard to forest lands. It will also be a chance to verify whether in territorial units threatened by the pressure of the centre the indicators of forest land depletion are similar to or differ from the mean values noted in Poland. The article will allow the reader to judge how successful commune authorities are in counteracting the depletion of forest resources and thus in adhering to the principle of sustainable development, which means sticking to the directions of local land use planning.

2. Forest lands and land use planning

Regardless of the legal and administrative status of a commune adjacent to the city one can expect an increased demand for building plots and the pressure to transforming agricultural and forest areas into building ones. In spite of the principle – introduced by the Concept of National Spatial Planning 2030 – of limiting the urban sprawl, there is no visible influence of that law on the Polish landscape [KPZK 2011]. Similarly, the local authorities seem to care little about the regulations introduced by the Act of 3 February 1995 on the protection of agricultural and forest lands, which states clearly that the change of the use of forest lands to non-forest purposes takes place by the local spatial development plan. The regulations impose the obligation to obtain necessary permissions depending on the ownership of forest lands. If the lands are the property of the State Treasury the permission of land use must be consented by the Minister of the Environment or an official authorized by him. It is done after gaining the approval of the Marshall of the Voivodeship, which is to be proceeded by getting the opinion of the chamber of agriculture. When state-owned lands are concerned, a city's mayor is obliged to obtain the opinion of a director of Regional Directorates of State Forests, and if the lands in questions are part of national parks – the opinion of the park's director is obligatory [Feltynowski 2015].

In communes the instrument of spatial planning are the local spatial development plans. In principle the plans are non-obligatory documents. The plans, being a part of the local law, must be consistent with the principle of sustainable development and be helpful in implementing the idea of spatial order. The cores of metropolitan areas and urban agglomerations have indirect influence on neighbouring communes, which sometimes means that land use plans must be worked-out in order to protect biologically active areas from anthropogenic impact on the environment of the local population and settlers. In accordance with the applicable Polish law the actions of local authorities can effect the resources that the commune has. One of these resources are forest lands. Their deforestation can take place exclusively on the basis of provisions of the local land use plans. When legal regulations are taken into account, it should be noted that the mean depletion of forest land in 2013 in Poland was equal to 0.7% of all forest lands.

3. The research area and methods

The choice of the examined communes that border on the cities being the core of agglomerations results from the fact that these areas are threatened by anthropogenic impact on the environment related to neighbourhood of a big city. The communes chosen for examination consist of the ring of units that have common border with the centre and thus communes of diverse legal and administrative status can be included in this group.

The research materials concerning two operational areas of local government units – spatial planning and forest lands – come from the Local Data Bank (BDL) of the

Central Statistical Office (GUS) and are for the year 2013, because the statistical data are accessible with one and a half year delay.

In the analysis a forest land depletion indicator has been created to assess what is the share of forest lands identified in local land use plans intended for deforestation [Feltynowski 2015]. The indicator was used to evaluate the attitude of local authorities to forest lands and to verify the problem in the studied group together with the type of communes that border on the voivodeships' capitals.

In 2013 there were 148 communes that bordered directly on eighteen voivodeships' capitals. Out of these communes 23 were urban communes, 33 rural-urban and 92 rural. Only one of them – the rural commune Koniusza, bordering on Kraków, had no land use plan. Among those analysed territorial units 44.6% had zoning plans covering more than 50% of their areas and 23 of them (15.5%) had such plan for the whole areas of the communes.

An additional criterion used for selecting communes as a subject of the study was the higher depletion percentage of forest lands than the respective mean value for the whole country, that is 0.7%. This limitation helped to single out only those territorial units which had a significant impact on the forest lands resources in their region.

4. Results and discussion

Discussion on the depletion of forest lands in areas bordering on the capitals of voivodeships should start from a statement that these lands are an element of the landscape and important resource affecting the natural and environmental spheres. As such they are subject to special protection, and their excessive elimination can have a negative influence on applying the principle of sustainable development in the areas close to large urban agglomerations. 41.2% of the 34 communes, chosen for further analysis, had a land use plan that did not even cover 50% of their total area and 20.6% of them had such plans covering the whole of their area, while half of the studied territorial units had land use plans that covered more than 80% of their area.

Among the 34 studied communes there were 10 urban communes, 6 urban-rural communes and 18 rural communes. The target group of the research consisted of communes bordering on 11 out of 18 voivodeships' capitals. The studied territorial units bordered on: Gdańsk (2 communes), Katowice (2), Kielce (2), Kraków (2), Lublin (4), Łódź (5), Opole (2), Szczecin (2), Toruń (1), Warsaw (11) and Wrocław (1).

Thanks to the adopted criterion it was possible to determine the influence of urban sprawl on adjacent areas of cities and assess its impact on forest lands. The cities like Warsaw, Łódź and Lublin are the ones that exert the greatest influence on their surroundings, affecting respectively on 11, 5 and 4 of their neighbouring units. In the remaining cases the number of territorial units bordering on the city does not exceed two.

Table 1. Statistics of land-use plans and forest land share in 2013 in the studies communes

Commune	Commune type	Percentage of land-use plan [%]	Land intended in local use plans for deforestation [ha]	Forest cover [%]	The forest land loss indicator [%]
Kobierzyce	rural	100	5	2.6	1.3
Lubicz	rural	27.4	40	18.8	2.0
Jastków	rural	94.9	322	4.7	59.2
Niemce	rural	99.9	63	8	5.6
Świdnik	urban	100	230	14.3	77.1
Wólka	rural	99.8	200	11.8	22.9
Andrespol	rural	100	101	25.2	16.7
Brójce	rural	15.5	6	6.2	1.4
Konstantynów Łódzki	urban	46.2	25	10.1	8.8
Pabianice	rural	100	6	8.4	2.1
Rzgów	urban-rural	92.4	14	3.9	5.5
Skawina	urban-rural	100.3	21	9.3	2.2
Zielonki	rural	95.3	6	1.3	9.5
Izabelin	rural	13.4	55	74.6	1.1
Jabłonna	rural	31.2	25	42	0.9
Józefów	urban	36.2	231	25.3	38.2
Konstancin-Jeziorna	urban-rural	68.9	257	11.6	27.8
Lesznowola	wiejska	81.3	174	12.8	19.1
Łomianki	urban-rural	18.3	12	14.9	2.0
Marki	urban	97.3	115	33.7	12.7
Nieporęt	rural	96.8	59	41.8	1.4
Piaseczno	urban-rural	49.1	118	27.3	3.3
Sulejówek	urban	57.4	90	27	16.8
Zielonka	urban	15.4	129	73.6	2.1
Tarnów Opolski	rural	62.8	37	42.9	1.0
Turawa	rural	12.3	99	50.4	1.1
Gdynia	urban	26.4	61	44	1.0
Pruszcz Gdański	urban	97.9	7	4.3	1.1

Commune	Commune type	Percentage of land-use plan [%]	Land intended in local use plans for deforestation [ha]	Forest cover [%]	The forest land loss indicator [%]
Lędziny	urban	9.8	10	13.8	2.2
Sosnowiec	urban	32.7	56	15.7	3.7
Morawica	rural	100	349	26.3	9.3
Sitkówka-Nowiny	rural	100.3	19	38.3	1.1
Dobra (Szczecińska)	rural	10.1	27	21.6	1.1
Police	urban-rural	99.8	182	47.9	1.5

Source: author's study based on data of the Central Statistical Office (GUS) in Poland

Among the studied communes the mean share of forest lands in the total area of a commune was 26.5%, and the mean afforestation was at 25.8%. In land use plans the local governments of the studied communes designated on average 4.1% of forest land for deforestation. In urban communes the forest lands took up on average 35.2%, and the mean afforestation was 33.9%, with forest land depletion level at 5.6%. In urban-rural communes the indicators were respectively at 28.3%, 27.5%, with forest land depletion level at 3.2%. The rural communes had the lowest share of forest lands at 23.4%, the afforestation level was 22.8% and the forest land depletion was at 4%. As expected, the greatest depletion of forest land was observed in communes bordering on the voivodeships' capitals. Regardless of the value of the forest depletion indicator resulting from the land use plans, the lowest indicator noted in urban-rural communes is more than 4.5 times and in urban communes almost 8 times higher than the mean value for Poland.

Data show that since 2009 in 19 communes the amount of forest lands designated for deforestation did not increase. During the period the deforestation level in one commune decreased due to changes in the local law. The remaining 14 communes chose new forest lands for land use change. In 4 local governments the increase of amount of lands intended for deforestation was insignificant with just 1 ha. In 5 communes the increase ranged from 1 do 10 ha. Only governments of 2 communes decided to increase the area for deforestation from 10 to 25 ha. The remaining 3 communes significantly increased the area of lands for deforestation during the 5 years period, and they were: Konstancin-Jeziorna (the increase amounted to 175 ha), Świdnik (207 ha) and Morawica (344 ha).

Nine communes or 26.5% of the studied territorial units had a deforestation indicator higher than 10%. The mean values of forest lands and afforestation in these communes amounted to respectively 13.9% and 13.6%, whereas the mean value of depletion of forest lands there was at 27.8%. The rural commune of Morawica bordering on Kielce, where the highest absolute depletion of forest lands was noted (at 9.3%), did not belong to this group. At 77% greatest depletion of forest lands in relation to their total area

was noted in Świdnik. The Konstancin-Jeziorna commune designated almost 28% of its forest lands for deforestation. The research confirmed the initial conclusions about the impact of urban agglomerations on their neighbouring communes, appointed on the basis of number of communes bordering on voivodeships' capitals. In the group of communes where the deforestation was the highest there were 5 units adjoining Warsaw, 3 bordering on Lublin and 1 on Łódź. The high level of deforestation was noted in the following communes: Jastków (59.2%), Józefów (38.2%), Wólka (22.9%), Lesznowola (19.1), Sulejówek (16.8%) and Andrespol (16.7%).

On the other hand, there were communes where less than 2% of forest lands had been intended for liquidation in land use plans. In this group there were more than 38% of the studied communes (13 territorial units). In these communes the forest lands took up on average 34.1% of their area, the afforestation was at 33.1%. The mean value of the deforestation in these units was at 1.2%.

5. Summary

In spite of the potential threat of suburbanisation to forest lands, the analysis shows that only 25% of communes bordering on voivodeships' capitals had an indicator of forest lands depletion higher than its mean value for Poland. Interestingly, diversity in changes of land use is visible in this group. The study shows too that the biggest impact on adjoining areas is exerted by three urban agglomerations: Warsaw, Lublin, Łódź. In some communes bordering on these cities an excessive level of forest land depletion was noted, which on the one hand is an indication of the problem related to the neighbourhood of a large city, and on the other, it reveals the attitude of local authorities to protection of forest resources.

It is impossible to detect a clear-cut trend among the studied communes as to changes of forest land areas and to link this phenomenon to specific data on particular territorial units. However, the plans of authorities of voivodeships' capitals only indirectly affect the agglomerations surrounding the core and so the local governments of the urban, rural, and urban-rural communes surrounding the cities should care for spatial order and sustainable development of their territorial units, thus hindering the negative impact of outflow of people from the cities to the surrounding areas. In land use plans local authorities should include the guidelines concerning housing development and designate for development the areas that are least likely to have influence on the landscape and natural resources, including forest lands.

Deforestation of communes and their chaotic development has also negative environmental consequences, which runs counter to the principle of sustainable development. The land use planning and documentation made during preparation of land use plans (forecast of environmental assessment) are often insufficient to foresee the long-term consequences of deforestation and anthropogenic impact on the environment in these areas. However the analysis led to a positive conclusion that only few communes surrounding the voivodeships' capitals want to diminish their forest resources. The study showed that in 2013 only 6.1% of all the communes bordering on the voivodeships' capitals decided to deforest more than 10% of their forest lands.

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