Authors

MANAGEMENT
OF REAL ESTATE RESOURCES

Edited by
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INTRODUCTION

Real estate management is an interdisciplinary term related both to spatial management and real estate management. Real estate management as a system includes groups of legal, economic, technical, information and informative activities.

There are some rules of material resources management as:

1. Identification of processes;
2. Cost analysis in particular processes;
3. Assessing reasons of unproductivity in particular processes of resources management;
4. Assessing alternative scenarios in particular processes:
   - investment,
   - organization,
   - human resources,
   - maintenance.

On the other hand managing the use of land is an important part of land administration systems. Natural resources are important assets and needs special policies and environmental protection. Modern agricultural policy supports various forms of farming.

The policy includes:

- support for reforestation,
- introduction of ecological farming methods,
- environmentally friendly growing methods,
- permanent fallowing of agricultural land.

Management means conscious activity, both individual and collective.

Therefore management tends to particular transformations of current state, than real estate management can be treated as a set of relations and procedures. Such set includes types of real estate and rights to them. Real estate management is strictly connected with economy. Real estate management is a part of economy. Real estate, which are the objects of management are identified, described, analyzed, assessed and aggregated. Real estate management treated as a system has been the object of many valuations and analysis. Within such system, various tools and procedures stimulating development of particular areas can be applied.

The managing real estate resources is conducted in specific condition because it is connected with irreversible goods and requires applying rules of sustainable development. Particular attention should be paid to economic dimension of efficiency of such management, which includes also the most important social aspects. Parts of successful real estate resources management are connected with way of management and quality of personnel responsible for such issues. Land management activities reflect the development agents of globalization and technology.

In many countries multipurpose cadastral systems support the real estate management system. Multipurpose cadastral systems support the interrelated functions of land tenure, value, use, and development. There are many forms of special information. Very important is integrating information about the natural and built environments.

Digital technologies adopted in land administration activities intended to enhance the performance of specific programs or activities.

In this monograph, in particular, the following issues are presented:

- tool supporting the public property management,
- analysis of economic trends in province,
- land consolidation works in agricultural areas,
- investigation of the sail and vegetation cover,
- real estate management and local real estate market,
- structure of agricultural land,
- management of marginal land,
- qualification method of land in forest,
• legal protection of spatial databases according to UE directives,
• public registers of real estates (the cadastre),
• 3D and 2D cadastre.

Scientific editor
Ryszard Źróbek
1. RESOURCE MANAGEMENT PLAN FOR PUBLIC PROPERTY AS A TOOL FOR POWER MANAGEMENT PROCESS

Abstract

The public real estate management system as a part of land management system relies on a number of the complicated legal and surveying procedures. During the concrete actions in this regard, it is important to make the right decision.

In Poland, the efficient public real estate management is based on the resource management plan. To prepare these plans are needed current information about these real estate and a knowledge of the demand for real estate in the local real estate market.

For this purpose, the local government bodies, managing the public real estate resources, collect data in their own databases, and use data on real estate from multiple distributed public records such as: the real estate cadastre, the surveying and cartographic system, land register, register of real estate prices and value or from the land utilities register. In the near future this process will be streamlined with the ability to view, analyze and download the integrated spatial data from multiple land information system in a single server.

This article presents the current tool solutions for the efficient real estate management in Poland and some information concerning rational management.

Key words: public property, land management, resource management plan, information.

1. Introduction

The article focuses on the helpful tool supporting the public property management. Therefore, it is important to define two basic notions: public property and land management. Important is comparison of property activity in the public sector with that in the private sector. By far the most visible public sector in real estate activity has been joint development.

Sometime term “public property” can be used as a subset of “state property”. This term may be used to describe the use to which the property is put. State ownership (public ownership-State Treasure), local government units ownership or state property are property interests that are vested in the state, rather than an individual or communities (Clark, Kohler, 2005). In the modern representative democracy public property is said to be owned by the people as a commons or held in trust by the government for common benefit (Grover, Elia 2011). Public property management is a part of the general processes of land management. Land management is understood as the whole of the problems and tasks related to appropriate use of the country area for its general economic and social purposes. In a more restricted meaning it includes all institutional, legal, economic and technical activities associated with rational use of land to achieve social, environmental, and economic sustainable development (Williamson et al., 2010). The main areas of land management include (Żróbek, 2012):

- civil and administrative trade in real estate;
- managing land from the agricultural resources of the state;
- managing forest and trading state-owned forest;
- managing land under water;
- integration and exchange of plots of land;
- divisions, demarcation and expropriation of real estate in rural areas;
- protecting agricultural and forest land, etc.

The basic objectives and tasks of land management include:

- optimum use of land;
- protection of land resources;
- establishing a correct structure of using and holding land;
- designing a correct spatial structure;
- the appropriate location of socio-economic functions;
- establishing conditions which ensure proper income on the land;
- adopting spatial-economic factors to the principles of market economy.
According Hopfer (2006), development of real estate in Poland dates back to the notion of public and private ownership and related rights. Rational real estate management includes then many dilemmas and choices (Żróbek, Żróbek-Różańska, 2010), such as:

1) Analyzing legitimacy of real estate sale;
2) Decisions on dividing and consolidating real estate – purposes and effects analysis;
3) Decisions on building technical infrastructure facilities;
4) Decisions on rates to calculate adjacent fees;
5) Analyzing profitability of actualization of fees for perpetual usufruct (long term of public land lease):
   - Benefits and costs analysis,
   - Economic and social effects.
6) Validity of transforming perpetual usufruct (PU) into full ownership (OW);
7) Perpetual usufruct with ‘option’ of sale after building objects (according to the agreement);
8) Justifying the use of the pre-emption right by the commune:
   - Conditions of pre-emption,
   - Purposes.
9) Regulating real estate legal relations (especially in towns):
   - Rational dividing the space,
   - Elimination plots ‘on the contour of building’.
10) Analysis of the legitimacy of purchasing real estate to ST or LGU resources;
11) Term ‘fair compensation’ for expropriation;
12) Validity and course of negotiations related to purchasing real estate to resources;
13) Improving systems of information on real estate:
   - Maps of real estate values,
   - Registers, specifications, lists,
   - Supplementary sources of information,
   - Information systems development.

These above activities and procedures of modern land (real estate) management have to take into account phases of market cycles. The phases can be taken into account in the procedure of developing resource management plans, owned by the State or by local governments.

2. Legal framework of the management the real estate resources in Poland

The social and economic role of the real estate resources in Poland is conditioned by a number of national and local laws. This role is also apparent from the institution of the public purpose. The public purpose can be defined in this case as the need to implement the necessary investments of a public nature and the role of the resource is to provide the local community an adequate number of real estate in connection with the needs arising from the process of social development.

Currently development of real estates and land management in Poland are regulated by several Acts, including:

1) Constitution of the Republic of Poland on 2 April 1997, where Art. 21 is worded as follows: "The Republic of Poland protects ownership rights and inheritance rights. Expropriation is acceptable only when it is necessary for achieving an important public goal and for fair compensation";

2) Civil Code of 23 April 1964 which defines rights related to land ownership including:
   - full ownership,
   - perpetual usufruct,
   - restricted rights of property.

3) Act of 21 August 1997 on Real Estate Management which uses and complements ideas from the Code Civil (1964) and adds the detailed principles concerning:
   a) managing real estate owned by the state or by local governments;
   b) performing divisions as well as integration and division of real estate;
   c) exercising the right of pre-emption by communes;
   d) real estate expropriation and returning expropriated real estate which has not been used in conformity with the purpose of the expropriation;
   e) participation in the cost of construction of technical infrastructure;
   f) performing real estate valuation and regulation of the principles of professional activities of real estate management.

4) Building Act of 7 July 1994 concerning designing, maintenance and extension of building constructions,
5) Act of 27 March 2003 on Spatial Planning and Development, which in particular covers land-use zoning for different purposes, fixing the principles of land management based on sustainable development.

- real estate acquisition by foreigners;
- integration and exchange of plots (agricultural land);
- managing forest real estate and state-owned agricultural real estate;
- acquisition of land for motorway construction and execution of investment projects of national roads construction;
- accommodation for the Polish Army;
- managing certain property components.

Important regulations concerning creations of resource management plans are contained in the Act on Real Estate Management.

3. Organization and competence of public real estate's resources management in Poland

In Poland, takes a rapid increase in property values, which results in the need for urgent attention to the owned resources of property. In this case, an indication of the role of real estate resources should help in the rational real estate management. It should also provide arguments to put the land management system and its utilities.

The social role of the real estate resources is directly determined by the place they occupy in the life of the individual members of the local community. Real estate, as a social good, provide and should provide the specific conditions of the community, ranging from the provision of the necessary property for roads, and ending on the real estate allotted for purposes related to economic activity.

In Poland, the public real estate resources are managed by the local, regional and state government bodies (local authorities), according to the administrative division of the country (Figure 1 and Table 1).

![Figure 1. Administrative division of Republic of Poland – as at January 1, 2011.](image-url)
Table 1.

List of territorial units of Poland - as at 01.01.2013.

<table>
<thead>
<tr>
<th>Specification:</th>
<th>Territorial units of Poland</th>
<th>Cities with poviat status</th>
<th>Municipalities</th>
<th>Total</th>
<th>Urban</th>
<th>Rural</th>
<th>Urban-Rural</th>
<th>Delegations</th>
<th>Districts</th>
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<th>Urban-Rural</th>
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<td>Poviat (county)</td>
<td>Cities</td>
<td>Total</td>
<td>Municipalities</td>
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<td>In urban-rural communities</td>
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</table>

Resource: Own study based on the data from TERYT (National Register of Country Territorial Division).

The public real estate constitute an immense resource which greatly affects the real estate market (Cellmer, Kuryj 2008). It comprises the following public real estate resources (Art. 20 Act on Real Estate Management):

- the real estate owned by the State Treasury, comprising 11.7 million ha of land, including 7.5 million ha of forest;
- communal (2479) real estate resources, comprising about 0.72 million ha of real estate, situated mainly in urbanised areas;
- county (poviat - 380) real estate resources, comprising about 0.08 million ha of real estate, situated mainly in urbanised areas;
- provincial (voivodeship - 16) real estate resources, comprising about 0.03 ha of real estate, situated mainly in urbanized areas.

The percentage of ownership in Poland is as follows (Figure 2):
Figure 2. The percentage of ownership in Poland – as at January 1, 2011.

Resource: Own study on the data from Survey Office

As shown in the above diagram 40 percent of all real estate in Poland is part of the public real estate resources. The lack of current market data is a major concern for public property managers. This impedes their effectiveness. All public bodies owned properties are tax-exempt. Market value are not assessed by tax authorities. It is important piece of market information.

4. Strategy of managing the public real estate resources

The Public Real Estate Management Strategy includes theory and practice of preparation, implementation, monitoring and evaluation of the real estate management processes. Management strategy is a way of achieving the goals of management on the basis of previously inventoried property rights and the facts, but also set up a database of real estate and made analysis the precincts of the real estate resource.

Management strategy should include many important aspects of the management process. It should be tight management tactics which takes into account all available resources, tools, methods, procedures, and personnel, to provide the needed inventory, legal, technical, social and economic information.

Management strategy is a multi-step process. The individual steps may be as follows (Wiśniewski, Janowski, 2008):

1. Defined the management goals, including:
   a) preparation of list the management goals,
   b) determination of the time horizon for chosen goals of management,
   c) assigned the rank and identify the importance of each objective to the chosen perspective.

2. Drawn up the plan of managing the public real estate's resources
   a) initial assignment the real estate from public resource to the defined objectives of management,
   b) performance of preliminary feasibility studies,
   c) signing the sources of individual goals funding,
   d) list of the property with the assigned objectives of management – a plan of managing the public real estate's resources

3. Assigning each real estate of management procedures, including:
   a) select the procedures of management,
   b) name the functions performed in each procedure,
   c) assigned each real estate of management procedures,
4. Drawing up of management algorithms for various procedures, including:
   a) define the structure of the procedure,
   b) name of actions to be performed during the different phases of the procedure and define the necessary documents, work that must be produced or performed,
   c) an indication of the structure of decision-making and executive for each procedure by:
      – identify the person, persons or entities responsible for implementing the specific procedures of management,
      – identify the person directly supervising and evaluating the various procedures of management execution,
   d) identify the structure of appeal.

5. Defining entities responsible for the development and implementation of a new management procedures.

Public - owned property in Poland appears to be treated as a public good. The public sector’s decision process is more complicated by the constant reelection pressures on elected officials. Real estate may sometimes be used to provide short – term social returns, which is not consistent with long- term cost minimization for public property (e.g. The lack of discounted cash flow analysis).

Once area for improvement in public real estate resources management is the level of education in general. Important role in public real estate sector plays the planners. They could foster the effective use of publicly owned property in achieving public goals and objectives.

5. **Resource management plan - an example of Warta Bolesławiecka commune**

All properties are objects of managing the great value. Thus, in many cases, are treated as a quick and easy source of income. This approach is acceptable, but only under the condition that results from properly prepared a plan of managing the public real estate resources. The correctness can ensure only the implementation of a systematic approach to the problem of public real estate management, one of whose effects should be a rational plan of managing the public real estate resources.

In the analysis, the authors want to present an example of such a plan of managing the public real estate resources drawn up for the municipality Warta Bolesławiecka (Figure 4). Warta Bolesławiecka is a small rural community located in Silesian Voivodeship (woj. Dolnośląskie) in the district of Bolesławiec (Figure 3). The area of municipality has 110.44 thousand of square km, and a population is 8174, the population density is 72.1 people per sq km.
Each plan should have its professional title page with the logo (Figure 4).

**Figure 3.** Location of Warta Bolesławiecka commune.  
**Resource:** https://maps.google.pl/maps?hl=pl&tab=wl

Any action taken in the land management requires full knowledge of condition and physical properties of real estate as a subject of real estate management. The real estate management cannot
be effective if it is not preceded by an inventory. In this case, the targets are set only on the basis of current needs. Unfortunately, this method is still practiced in Poland. This situation is disadvantageous for real estate management and should be changed. It’s necessary to strive to:

– take an inventory of the property, their legal status and objectives of management,
– create by the state and local authorities their own, modern database on properties in the individual resource.

The inventory is a list of all properties that are part of real estate resources, the regulation of non-compliance with legal conditions, setting goals relating to the real estate management and remove any inconsistencies and discrepancies between the actual states and the registered states.

Such a definition of inventory is unusual. This includes not only the physical list of real estate (things), but also to identify the legal status relating to concrete real estate in resource. Also aims to conduct an inventory of management objectives to be realized based on the real estate being part of the real estate resource. The adopted definition of inventory follows that before the creation of real estate records, all properties are identified, described and analyzed comprehensively.

Below there is an example of a partial inventory of land area constituting the community Warta Bolesławiecka resource with regard to land use in specific localities (Figure 5).

![Figure 5. Fragment of an inventory of the Warta Bolesławiecka real estate resources.](http://bip.wartaboleslawiecka.pl/plan-wykorzystania-zasobu-gminy-na-lata-2011-2013)

A large value of the property and a very large market value of the real estate resources in the economic sense impact on local development processes. Owning the real estate resources of the correct structure and quality (in good technical condition, well located, etc.) is perceived by the environment (private subjects and society) positively, as evidence of economic stability and high capacity for development.

By treating the property as a factor of income should emphasize their role in the processes of providing funds to the entity's budget.
Transfer of the property right brings a big income, because of the high market value of real estate. Sales can provide the financial means, but these revenues are one-time, and the entity loses forever the right to ownership of the property. In this case, the rationalization of the sales process seems to be a necessity. This rationalization should be based on an analysis of sales volume expressed by the number of properties for sale in the context of the needs and the optimization of the spatial and temporal sale fact (Figure 6).

Sales analysis should be carried out taking into account the criterion of necessity and cost-effectiveness. Spatial optimization is aimed at predicting the sale of such properties, which have the best indicator of the location of the expected price in the context of the expected revenue, and thus fulfill the expectations of the level of income consistent with the assumption that the property is sold at the worst location for the anticipated income.

![Gmina Warta Bolesławiecka](image)

**Figure 6.** The use of the commune Warta Bolesławiecka real estate resource planned for implementation in 2012.


### 6. Summary and Conclusions

Today’s real estate resource management processes are planned, implemented and reviewed in a very complex conditions associated with: the complexity of the subjects of management, the complexity and variety of decision-making, multi-threading implementation process of management goals and many other groups of conditions determining the quality management processes (Wisniewski, Janowski, 2008).

The implementation of sound real estate management process is a complicated process and requires a modern look that goes beyond the scope of traditional understanding an officials knowledge. Today, well led the real estate management is something more than just a sale, charging and collecting payment. In the era of rapid changes in the closer and farther surroundings of the
entity managing, the governing bodies have become active participants in the development process, helping to improve the image of these sector of the economy.

Changing the approach involves the development of appropriate computer tools for the management operations. The specialized tools used in the service of management processes can improve the effectiveness of management and affect the quality of decisions.

In the era of the information society the information effectiveness becomes a key matter, because determines the ability of reflecting the real estate management system all the information available, so that the system responds to the emergence of new information entering the appropriate response and action.

Efficiency is important to improve the competitiveness and quality of management.

The key element that determines the correct managing the real estate resource is to use the strategic tool - the plan of managing the public real estate resources, which should included:

a) the space-time identification and description of the property,
b) the identification of needs of the entity and identification of needs for transformation qualitative and quantitative structure of resources,
c) planning and forecasting the real estate using in a resource,
d) the ways determination to verify of the applicable procedures and tasks assessment.
2. ANALYSIS OF ECONOMIC TRENDS OF EASTERN CROATIA

Abstract

Although well-known for quality agricultural areas, pastures and forests – especially Slavonian (Pedunculate) oak, Sessile oak and Turkey oak forests, with particular opportunities for growing grapes, development of hunting and fishing tourism, visits to nature reserves, valuable monumental heritage, eastern Croatia is increasingly lagging behind in development.

This paper analyses the data of eastern Croatia which have been accessible to the authors. The goal of the paper is to get a clearer and complete picture of the economic situation in the area of eastern Croatia that in terms of population and size of territory encompasses nearly one-third of the Republic of Croatia. The methodology of the paper is based on relevant literature and statistical databases.

Key words: eastern Croatia, regions, regional development, gross domestic product, economy, employment;

1. Introduction

Eastern Croatia with its five counties makes one complete and rounded part of the north eastern part of the Republic of Croatia which encompasses Slavonia, Baranya and Western Srijem.

Besides fertile and lowland terrain, hilly slopes of rich forests, pastures and vineyards, water courses of the rivers, fresh water springs and thermal springs, sacral objects, there are unused human capital that are waiting for better times and opportunities. Besides all of that has not been used to such an extent that the standard of living of the people was better, there is still a danger of collapsing the existing, and as ultimate concern is the departure of people looking for work in the countries of developed economies.

We are known for many things in the not so distant past, these areas were colonized for fertile land, farming and livestock breeding. The vine was cultivated and wines were produced that found their way to the tables of the jet set, they are still produced, but there is a problem with selling them in the market. Area of eastern Croatia was known for the production of flax, fish farming and processing, fruit plantations, vegetable growing, breeding horses, cattle farms, and export of quality "baby beef" to picky world markets (which is why, among other things, the airport in Klisa was built, in order to transport cargo – produced goods to the Arabian Emirates). In fact, this area is one of the most important agricultural areas of the Republic of Croatia.

There was an initiative to give eastern Croatia with all it has got a chance to be as it used to be throughout the history, a prosperous region with developed economy and an intersection of roads where traders came, where people bought and sold things, and lived a full life.

Corridor Vc passes through eastern Croatia, enters into Baranya, passing near Osijek, Đakovo, Sredanci and Svilaj towards the border with the Republic of Bosnia and Herzegovina. The plan is to go through the valley of the river Bosna near Sarajevo, through Herzegovina, to the port of Ploče. A total of seven junctions are projected in eastern Croatia: Beli Manastir, Čeminac, Osijek, Podravina motorway, Đakovo, Sredanci and Svilaj. Near the road there are towns Vinkovci and Slavonski Brod. Other parts of the region will be specially linked to the highway, such as the towns Vukovar, Županja, Ilok, Valpovo, Donji Miholjac and Našice.

In this paper, an analysis of some important indicators was conducted that should inspire us to think about the possibilities of organization and good will to initiate the development of the eastern Croatia with regard to peculiarities of the area.

1 Osijek-Baranya, Vukovar-Srijem, Slavonski Brod-Posavina, Požega-Slavonia and Virovitica-Podravina County;
2 The Ilok wines were registered in first wine lists in Europe;
3 The route of the motorway (Trans European Motorway -TEM ) starts in the area north of Luč, extends to the south east of the existing road D-7, bypasses Beli Manastir from the west, goes west of Čeminac, and in the part between Petrijevci and Josipovac crosses the Drava river by bridge continuing between Čepin and Cepinski Martinci towards the south. Further on, the route is laid to west, parallel to the existing road D-7, bypassing Đakovo from the west, and going near Stari Perkovci and Donji Andrijevci. East of the village Sredanci it joins the D-4 (E-70) motorway. Ibidem, p.10;
2. Regions in the Republic of Croatia

At the session of the Council of Ministers of the European Union held on 3rd October 2005 Croatia was granted candidate status for EU membership. The beginning of negotiations was determined on 20th October 2005. In negotiations on full membership between the EU and the candidate countries great importance is given to regional policy, as an important segment of economic policy. Regions are formed in order to better analyse and solve economic issues and use resources for balanced development of the Community. According to the Maastricht Treaty, the Community shall aim to implement coordinated regional development by advancing economic and social cohesion. For this purpose, the pre-accession funds were founded whose purpose is to reduce disparities between regions within the Community and to achieve economic and social progress of the whole Union.

In accordance with a standardized European statistical nomenclature, so called NUTS, Central Bureau of Statistics was given the task to deliver its proposal on the division of Croatian territory in five statistical regions to EUROSTAT in spring 2004. According to that division Eastern Croatia included Virovitica-Podravina, Požega-Slavonia, Slavonski Brod-Posavina, Vukovar-Srijem and Osijek-Baranya County.

EUROSTAT declined the aforementioned proposal in May 2004, because two of the proposed regions did not meet the criteria, so Central Bureau of Statistics started making a new division, because a region cannot have less than 800 000 nor more than 3 000 000 residents.

In the division into four regions (Central Croatia, Zagreb region, Adriatic Croatia and Eastern Croatia) eastern Croatia has again retained its five counties mentioned in the first draft. This proposal was accepted by EUROSTAT.

Basic concepts of the Law on Regional Development of Republic of Croatia include that "regional development policy means comprehensive and coordinated set of objectives, priorities and measures aimed at achieving economic growth and sustainable development, reduction of regional economic and social differences within the Republic of Croatia to achieve balanced development, and establishing a framework for effective planning and coordination of development activities." At the same time it was pointed out that the lagging areas, which in the social and economic sense are behind the national average, should be further stimulated. The Law states that "the policy of regional development is based on partnership and cooperation between the public, private and civil sector". Given the politics of the EU, which is based on "sustainable development" with matching growth in all regions of the Community, the draft law contains in Art. 10th that the Regional Policy contributes to the harmonious and balanced economic and social development that ensures the protection and preservation of the natural environment and the diversity of cultural heritage of the Republic of Croatia.

Central Office for Development Strategy prepared at the beginning of 2005 the first draft of the National Development Plan with the basic elements of regional development on the basis of which the Regional Development Strategy of the Republic of Croatia was developed. The main component of the Regional Development Strategy is the Development program for counties and wider regions. The goal of the Regional Development Strategy is that "all relevant participants in the process work together to define priorities and provide solutions to problems the regions are facing".

The European Union has in the 2012th adopted a new model of dividing the Republic of Croatia into two regions on which Croatia will continue to base their regional development policy and withdraw the money from EU funds. A new division of the Republic of Croatia on two statistical regions - Continental and Adriatic Croatia (Scheme 1) - in the context of the goal to optimally withdraw money from EU funds will start to be applied from 1st January 2013.

Continental Croatia consists of: the City of Zagreb, County of Zagreb, County of Krapina-Zagorje, County of Varaždin, County of Koprivnica-Križevci, County of Međimurje, County of Bjelovar-Bilogora, County of Virovitica-Podravina, County of Požega-Slavonia, County of Slavonski Brod-Posavina, County of Osijek-Baranya, County of Vukovar-Srijem, County of Karlovac and County of Sisak-Moslavina.

Adriatic Croatia consists of: County of Primorje-Gorski Kotar, County of Lika-Senj, County of Zadar, County of Šibenik-Knin, County of Split-Dalmatia, County of Istria and County of Dubrovnik-Neretva.

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4 The Maastricht Treaty, art. 130a;
5 Ibidem. art. 3;
6 Ibidem. art. 6;
7 ECORYS Nederland BV 3006 AD Rotterdam, The Netherlands, p. 5;
From 01st June 2013 Republic of Croatia has become a full member state of European Union.

**Scheme 1: A new scheme of division of Croatia on two statistical regions by NUTS**

3. Eastern Croatia - Analysis of Economic Trends

Under the territory of Eastern Croatia we imply five counties in Eastern Croatia: County of Slavonski Brod-Posavina, County of Osijek-Baranya, County of Požega-Slavonia, County of Virovitica-Podravina and County of Vukovar-Srijem. In Table 1 there are main natural and economic indicators and characteristics for the area of aforementioned five counties.
Eastern Croatia embraces 22% of the territory of the Republic of Croatia, and 20% of the total population of Croatia in 106 municipalities and 20 towns or cities.

This part of Croatia features plain landscapes with fertile land in mostly lowland relief, adequate for cultivation of various agricultural products. On mild slopes of hills in Požega, Brod-Pošavina, Fenićanci, Slatina, Orasovica, Kutjevo, Baranya, Erdut and Ilok there are grape vines of which wine is made which is not only famous in Croatia but also worldwide. This area belongs to the most important agricultural area in Croatia. Until 1991, processing capacities of food-processing industry were developed here on agricultural basis. Agriculture and food-processing industry were main economic activities according to their part in achieving Croatia's business results. In 1999, more than 50% of fundamental agricultural products were produced in Eastern Croatia, in relation to total production in Croatia, as it is evident from the following numbers: sugar beet 83.8%, oil seed rape 80.5%, wheat 75.8%, barley 64.2%, and corn 59.0%. Slavonia is well known in the whole globalization area for Slavonian (Pedunculate) oak, Sessile oak and Turkey oak, whose raw materials are sold for export, instead of being processed in domestic facilities.

Forests of Slavonia and Baranya are abundant in various wild animals which is favourable for development of hunting tourism. Papuk and Psunj mountains have been recognized long ago as health resorts where there were once (during the Guttmans’ ownership) well known sanatoriums for pulmonary and respiratory diseases. People from Central Europe were coming here for treatments and recreation. We lost an evolutional continuity which has to be brought back. These are the areas with clean air and water – bio-ecological quality that more developed European countries crave for. Well known landscape alongside Drava and Danube rivers and bio-ecologically clean nature allow for sport fishing to take place. A world famous nature reserve and bird habitat Kopački rit is located here, which enables the whole surrounding area to involve in rural tourism entrepreneurship, and all Baranya villages can be one big “bedroom community”. Tourist offerings are not limited by any season, and they can last throughout the whole year. The whole Eastern

### Table 1

<table>
<thead>
<tr>
<th>Elements</th>
<th>County of Slavonski Brod-Pošavina</th>
<th>County of Osijek-Baranya</th>
<th>County of Požega-Slavonia</th>
<th>County of Virovitica-Podravina</th>
<th>County of Vukovar-Srijem</th>
<th>Total for 5 counties</th>
<th>Croatia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area (in km²)</td>
<td>2,626</td>
<td>3,619</td>
<td>2,374</td>
<td>2,068</td>
<td>2,442</td>
<td>12,529</td>
<td>56,610</td>
</tr>
<tr>
<td>Population in 2011</td>
<td>158,559</td>
<td>304,889</td>
<td>78,031</td>
<td>84,586</td>
<td>180,117</td>
<td>806,452</td>
<td>4,290,612</td>
</tr>
<tr>
<td>Population density (people/km²)</td>
<td>78</td>
<td>84</td>
<td>33</td>
<td>41</td>
<td>74</td>
<td>64</td>
<td>76</td>
</tr>
<tr>
<td>Number of settlements</td>
<td>185</td>
<td>264</td>
<td>277</td>
<td>190</td>
<td>52</td>
<td>968</td>
<td>6,756</td>
</tr>
<tr>
<td>Number of municipalities</td>
<td>26</td>
<td>35</td>
<td>6</td>
<td>13</td>
<td>26</td>
<td>106</td>
<td>429</td>
</tr>
<tr>
<td>Number of towns/cities</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>20</td>
<td>127</td>
</tr>
<tr>
<td>Number of entrepreneurs in 2011 Ratio (in %)</td>
<td>1,523</td>
<td>4,038</td>
<td>621</td>
<td>842</td>
<td>1,597</td>
<td>8,621</td>
<td>98,530</td>
</tr>
<tr>
<td>Number of employed in 2011 Ratio (in %)</td>
<td>15,210</td>
<td>42,560</td>
<td>7,786</td>
<td>8,072</td>
<td>17,468</td>
<td>91,096</td>
<td>851,386</td>
</tr>
<tr>
<td>Total income in 2011 (in millions of Kuna) Ratio (in %)</td>
<td>7,719</td>
<td>25,958</td>
<td>3,238</td>
<td>4,471</td>
<td>9,481</td>
<td>50,867</td>
<td>624,807</td>
</tr>
<tr>
<td>Total expenditure in 2011 (in millions of Kuna) Ratio (in %)</td>
<td>7,733</td>
<td>26,319</td>
<td>3,256</td>
<td>4,397</td>
<td>9,541</td>
<td>51,246</td>
<td>612,393</td>
</tr>
<tr>
<td>Profit in 2011 (in millions of Kuna) Ratio (in %)</td>
<td>194</td>
<td>827</td>
<td>77</td>
<td>223</td>
<td>301</td>
<td>1,622</td>
<td>32,911</td>
</tr>
<tr>
<td>Deficit in 2011 (in millions of Kuna) Ratio (in %)</td>
<td>253</td>
<td>1,299</td>
<td>117</td>
<td>170</td>
<td>400</td>
<td>2,239</td>
<td>25,731</td>
</tr>
<tr>
<td>Consolidated financial result (in millions of Kuna)</td>
<td>-59</td>
<td>-472</td>
<td>-40</td>
<td>53</td>
<td>-99</td>
<td>-617</td>
<td>7,180</td>
</tr>
</tbody>
</table>

Source: FINA; Analysis of financial results of entrepreneurial business activities per Counties in 2011. Zagreb, June 2012, www.dzs.hr, authors calculations;
Croatia area is embroidered with highly valuable monumental heritage of old castles, sacral and other cultural monuments.

All these well-preserved ecological and ethnic values, clean air and water, together with a part of autochthonous rural population can be an advantage for economic development, especially for tourist offerings with ecological products, in this 21st century where original human values are sought for. Our economy is not in a good shape, but we have clean air, water, and autochthonous population, ecological and ethnic values. A development can be initiated in accordance to the new development paradigm. Local Region can contribute to the creation of sophisticated economic area for the 21st century which will be bio-technologically and ecologically compatible to the worldwide global bio-ecological market.8

Slavonia still has a significant part of agricultural areas and pastures that are mined. After their removal, the soil will be rested and adequate for ecological production. From time to time entrepreneurs emerge in Slavonian region that readily embark new business ventures of ecological production of cereals, fruit and vegetables, livestock breeding and related products.

Table 2 shows strengths, weaknesses, opportunities and threats of the eastern Croatia region.

Table 2

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- University of J. J. Strossmayer with 12 faculties</td>
<td>- Predominantly old-age population,</td>
</tr>
<tr>
<td>- Agricultural Institute</td>
<td>- Dying out of villages and smaller settlements,</td>
</tr>
<tr>
<td>- Department of Soil Quality</td>
<td>- Emigration from settlements,</td>
</tr>
<tr>
<td>- Good traffic connections, especially with construction of the traffic route Corridor Vc,</td>
<td>- Only 20% of the region have organized sewer network,</td>
</tr>
<tr>
<td>- According to soil categorization, agricultural land is predominantly of high quality or, mostly, of medium quality,</td>
<td>- There are no adequate solutions for drinking water,</td>
</tr>
<tr>
<td>- Danubian region,</td>
<td>- Waste recycling and disposal not implemented,</td>
</tr>
<tr>
<td>- Interweaving of the rivers Drava, Sava, Bosut, Karašica,</td>
<td>- Mined areas,</td>
</tr>
<tr>
<td>- Kopački rit, protected nature reserve, is unique in Europe,</td>
<td>- Devastated processing industry,</td>
</tr>
<tr>
<td>- Due to the natural position of the Danube, Drava and Sava courses, road, rail and air traffic, the region is suitable for the development of terminals in order to become intersection of roads North - South, East – West,</td>
<td>- Highly educated population is not working, which is a threat to young people leaving to more developed countries of the EU,</td>
</tr>
<tr>
<td>- There are sources of drinking water at the location Babina Greda – Gundinci which are sufficient to cater to the entire eastern Croatia,</td>
<td>-</td>
</tr>
<tr>
<td>- The existence of thermal waters and spas,</td>
<td>-</td>
</tr>
<tr>
<td>- There are important sacral sites, cultural heritage, the birth and life of Nobel Prize winners and writers.</td>
<td>-</td>
</tr>
</tbody>
</table>

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8 Mašek, A.; Quo vadis Istočna Hrvatska. The magazine EKONOMIST, ISCN 1332-2788, 2002; pp. 38-44;
Opportunities

- Construction of the infrastructure:
  - roads Corridor Vc
  - railway route,
  - putting in order port of Osijek and port of Vukovar,
- Construction of cargo terminals at the crossroads, Osijek, Vrpolje, Vinkovci, at port of Osijek on the Drava and port of Vukovar on the Danube
- Construction of Danube – Sava canal, 57 km,
- Construction of sewer network for 80% of the territory,
- Construction of recycling and waste incineration plants,
- Construction of a new water supply for the entire region,
- Demining of land,
- Construction of processing facilities,
- Construction of bio-diesel plants,
- Construction of the stock market for agricultural products in Osijek and an Agro-square in Županja,
- Development of continental tourism
  - rural tourism,
  - sacral tourism,
  - monumental heritage,
  - hunting and fishing tourism
  - construction of monitoring to measure noise, air and water pollution GIS, thus preserving the environment.

Threats

- Departure of young people from villages and small towns,
- Contamination of soil and water for unregulated sewage network,
- High rate of unemployment,
- Environmental pollution because of the unresolved issue of waste disposal for the entire region,
- The problem of possible contamination of drinking water sources,
- Contamination of agricultural land,
- Destruction of the forests,
- Pollution of the nature reserve Kopački rit,
- Lagging behind in development compared to other regions in the country and the EU.

Table 3

Unemployed persons by qualification for eastern Croatia at the end of February 2002 and at the end of April 2013:

<table>
<thead>
<tr>
<th>No.</th>
<th>County</th>
<th>Year</th>
<th>Total</th>
<th>Unskilled</th>
<th>Semi-skilled</th>
<th>Skilled, Highly skilled</th>
<th>Secondary education</th>
<th>Associate degree</th>
<th>University degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Osijek-Baranya</td>
<td>2002</td>
<td>38,705</td>
<td>3,765</td>
<td>10,477</td>
<td>13,562</td>
<td>9,163</td>
<td>764</td>
<td>974</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>37,574</td>
<td>3,019</td>
<td>8,255</td>
<td>12,028</td>
<td>11,261</td>
<td>1,246</td>
<td>1,765</td>
</tr>
<tr>
<td>2</td>
<td>Vukovar-Srijem</td>
<td>2002</td>
<td>24,843</td>
<td>2,638</td>
<td>7,130</td>
<td>9,151</td>
<td>5,150</td>
<td>417</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>21,901</td>
<td>673</td>
<td>5,609</td>
<td>8,238</td>
<td>6,051</td>
<td>710</td>
<td>620</td>
</tr>
<tr>
<td>3</td>
<td>Slavonski Brod-Posavina</td>
<td>2002</td>
<td>20,380</td>
<td>4,962</td>
<td>3,512</td>
<td>7,277</td>
<td>4,011</td>
<td>327</td>
<td>291</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>18,431</td>
<td>1,729</td>
<td>3,804</td>
<td>7,253</td>
<td>4,600</td>
<td>614</td>
<td>431</td>
</tr>
<tr>
<td>4</td>
<td>Požega-Slavonia</td>
<td>2002</td>
<td>8,323</td>
<td>1,025</td>
<td>2,623</td>
<td>2,942</td>
<td>1,478</td>
<td>142</td>
<td>113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>7,198</td>
<td>590</td>
<td>1,392</td>
<td>2,731</td>
<td>1,926</td>
<td>348</td>
<td>211</td>
</tr>
<tr>
<td>5</td>
<td>Virovitica-Podravina</td>
<td>2002</td>
<td>11,406</td>
<td>4,302</td>
<td>1,001</td>
<td>3,827</td>
<td>2,015</td>
<td>150</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>10,668</td>
<td>612</td>
<td>2,995</td>
<td>3,865</td>
<td>2,626</td>
<td>357</td>
<td>213</td>
</tr>
<tr>
<td></td>
<td>Total for eastern Croatia</td>
<td>2002</td>
<td>103,657</td>
<td>16,692</td>
<td>24,743</td>
<td>36,759</td>
<td>21,817</td>
<td>1,800</td>
<td>1,846</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>95,772</td>
<td>6,623</td>
<td>22,055</td>
<td>34,115</td>
<td>26,464</td>
<td>3,275</td>
<td>3,240</td>
</tr>
<tr>
<td></td>
<td>Eastern Croatia - share in %</td>
<td>2002</td>
<td>25.01</td>
<td>21.80</td>
<td>36.55</td>
<td>25.86</td>
<td>21.86</td>
<td>14.08</td>
<td>11.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>26.93</td>
<td>35.67</td>
<td>29.91</td>
<td>27.83</td>
<td>26.18</td>
<td>18.32</td>
<td>14.90</td>
</tr>
<tr>
<td></td>
<td>Total for Croatia</td>
<td>2002</td>
<td>414,418</td>
<td>76,565</td>
<td>67,703</td>
<td>142,136</td>
<td>99,782</td>
<td>12,782</td>
<td>15,450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>355,598</td>
<td>18,565</td>
<td>73,735</td>
<td>122,587</td>
<td>101,086</td>
<td>17,879</td>
<td>21,746</td>
</tr>
</tbody>
</table>

Table 3 gives the view on the status of unemployed persons according to qualifications for five counties that make up the region of eastern Croatia. Specifically, the number of unemployed from February 2002 until the end of April 2013 has been reduced by 7,885 people. In the observed period there has been a reduction in the number of unemployed with primary education, skilled and highly skilled workers by a total of 15,401 people.

However, the number of unemployed with secondary education has increased by 4,647 people, with associate degree by 1,475 people and with university degree by 1,394 people. A similar trend is also present in the whole Republic of Croatia.

Table 4 shows the investments in fixed assets in 2010, status of employed and unemployed people with their share by county, as well as the size of the gross domestic product per capita by county in 2004 and according to the National Bureau of Statistics' data for 2010.

The highest growth in gross domestic product, if we take that to be a measurable quantity of a success in economic development, was recorded in Vukovar-Srijem County, although the highest investments in fixed assets in 2010 were in Osijek-Baranya County. Compared with the gross domestic product per capita in 2010 in the entire Republic of Croatia, achieved GDP per capita for the five observed counties in 2010 accounted for 49.81%, that is, it is smaller by 50.19% in relation to GDP per capita of the whole Republic of Croatia.

### 4. Conclusion

Eastern Croatia which represents for Slavonia, Baranya and Western Srijem and which can be statistically observed through five counties has the characteristics of rich landscape, natural and human resources for economic growth and development. Although the gross national product of these counties is below the average Croatian, and many believe that this is not the most important indicator in presenting a prosperity, because of the natural resources potentials for a rapid development are present here if we make a shift in thinking and management of economic and other policies of the country.

Preserved ecological and ethnic values, clean air and water together with a part of autochthonous rural population in today’s 21st century where we are seeking for genuine human values, can be an advantage for economic development especially within the tourist offerings –
development of continental tourism with a complete range of autochthonous products, ethnic and ecological values of eastern Croatia which consists of Slavonia, Baranya and Western Srijem.

Construction of traffic route Corridor Vc (road, rail, water and air transport) through the area enables connection with foreign manufacturers and new markets, especially those from the Nordic countries for the sale of local organic products, and the availability of healthy food.
Abstract

An international system of protected areas NATURA 2000 is aimed at protecting the environmental heritage of Europe as well as realising the concept of the sustainable development on an international scale. In reference to the realisation of structural changes in the rural areas and land management, the areas of NATURA 2000 are also included in consolidation works. The projects of the plans of the area protection of NATURA 200 impose certain limitations as to the possibility of changing the structure of agricultural farms within land consolidations works. The paper treats of the specification of land consolidation works in protected areas as well as the elements relating to a necessity to prepare the evaluation report on the impact on the environment.

Keywords: NATURA 2000, land consolidation work, environmental protection

1. Introduction

The EU Common Agricultural Policy (CAP) aims at limitation of traditional forms of supporting the agriculture in order to meet social expectations, concerning additional functions of the agriculture. They include, for example, taking care of the natural environment, preservation of the landscape or the culture of rural and urban areas.

The „NATURA 2000” areas, which are also defined as "The European Ecological Network", create the system of protected areas, which is to ensure the stable existence of flora and fauna of the Old Continent. The overall objective is to preserve valuable, and, at the same time, threatened natural habitats and integration of the natural protection and human activities. These activities follow the EU initiative and they are to cover all European Communities member states. According to recent data of the European Commission (dated January 2011) NATURA 2000 sites cover 751 000 sq. km within the EU territory. The mean percentage of the cover (by both types of NATURA 2000 sites, i.e. habitat and bird protection areas) equals to 17,5% of this territory.

In Poland NATURA 2000 sites cover almost 61 000 sq. km, being 19.5% of the entire area (about 960 such areas exist); this classifies Poland at the third place in the EU, after Spain (the leader, 137 000 sq. km) and France (69 000 sq. km). The sea Natura 2000 areas cover almost 200 000 sq.km of the EU territory (what equals to approximately 4% of the entire sea areas, which belong to the EU member states); in Poland such areas cover 22.2% of all Natura 2000 areas.

The Natura 2000 areas cover various ecosystems. Forests are prevailing (about 51% of their total area within the EU); ecosystems of agricultural arable lands are classified at the second place (24%), and successive places are occupied by grassy ecosystems (10% – meadows and pastures) and ecosystems of marshlands (9,5%). The percentage of these ecosystems varies in particular states. In Poland agricultural lands are prevailing. It is assumed that finally the area NATURA 2000 sites is to cover about 22% of the entire country. The current expansions of NATURA 2000 sites in Poland is presented in Fig.1.
2. LEGAL FOUNDATIONS OF PROTECTION OF NATURA 2000 AREAS

Two legal acts create the legal regulations concerning the European fauna, flora and habitats:


The directives are amended by decisions of the European Commission, which relate to methodological and formal aspects of implementation of the "NATURA 2000" ideas.

The Bird Directive obliges all member states to take the requisite legislative, protection, controlling and monitoring actions in order to maintain the population of all species of the wild European fauna (including birds connected with sea environment, which represent species only temporarily connected with the continent of Europe).

The Habitats Directive obliges the EU member states to protect natural types of habitats, as well as habitats of species of animals and plants, as the basic methods to maintain populations in their favourable, natural environment.

Provisions of both EU directives also point to opportunities to perform farming activities within these areas.

In Poland, legal foundations for creation of NATURA 2000 sites, as well as concerning activities performed by responsible bodies and possibilities of participation of local societies in delineation of such areas, are included, among others, in the following legal acts:

1. The act of October 3, 2008 on dissemination of environmental information and the environmental protection, participation of the society in environmental protection, and on environmental impact assessment (OffJ, 2008, no. 199, item 1227 with amendments).

2. The act on prevention and restoring the environmental damages (OffJ, 2007, no. 75, item 493 with amendments).
4. The decree of the Minister of the Environment on development of the draft plan of protection activities for NATURA 2000 site (Off.J., 2010, no. 34, item 186).

Legal regulation concerning the support for structural transformation within rural areas, as well as farming, including agricultural and environmental programmes and forestation of ex-rural lands, are included in separate legal acts.

3. RULES OF ADMINISTRATION OF NATURA 2000 AREAS

Following the provisions of the act on the natural protection, which define the general rules of undertaking actions within NATURA 2000 sites, undertaking actions which may negatively influence the protection objectives of NATURA 2000 sites, is forbidden.

The substantial evaluation of negative impacts on NATURA 2000 sites is based on the necessity to recognise impacts of individual actions, as well as to consider cumulated impacts of various, assumed activities, including land consolidation projects.

The effect of prohibition concerning the negative impacts on habitats and species protected within a given Natura 2000 area, is the necessity to proceed all planned actions and related documents, according to the environmental impact assessment procedures. The Natura 2000 areas are considered in Poland as other forms of the natural conservation. Conservations plans are developed for these areas, which determine opportunities and bans concerning undertaking of certain actions and solutions. At the same time, the essence of the Habitats Directive aims to ensure and maintain the existing form of business and farming activities, which are required to maintain the appropriate level of protection of the given area [B. Iwańska, 2009].

Detailed rules of farming within NATURA 2000 sites depend on specific features of the given area and protected species or habitats which occur in this area. The Polish legislation assumes creation of documents, which specify the rules of protection separately, for each area. Two types of plans are developed:
– plans of protection tasks,
– plans of protection for NATURA 2000 sites – detailed plans which will be developed in specific conditions only.

The plan of protection tasks is created by the regional director of environmental protection who develops this plan as a local legal act, considering the necessity to maintain and restore the appropriate conditions of protection of natural habitats and species of plants and animals, for which NATURA 2000 site has been created.

The draft plan of NATURA 2000 site protection is created by the unit which supervises this area, within 5 years since the date of creation of this area, in agreement with appropriate municipal councils.

The plan of protection of NATURA 2000 site includes:
1. description and evaluation of the existing and possible, internal and external threats and determination of methods of elimination or limitation of those threats and their effects,
2. description of conditions required for maintenance or restoration of appropriate conditions for protection of habitats and species,
3. the list of protection tasks, including methods of their implementation, types, the scope and location, for a period which corresponds to existing demands,
4. determination of the scope of natural monitoring,
5. description of location of borders of NATURA 2000 site.

Within the area administered by the State Forests, which is located in NATURA 2000 site, tasks related to the natural protection are performed independently by the local forestry, according to provisions of NATURA 2000 site protection plan, which are also considered in the forest management plan.

The plan or draft of activities of possible, direct impacts on conditions of NATURA 2000 site is the subject of evaluation, with consideration of possible impacts of the plan or activities in relations to natural habitats and species of plants and animals, the protection of which was the objective of NATURA 2000 site creation.

Within NATURA 2000 sites there are no limitations concerning maintenance of installations and objects used for ensuring flood protection, as well as concerning other business
activities, farming, forestry, hunting and amateur fishing, if such activities do not threaten the maintenance of natural habitats of plants or animals or if they do not significantly and negatively influence the species of plants and animals, the protection of which was the objective of NATURA 2000 site creation.

If business activities related to farming, forestry, hunting or fishing requires adaptation to the requirements of NATURA 2000 site, where assistance programmes compensating lower incomes are not applicable, the voivode may conclude an agreement with the owner, concerning compensation of lost incomes resulting from applied limitations.

Within NATURA 2000 sites specified limitations concerning the use of arable land and farming may be applied; they may include, for example:

- the scope of utilisation of water streams for the purpose of agriculture,
- plant protection means,
- water melioration works,
- mining of minerals (gravel, sand, clays).

4. LAND CONSOLIDATION WITHIN NATURA 2000 AREAS - analysis

Following the definition in the Polish Standard [PN-R-04151, XII.1997r.] land consolidation is a set of designing and technical works, which aim at creation of more favourable conditions of farming through improvements of the agrarian structure of farms, rational management of expansion of lands, adaptation of borders of farms to the water melioration installations, roads and to the terrain relief.

Surveying works, for which the necessity to prepare reports concerning the environmental impacts assessment has been specified, include [the Decree of 2004]:

- Consolidation and exchange of arable lands, which area exceeds 300 hectares, or forests of the size not smaller than 100 hectares;
- Change of forests or wastelands into arable lands of the size not smaller than 1 hectare;
- Water management for the purpose of agriculture, including water melioration within the area not smaller than 20 hectares;
- Forestation covering the area exceeding 20 hectares or deforestation of areas not smaller than 1 hectare, aiming at land use changes.

The report specifies the possibility to perform given activities only in the case of neutral or positive environmental impacts. In the case when negative environmental impacts occur, the land consolidation plan cannot be implemented or it must contain the plan of improvements in the field of compensation of environmental losses.

The review of provisions of the Instruction on land consolidation defines the scope of designing within the area of land consolidation works and specifies that the following elements should be specified, among others, in the land consolidation plan:

- Proposals concerning changes in the structure of arable areas and determination of areas for the future forestation,
- Design of wind protection zones and erosion protection means;
- Requirements concerning the maintenance and protection of field hedges, as well as shrubs and hedges, which create the “biological housing” of water streams, gorges, ravines and high balks;
- Corrections of locations of existing ditches and melioration canals;
- Corrections of the transportation system in a village, including roads used for farming purposes,
- Proposals concerning locations of areas used for development of tourism and agro-tourist activities.

Basing on the analysis of the definition of land consolidation, its substantial scope and the list of works which require preparation of the environmental impact assessment report, as well as basing on the idea of creation of NATURA 2000 sites, many relations may be observed. It is presented in Table 1.

Table 1.

<table>
<thead>
<tr>
<th>Types of</th>
<th>Correlation of land</th>
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24
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<tr>
<th>No.</th>
<th>operations implemented in the frames of land consolidation (S)</th>
<th>consolidation with:</th>
<th>Correlation results</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>NATURA 2000 sites (N)</td>
<td>EIA report (EIA)</td>
</tr>
<tr>
<td>1</td>
<td>Increasing the size of arable fields in farms</td>
<td>Limitations in the use of plant protection means</td>
<td>The necessity to prepare EIA above 300 ha</td>
</tr>
<tr>
<td>2</td>
<td>Correction of the transportation system: - the network of rods used for farming purposes</td>
<td>The necessity to prepare EIA above 300 ha</td>
<td>(S)-positive</td>
</tr>
<tr>
<td>3</td>
<td>Transformation of land use units</td>
<td>Size above 1 ha</td>
<td>(S)-positive</td>
</tr>
<tr>
<td>4</td>
<td>Forestation of lands</td>
<td>The necessity to prepare EIA above 20 ha</td>
<td>(S)-positive</td>
</tr>
<tr>
<td>5</td>
<td>Creation of hedges</td>
<td></td>
<td>(S)-positive</td>
</tr>
<tr>
<td>6</td>
<td>Biological “housing” of streams</td>
<td>Limitations in performing water melioration works</td>
<td>(S)-positive/ negative/ Neutral</td>
</tr>
<tr>
<td>7</td>
<td>Corrections of the melioration system</td>
<td>Limitations concerning the use of water streams</td>
<td>The necessity to prepare EIA above 20 ha</td>
</tr>
<tr>
<td>8</td>
<td>Location of areas for agrotourist purposes</td>
<td></td>
<td>(S)-positive</td>
</tr>
</tbody>
</table>

Source: Analysis performed by the author

The analysis of information presented in Table 1 points to the necessity of increased correlation between designing solutions, implemented in the frames of land consolidation processes with the plan of protection tasks for NATURA 2000 site. Diversification of rural areas and functions played by those areas force conflict situations, which resolution is often difficult in plans of land consolidation works. Figure 2 presents the location of a fragment of NATURA 2000 site together with areas of the highest protection requirements (natural reservations), as well as the borders of the register district, for which land consolidation operations were performed in 2012.
Figure 2. Analysis performer by the author

Figure 3 presents another example of location of the land consolidation area. This area (Klimki village) is not located within NATURA 2000 site; it is located close to this area. Kolejnym przykładem lokalizacji obszaru scalenia jest rysunek 3. The land consolidation plan should assumed location of the tourist infrastructure, in order to allow for the use of alternative sources of incomes for farmers.

Figure 3. Location of the land consolidation areas and locations of NATURA 2000 sites

Locations of rural districts, discussed above, for which land consolidation works have been performed, are characterised by many conflicts of interests and difficult designing decisions. In order to achieve economic effects of land consolidation together with maintenance of the landscape and environmental protection it is required to perform study works prior to implementation of the design.

The land consolidation design and the project of NATURA 2000 site protection should consider, among others:

1. Distribution of objects and installations to be used for NATURA 2000 site protection;
2. The rules of water management, including regulations of water relations;
3. Farming, forestry and fishing management, including:
   — Directions of development of the agricultural and forest production space;
   — Delineation of areas, which should be forested, as well as areas excluded from forestation;
— Delineation of inland, surface, flowing waters in which the possibilities of travels of fish and other water species should be maintained or restored.

5. Conditions of administration of lands and of the land use, including relations between economic demands and directions of development, as well as possible locations of:
— The future built-up areas,
— Areas of the future technical and transportation infrastructure, including roads used for agricultural purposes,
— Tourist and educational infrastructure (for example car parking places, educational paths),

6. Objective of protection activities related to the necessity to protect soils and waters against erosion and pollution.

Development of the agricultural production space in NATURA 2000 sites should be amended with designing the landscape structures. Lack of hedges, which might be the connection between water streams and forests, is well visible in Fig. 4. The best location for the raw of trees is the zone located along the agricultural road. Protection of waters is implemented by river bank buffer zones.

![Buffer zone – protection of waters](image1.png)

**Figure 4.** Klimki register district. *Source: statoswolukow.pl*

Cadastral maps at the scale of 1:5000 should play the role of cartographic background data, used for implementation of common objectives resulting from methods of management in NATURA 2000 sites and from the increase of management effectiveness in rural areas, resulting from land consolidation works.

The analysis of environmental conditions should include guidelines concerning changes of existing planning documents, such as studies of conditions and directions of spatial management of municipalities and local spatial management plans, for which NATURA 2000 site has been delineated. The example of transfer of protected areas onto the map of the land consolidation area is presented in Fig. 5.

The land consolidation project should be amended with the borders of NATURA 2000 site and specified on the cadastral map, at the scale of 1:5000 (as the optimum). The sources of such data in municipalities are planning works and the legal act on land consolidation and exchange obliges the planner to transfer the situation from plans to the register district level. For that purpose environmental study works are performer for consolidated areas.
The borders of NATURA 2000 sites delineated within the areas of the State Forests are marked on economic maps of forest districts at the scale of 1:5000. At the same time it should be considered that many Natrura 2000 areas are overlapping national parks, natural reservations, landscape parks – therefore all bans and limitations, which are valid within such areas, result from the legal act on natural protection. In the case of national parks, natural reservations and landscape parks, the forms of protection are automatically transferred onto NATURA 2000 sites. If a conflict exists between the national park and NATURA 2000 site, concerning implementation of particular tasks and priority objectives, it is necessary to create integrated plans of protection for national parks and NATURA 2000 sites.

The borders of NATURA 2000 sites in remaining areas are marked on land register maps of rural districts at the scale of 1:5000. The borders of such areas, transferred onto cadastral maps will allow for determination the volume of compensations concerning limitations of land use, resulting from natural conditions.

5. Final remarks and conclusions

The Natura 2000 areas should not be associated with limitations in management only. In these areas it is permitted to perform activities in new directions, according to the idea of sustainable and multifunctional development. Inhabitants of rural areas, included in the network of NATURA 2000 sites may, for example, use the agricultural and environmental programmes, focused on the natural protection, as well as to search for alternative sources of incomes and to promote own regions basing on the development of agrotourism. Possibilities of management in the given area, basing on the utilisation of landscape and natural resources and on implementation of land consolidation works – in particular in connection with construction and location of technical, transportation, tourist and educational infrastructure, significantly contribute to development of rural areas. Coordination of works, performed at the municipal level, where studies of conditions and directions of management, with consideration of implementation of land consolidation works, are the important element of development of rural areas. For the Polish rural areas, particularly for such areas, where the strong demands for improvements of the spatial structure of farms, some limitations concerning the possible use of NATURA 2000 sites, occur. It seems that the wide approach to the land consolidation process, with consideration of all environmental aspects, would solve many issues resulting from the multifunctional nature of rural areas.
4. THE SOIL AND VEGETATION COVER IN THE AREA OF RIVER-HEAD OF KŁODNICA RIVER (SILESIAN UPLAND, SOUTHERN POLAND)

Abstract
This study aims to identify plant communities and soil cover in a protected area in the southern part of the city of Katowice. The study was conducted in 2000 through 2006. The study included also the monitoring of changes to the range of protected species of Allium ursinum and Veratrum lobelianum.

The result of the study was to determine the occurrence of the Fraxino-Alnetum community, of mixed-forest and of anthropogenic forest patches. The use of GIS software enabled observation and comparison of changes to the test species ranges. In the valley area Mollic Gleysol and Umbric Gleysol soil types were found while the outskirts have anthropogenic soils forming of the Ecranic Technosol, Urbic Technosol and Mollic Technosol.

Keywords: Kłodnica River, soil cover, vegetation, GIS methods, mining activities, ecological monitoring, Allium ursinum, Veratrum lobelianum.

1. Introduction
The Kłodnica River-Head Nature and Landscape Complex is found in the southern part of the city of Katowice within the Lasy Murckowskie forest area, at the source head of the Kłodnica (19°0'39,8"E; 50°13'15,9"N). The area has been recognised as one of the most valuable location in Katowice due to numerous wildlife and landscape features of outstanding beauty (Tokarska-Guzik et al., 2002).

The Kłodnica river-head is located within the mining area of the Staszic Colliery. Due to coal mining activities undertaken beneath the surface by the Staszic Colliery, the need arose for a number of nature expert opinions including characteristics of the soil and vegetation cover. These activities are intended to understand the impact of mining extraction on the nature and the area functions. Therefore, observations started over the functioning of the riparian ecosystem in the source section of the Kłodnica, especially watching rare species from the point of view of Polish flora. Monitoring studies have been carried out since 2000 in the c (Czaja et al., 2001a, b, c). In 2000 through 2006, the Katowice-based Staszic Colliery had been extracting coal there.

The purpose of this paper is to present the characteristics of the soil and vegetation cover and to monitor changes to the population Allium ursinum and Veratrum lobelianum which are protected species in Poland.

2. Materials and methods
The study object in question encroaches upon the western slope of the drainage divide ridge (Oder-Vistula). The ridge is made of carboniferous formations (sandstones and shales) covered locally with tertiary clays and muds of up to 11 m thickness (Fig. 1). They provide an insulating and hydrophilic layer which is essential for the water retention in the bottom of the Kłodnica valley and, indirectly, on the operation of local ecosystems (Czaja et al., 2001b).
The investigated area: the boarder of analyzed surface (Kłodnica River Basin), 2 – 3 deformed surfaces with pit embankments, rail-road and contour lines, 4 – streams, drainage ditches, water reservoirs, 5 - silts on the tertiary deposits (Holocene), 6 - silts on the carbon deposits (Holocene), 7 - eluvium of boulder clay on the tertiary deposits (Pleistocene), 8 - eluvium of boulder clay on the carbon deposits (Pleistocene), 9 - fluvioglacial sands and gravels, boulder clay on the tertiary deposits (Pleistocene), 10 - the boulder clay on the carbon deposits (Pleistocene).

Source: author's elaboration

The vegetation of the area under study is mapped in detail, and species of the monumental value are measured. The measurements covered trees with a diameter of at least 25 cm, i.e. nearly all Alnus glutinosa specimens growing in the studied area. Eco-monitoring was conducted within the studied object and, notably, included species such as Allium ursinum and Veratrum lobelianum. Plant communities were determined using the Braun-Blanquet (1964) method. When separating vegetation patches, data contained in the map of the Katowice Forest District were taken into account. The ranges of Allium ursinum and Veratrum lobelianum were designated by GPS receiver and the vegetation maps were generated with applied GIS software MapInfo Professional on the base of collected coordinates. Maps were generated in Poland CS92 coordinate system (EPSG: 2180), but GPS data was calibrated from WGS84 coordinate system.

The profiles under study are located in the Kłodnica River-Head Nature and Landscape Complex in the alder-grown riparian zone and the mixed temperate zone broadleaf and coniferous forest. The site selection place for soil profiling was conditioned by the area topography. Profiles were described macroscopically on site. From each genetic horizon, soil samples were taken for laboratory analyses. The collected samples determined following parameters: mechanical composition, pH of the soil in H2O and 1 KCl, hydrolytic acidity, exchangeable cation contents (Ca, Mg, K, Na, Al), total nitrogen (N), and organic carbon. Analyses were performed using standard methods applicable in soil studies (Bednarek et al., 2004).

3. Results and Discussion

Vegetation cover - the area under study was found to have four vegetation communities and a planted young pine forest with tree nursery subsections run by Forest Services. The planting of a mixed forest and coniferous forest varieties cover large land areas. The distribution of communities is shown in Figure 2. In addition to Fraxino-Alnetum the remaining community is, by its nature, related to the Quercion robori-petrea union.
Figure 2. The distribution of vegetation in investigated area: 1 - the border of area, 2 – counters line and theirs value in m a.s.l, 3 – water net, 4. the monumental specimens of Alnus glutinosa with diameters > 25 cm , 5 - Fraxino_Alnetum, 6 - Mixed forest with domination of B. pendula, 7 - Mixed forest with domination of Q. rubra, 8- Pine forest, 9– artificially planted pine, 10 – plantation forestry.

Source: author’s elaboration

It should be noted that the major part of the ecological grounds are made of young forest stands 20 to 30 years old. However, the Fraxino-Alnetum under protection takes as little as 6.5% of the total surface area. This is also visible on aerial photographs taken in 1981, on which most of the land is devoid of vegetation.

3.1 Fraxino-Alnetum

This association is primarily found in the bottom of the valley, and to a lesser extent, on the valley slopes. The tree stand is dominated by Alnus glutinosa, which is mostly of monumental nature. The age of the stand is estimated to be 115 to 120 years old, while 35-year old alder plantings occur in the southern part. The plantings with Alnus glutinosa are found along the concrete channel. The admixtures are: Quercus robur, Betula pendula, Fraxinus excelsior, and single specimens of Picea abies and Pinus sylvestris. The juvenile layer features, next to naturally regenerating F. excelsior, planted trees of this species. The shrub layer is represented largely by Padus avium, locally by Frangula alnus and Viburnum opulus. The ground layer is lush, at least double-tiered, with 100% coverage. It is formed mainly by Carex remota, Lycopus europaeus, Aegopodium podagraria, Athyrium filix-femina, Geum urbanum, Juncus effusus, Galium aparine, Galeobdolon luteum, Rubus caesius, Equisetum silvicicum. Noteworthy is the masses presence of Allium ursinum and Veratrum lobelianum. The recesses with hampered drainage develop typically formed phytocenoses of Scirpetum silvicatae, Phalaridotum arundinaceae and Equisetosum limosae.
Within the Fraxino-Alnetum phytocoenosis there are many monumental specimens of A. glutinosa. In addition to black alder of monumental character single occurrences of Betula pendula, Populus nigra and Quercus robur can be mentioned.

As a result of the study 233 specimens were measured. The specimen distribution of diameters greater than 45 cm is illustrated in Figure 2. The study shows that the greatest concentration of black alder are near the bottom of the valley. This is linked to the land relief which affects moisture and trophic conditions – i.e. relates to other parts of the study area. Old tree stands growing in the northern slope of the valley are relatively thinner in circumference - though probably of the same age. The habitat is, compared to the bottom of the valley, less humid, and the undergrowth features less riparian species.

3.2 Changes in the area of the Allium ursinum and Veratrum lobelianum populations

Allium ursinum colonised both wet, moist and fresh habitats in the valley. During monitoring, within individual plots dominated by Allium ursinum, there were no significant changes (Fig. 3). A slight decrease in the population of A. ursinum marked the years of 2003, 2005 and 2006 on Plot No. 1, where the reduction in population range was observed for this species, while Plots 2 and 3 demonstrated a steady increase with minor fluctuations (Fig. 3).
Figure 3. The range of Allium ursinum (P_1, 3) and Veratrum lobelianum (P_4, 5) in the period of 2000 to 2006

Veratrum lobelianum was found in the study area primarily within the brook banks, in the headwaters area, and in the hollows of standing water often originating from precipitation, and in luminous (not dense) forest fragments. During the study time, the population was of almost stable nature or showed an upward growth trend as compared to the first period of the study in the test plots (P_4 and P_5). The only decline in V. lobelianum population on both plots (10%) was observed in 2003 (Fig. 3). A. ursinum co-existed next to V. lobelianum and other individual species in the Plot No. 4, where the first’ population size manifested growth trending from the beginning of the study.
3.3 Mixed forest of coniferous specific nature

Due to the age, the tree stand was divided into the old and young one. The main forest-building components are there: P. sylvestris and B. pendula, Picea abies, and stand-alone specimens of Quercus robur and Alnus glutinosa. Especially old are the specimens of B. pendula, whose age is estimated at 90 years. The admixtures show also stand-alone species: Fagus sylvatica, Carpinus betulus and Ulmus montana. The coniferous forest species in the undergrowth are represented by Vaccinium myrtillus, Oxalis acetosela, Deschampsia flexuosa and, en masse, Pteridium aquilinum. Patches of Asarum europaeum and Convallaria maialis – a protected species in Poland – were spotted in the undergrowth layer.

Old mixed forest with prevailing Alnus glutinosa - the northern part of the area near the road preserved a patch of old specimens of black alder, whose age is estimated at 90 years. Currently, the following species are introduced: B. pendula, Quercus rubra and such Mediterranean species as Pinus nigra is.

Artificial planting - plantation which is found in the study (Fig. 2) is a mixed deciduous and coniferous forest and partially a mixed coniferous forest. He age of this community does in general not exceed 40 years. In the specified field, in different parts, the dominance of B. pendula and Quercus rubra is observed.

Pine forest - covers a small area in the southern part of the land along the railway tracks. The forest-forming species is mainly Scots pine accompanied by birch, oak and other species. The age of the pine specimens is estimated at 60 years (Czaja et al., 2001c).

Young pine forest and nursery - occupies the southern part of the land area in the vicinity of the railway track. They are clean single-age pine monocultures of even population distribution. This separation covers the area of the former tree nursery where primarily Larix decidua and Pinus sylvestris were grown.

Rare and protected plants - within plant communities in the study area a number of protected species were found (Allium ursinum, Veratrum lobelianum, Daphne mezereum, Convallaria maialis, Epipactis helleborine, Epipactis atrorubens, Asarum europaeum, Frangula alnus and Viburnum opulus). In addition to the protected species there are also species rare in the Silesian Upland. Other plants of interest in this area deserving mention are Paris quadrifolia, Polygonatum multiflorum, Mercurialis perennis, Millium effusum, Senecio crispatus and Crepis paludosa.
4. Soil cover

The soil cover in the valley area is of natural origin and is subject to mechanical human interactions beyond the valley. The boundary of the object is composed of railway track sections and related infrastructure. Here, anthropogenic soils are found of Ecranic Technosol, Urbic Technosol and Mollic Technosol varieties with a distinctive anthic or urbic horizons in the northern and southern parts of the area under study. Portions of the area in which artificial planting was done (from north with Q. rubra and from south with P. sylvestris), were previously ploughed so that soil levels were intermixed and retain traces of human impact. Here, in both cases, voluminous organic horizon (OL) developed with a mor type humus. This is due to the weak decomposition of organic matter and the advantages of provided plant litter over its decomposition. The slowed down decomposition of the plant litter is caused by poor development of soil organisms responsible for litter decomposition (Bednarek et al., 2004, Rahmonov, 2007).

The soil in the valley area by WRB (2006) can be classified as Mollic Gleysol, Umbric Gleysol and their occurrences are subject to the ground characteristics and water conditions. At the site of the soil profiling plants were described as having a bearing on the process of forest humus formation.

The described soil types feature OA / CeggCgg or OAC profile design and are formed in the fluvioglacial - sand and gravel, boulder clay with some share of Miocene clays. These are mesotrophic soils with the mod type litter. Detritus layer is almost identical in each studied soil profiles. It is found in varying stages of decomposition. The thickness of the A horizon is varied and each profile shows a gradual transition to the second horizon. There observes the highest content of organic carbon (C_{org}), which develops in the range of 6.26 to 16.48% in mineral (A) and organic (O) horizons, respectively (Table 1).

The content of total nitrogen (N) in soils is connected to the quantity, quality, delivery and circulation of organic matter in the soil-plant system. The soils under study feature high nitrogen contents in organic layers (O). Nitrogen decreases with decreasing organic matter in the soil, and reaches the value of about 0.02% in mineral layers. The C:N ratio in organic layers fluctuates within a wide range (Table 1). This ratio indicates a moderate activity of biological processes and a relatively rapid mineralization of the organic matter.

In terms of pH soils are very acidic (Profile 2, pH 3.8), acidic and medium acidic (Table 1). Down the profile 3 the pH value gradually increases up to neutral (in water), and remains acidic in remaining levels (Profile 1, 2). The alder effect on the acidification of the substrate (Olson, 1958) has long been known, and it is Alnus glutinosa that is the main forest-forming species in areas where soil profiles were made.

These are soils which are rich in plant nutrients. Depending on the host rock and richness they can be divided into dystrophic, mesotrophic and eutrophic ground and ground-soil soils (Konecka-Betley and Kuźnicki, Zawadzki, 1999). In terms of the content of exchangeable cations (alkaline and acidic) the described soils are rich in Ca> Mg> K> Al> Na. The high content of Ca is associated with the dissolution of calcium carbonate present in the glacial clays that are deposited in the ground. The richness of these soils also has a direct relationship with the fast rate of mineralization as evidenced at least by the C: N ratio in the individual profiles.
The chemical properties of soils

<table>
<thead>
<tr>
<th>Horizons</th>
<th>Deep [cm]</th>
<th>C_{org} [%]</th>
<th>N\textsubscript{t}</th>
<th>pH C/N</th>
<th>H\textsubscript{2}O</th>
<th>KCl Na\textsuperscript{+}</th>
<th>K\textsuperscript{+}</th>
<th>Mg\textsuperscript{2+}</th>
<th>Ca\textsuperscript{2+}</th>
<th>Al\textsuperscript{3+}</th>
<th>Exchangeable cations cmol(+)/ kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mollic Gleysol</td>
<td>O</td>
<td>0-2</td>
<td>22.1</td>
<td>1.79</td>
<td>12</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
</tr>
<tr>
<td></td>
<td>O\textsubscript{h}/A</td>
<td>2-10</td>
<td>13.1</td>
<td>0.651</td>
<td>20</td>
<td>4.0</td>
<td>3.7</td>
<td>0.60</td>
<td>2.72</td>
<td>47.5</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>A/C\textsubscript{org}</td>
<td>10-25</td>
<td>2.0</td>
<td>0.103</td>
<td>19</td>
<td>4.3</td>
<td>3.9</td>
<td>0.16</td>
<td>0.42</td>
<td>24.0</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>C\textsubscript{org}</td>
<td>25</td>
<td>0.55</td>
<td>0.021</td>
<td>26</td>
<td>4.3</td>
<td>3.9</td>
<td>0.21</td>
<td>0.77</td>
<td>27.0</td>
<td>18.3</td>
</tr>
<tr>
<td>Mollic Gleysol, Umbric Gleysol</td>
<td>O\textsubscript{h}</td>
<td>0-2</td>
<td>16.4</td>
<td>1.06</td>
<td>15</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>3-10</td>
<td>12.5</td>
<td>0.481</td>
<td>26</td>
<td>3.8</td>
<td>3.6</td>
<td>0.33</td>
<td>2.49</td>
<td>37.0</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>A/C\textsubscript{org}</td>
<td>11-22</td>
<td>3.0</td>
<td>0.124</td>
<td>24</td>
<td>4.0</td>
<td>3.8</td>
<td>0.47</td>
<td>0.88</td>
<td>25.0</td>
<td>11.0</td>
</tr>
<tr>
<td></td>
<td>C\textsubscript{org}</td>
<td>23-30</td>
<td>0.62</td>
<td>0.033</td>
<td>19</td>
<td>4.2</td>
<td>4.1</td>
<td>0.15</td>
<td>0.33</td>
<td>0.74</td>
<td>5.3</td>
</tr>
<tr>
<td>Mollic Gleysol</td>
<td>O\textsubscript{h}</td>
<td>0-2</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
<td>n.o</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>3-20</td>
<td>6.2</td>
<td>0.143</td>
<td>43</td>
<td>4.2</td>
<td>3.7</td>
<td>0.09</td>
<td>0.96</td>
<td>16.0</td>
<td>22.1</td>
</tr>
<tr>
<td></td>
<td>A/C\textsubscript{org}</td>
<td>21-32</td>
<td>0.51</td>
<td>0.023</td>
<td>22</td>
<td>6.2</td>
<td>5.7</td>
<td>0.46</td>
<td>0.74</td>
<td>23.2</td>
<td>33.4</td>
</tr>
<tr>
<td></td>
<td>C\textsubscript{org}</td>
<td>33...</td>
<td>0.67</td>
<td>0.023</td>
<td>29</td>
<td>6.5</td>
<td>5.7</td>
<td>0.17</td>
<td>0.57</td>
<td>29.0</td>
<td>67.0</td>
</tr>
</tbody>
</table>

Source: author’s elaboration

In each profile, as deep as 10 cm, gleying processes are observed. These processes prevail over others. These levels are characteristically bluish-greenish which is associated with the presence of divalent iron. However, the better oxygenated layer demonstrates trivalent iron precipitate in the form of rusty stains or concretions. It is worth mentioning that the groundwater level is found already at a depth of 22 cm

5. Conclusions

The study area is dominated mainly by the Fraxino-Alnetum association, especially in the valley area. The association is characterized by a typical structure, floristic composition and habitat conditions which are very similar to phytocenoses of natural character. This is evidenced by classically developed vertical structure and species composition of the tree stands and the forest floor plant cover. The ground layer has various association sections dominated by Allium ursinum and Veratrum lobelianum which did, during observations, generally not change their range, but showed a tendency to expand their range.

Noteworthy is also the presence of many memorial specimens of Alnus glutinosa of the diameters sometimes exceeding 75 cm. This indicates indirectly the very old age of these trees - about 100-120 years, which in turn points to the age diversity of individual trees within the association and, thus, that it is close to natural. The soil functions within the study area are closely linked to fluctuations in the groundwater levels which result from the ground subsidence and from changes to the area drainage.

36
5. REAL ESTATE MANAGEMENT AT THE LOCAL LEVEL IN POLAND

Abstract

Real estate management at the local level is a series of taken and carried out activities responsible for the pace and directions changes on local real estate markets. Rational decisions in planning and land development is an important part of the regional development policy. Local authorities, granted to them by law, competence in spatial policy, real estate management and socio-economic development, both indirectly and directly affect the property value. Through a system of fees from real estate this is reflected in the municipality budget and inhabitants portfolios. The value is an abstract concept and is assigned a property considered useful and interchangeable. As such no doubt can be considered real estate. Their financial potential in Poland, however, is not fully used.

In light of need to improve the implementation of procedures for real estate management at the local level, and thus the development of real estate market, shows the use of information registered in the cadastral system in Poland.

Keywords: cadastre, real estate management, local government, local fees

1. Introduction.

Detailed and rational ways of spatial planning, the implementation of selected real estate management processes, recording status, and physical changes taking place as a result of real estate and legal management and estimating the value of property have a common denominator in the form of information about real estate. Implementing property management tasks in the administrative use of data recorded in the cadastre. However, it should be noted that in Poland with the cadastre identified is the institution of land records and buildings [6]. But this is not a complete data register of properties which should be effective cadastre. Important addition to the information contained in the register of land and buildings is the the institution even land and mortgage registers. Often it comes to the situation when the information stored in these records are not complete and homogeneous. This causes a lot of problems, which are forced to face the real estate owners themselves. It's in their interest for explanation of discrepancies arising from the fault of flawed organization and a lack of synchronization of existing records. Solution to this state of affairs would be accounting system all data about real estate in one coherent and consistent basis. Design of such a solution, in the form of a cadastral system, appeared in Poland a few years ago. Unfortunately these plans were not realized. One of the primary functions of what was designed to meet, in addition to the land granted registration complete data about real estate, was the fiscal function. The proposed way of taxation "ad valorem", based on property values, invoke a lot of controversy, which in turn led to postponement of execution time of this project.

The function of fiscal cadastre is not the only possible way to use the value of the property saved in the system. Its possible to use the legislature envisioned in terms of determining property tax base and determining value of property owned by the State Treasury or local government units. The area of cadastral value may be extended to implementation of these steps, "to which implementation it is necessary to specify the value of property" [ugn]. Above the entry opens way alternative use of the cadastral value.

2. Cadastral system determines the correct management of real estate.

Creation a cadastral system is intended to protect rights that are assigned to the real estate and simultaneous implementation of the processes to which they are subjected. This system should combine in a coherent and consistent database content for all real estate saved today in several records. The availability of such data will make it possible to use them in many processes in field of real estate management. It can bring measurable effects, above all at local level.

Smoothly functioning cadastral system is an indispensable source of complete information about real estate and the starting point for any action carried out within the framework of the procedures for the planning and management of space. Real estate investment and economic

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9 Work realized as part of statutory research of Department of Geomatics and dean grant no.15.11.150.140
ownership are assigned, which means that it is the hidden potential that can be tapped. A prerequisite is aware of the action focused on achieving the best possible benefits while at the same time optimising real estate values. Hence, it is concluded that only suitably chosen management strategy can bring tangible results. Relationships and procedures for rational land use surrounding space should be based on information obtained from the cadastral system. The realization of the intended changes in the field, it’s a matter of remaining within the scope of the legal acts and which is also surveying are the property management aspect [Jasiołek j., 2011]

From March 2013, underway in the administrative work related to establishment of an integrated system for information about real estate (ZSIN). In order to achieve basic assumptions of ZSIN should focus on eliminating the discrepancy between the cadastre (previous records of land and buildings) and land and mortgage registers, on improving the quality and timeliness of data records and access to them. This System is designed to streamline acquisition processes, exchanging data and updating and sharing information about immovable property collected in land and buildings records and registers. The end result is going to be improving the credibility of public records covered by the ZSIN. These are, among others:

- KW (land and mortgage registers),
- EGiB (register of land and buildings),
- Social Security (Universal Electronic System for Registration of the Population),
- TAX (National Official Register of Economic Entities),
- TERTYT (National Official Register of Territorial Division of the Country).

Very important for the development of real estate market in Poland is the fact that one of the integral information contained in ZSIN be estimated cadastral value. This is an important element of the growing real estate market in Poland, which has so far lacked. Properly used information about real estate values can contribute to the improvement of the implementation of the many property management processes, particularly at the local level.

3. Management of real estate on the territory of the municipality.

“Real estate management is a team of certain actions taken by public authorities to obtain the correct and optimum condition for different types of real estate in the area covered by the competence of the activities of these bodies and in accordance with the relevant normative act” [Hycner, 2006]. The basis for realization of these action is coherent, rational and fair prepared strategy of spatial planning and land development. This process begins at the national level, by the concept of the software architecture to reach the local government units. And so the local zoning plans indicate scope of the intended changes in space, and real estate management provides methods to implement these concepts.

Property management processes, in turn, is a string of decisions, procedures and activities leading to changes in both the facts and the law [Hycner, 2006]. A significant proportion of them also contributes to changes in value. This includes not only those properties that are the subject of actions taken, but often such effects have a much wider scope.

Figure 1 schematically shows the possibilities of real estate management and indicates these procedures, the implementation of which may result in need to determine property value. These processes deserve special attention, which changes the property value and calls specified financial consequences, in form of adjacent or planning fees.

**Figure 1.** Real estate management processes

**Source:** own elaboration

The term real estate management so you should understand the general processes and activities responsible for pace and direction of real estate markets development, especially local
markets. It is at municipalities level, we are dealing with implementation of substantial part of real estate management processes - financed in large part from the municipal budget.

The possibility of charging fees in connection with the implementation of selected real estate management processes mobilizes local authorities to rational planning and implementation of future investment. Fees charging in connection with increasing property value may be in order even for indemnification by municipality. However, despite many advantages, the procedure for calculating and collecting such fees is still only sporadically implemented.

4. Rules for charging and collecting fees for increase in property value.

Legal standard [ugn] indicates three main situations that may result in charging adjacent fee:

- real estate division - made at request of the owner or operator a perpetual,
- integration and division of real estate based on the relevant resolutions of the council,
- construction of technical infrastructure implemented in framework of the municipality own tasks.

The executive body of local government is not obliged to issue a decision on fixing of that fees – legislature leaves in this respect freedom of settlement. However, if it take steps towards charging the fees municipality authority should take into account all the circumstances and objectives formulated in the act [6].

The fact common to all these cases is the condition that the provisions of this act shall apply to all properties, regardless of their location and type. Exclusion of real estate subject to local zoning plan intended for agricultural and forestry purposes, and in absence of any local plan real estate for the purposes of agricultural and forestry used actually.

A prerequisite to charge adjacent fee is an increase in property value as a result of implementation of one of the three said. It can be confirmed this solely on the basis of the opinion of property value done by an approved valuer.

The following disclaimer applies to determine percentage of that fee, which threshold is defined by legislator. It is important that at the time of existence of grounds to charge exist municipal council resolution, in which it has been fixed interest rate:

- as a result of division of real estate – up to 30% increase in its value,
- as a result of merge and division the ground - up to 50% increase in its value,
- as a result of construction of technical infrastructure – up to 50% increase in its value.

If all of above circumstances are met, then the only limitation remains only the time. Adjacent fee can be charged within three years:

- from the date on which the decision approving property division has become final or the judgment of division has become final,
- from the date of creation conditions for connection to each device technical infrastructure or create conditions for use of built roads,
- in the case of procedure merging and division property the term and manner of its payment shall be determined in accordance with provisions of agreement or resolution in this regard.

The law [8] adjusts billing issues with planning fees. These are fees associated with increase property value as a result of changes to or enactment of a new local zoning plan. The circumstances which must be satisfied that the local authority could charge this fee are:

- increase value of property confirmed in appraiser's opinion,
- disposal of real estate before the expiry of five years from the date of change/adoption zoning plan.

The value of property shall be determined taking into account her destination before and after the change of spatial plan and according to level of property prices on local market and its state from the date of entry into force of the local plan. The amount of the fee may not be higher than 30% of the estimated increase in the property value, and the rate should be determined by the municipal council resolution stating the validity of the local plan.

To ensure that all terms and conditions described above, despite involvement of staff and financial resources, municipal authorities can bring measurable results. Proceeds from the fees for increase in value of property goes directly to budgets of local governments. Can be used for the implementation of subsequent investments making alternatives to the terrain of the municipality and to improve the living conditions of its inhabitants.

5. Case study
In order to verify the thesis were carried out test and analysis based on database of transactions concluded in the years 2009-2011, in one of the municipalities in Cracow metropolitan area. The commune has completed the construction of technical infrastructure which results in property value directly related to the investment increased. So there is a premise to charging adjacent fees. Within the study area was divided into municipalities in four zone. In each of them it was the impact of media construction on transaction prices on local market - share by weight in table 1, then the estimated value of cadastral property. In table 1 summarizes the estimated increase property cadastral value unit in each of the zones.

Table 1.

Increase in the value of real property cadastral Unit:

<table>
<thead>
<tr>
<th>the zone</th>
<th>water supply</th>
<th>gas stove</th>
<th>Sewage</th>
<th>power engineering</th>
<th>telecommunications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% by weight fraction ( k_i )</td>
<td>15</td>
<td>18</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>% increase in value</td>
<td>12 ÷ 16</td>
<td>12 ÷ 19</td>
<td>10 ÷ 17</td>
<td>3 ÷ 5</td>
</tr>
<tr>
<td></td>
<td>% by weight fraction ( k_i )</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>% increase in value</td>
<td>8 ÷ 11</td>
<td>8 ÷ 11</td>
<td>9 ÷ 14</td>
<td>9 ÷ 11</td>
</tr>
<tr>
<td></td>
<td>% by weight fraction ( k_i )</td>
<td>22</td>
<td>21</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>% increase in value</td>
<td>20 ÷ 24</td>
<td>15 ÷ 21</td>
<td>7 ÷ 12</td>
<td>5 ÷ 9</td>
</tr>
<tr>
<td></td>
<td>% by weight fraction ( k_i )</td>
<td>19</td>
<td>23</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>% increase in value</td>
<td>14 ÷ 18</td>
<td>15 ÷ 20</td>
<td>11 to 17</td>
<td>7 ÷ 9</td>
</tr>
</tbody>
</table>

Source: own elaboration based on [Jasiołek J., 2012]

Based on the results obtained, it can be concluded undisputed increase in real estate values. Factor in making these changes are weighting attributes \( k_i \) showing an outflow of value attribute on evolution of market prices. The greater the weight, the greater the attribute values of the differences when, as a result of various activities to change characteristics of property.

Assuming that prior to implementation of building the technical infrastructure municipal council adopted a resolution to establish the interest rate charges adjacent fee a maximum of 50%, it can specify the amount of any fees according to the formula:

\[ O_{ad} = 50\% \times \left( w_{k,p} - w_{k,w} \right) \]  

where:

- \( O_{ad} \) - the amount of the fixed fee adiacencie
- \( w_{k,p} \) - cadastral value by "i" property "later"
- \( w_{k,w} \) - cadastral value by "i" property "earlier"

Table 2 presents an increase in value resulting from the construction of infrastructure facilities, the potential amount of adjacent fees in relation to selected property in zone II, and the expected income of affiliated charging fees.
Table 2

Increase in cadastral value and adjacent fees in the selected zone

<table>
<thead>
<tr>
<th>Parcel ID</th>
<th>water supply</th>
<th>gas stove</th>
<th>sewage</th>
<th>power engineering</th>
<th>telecommunications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>adjacent fees</td>
<td>increase in value</td>
<td>adjacent fees</td>
<td>increase in value</td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>5 292</td>
<td>2 646</td>
<td>6 811</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>9 072</td>
<td>4 536</td>
<td>11 676</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14 595</td>
</tr>
<tr>
<td>4</td>
<td>7 260</td>
<td>3 630</td>
<td>7 560</td>
<td>3 780</td>
<td>9 730</td>
</tr>
<tr>
<td>5</td>
<td>7 826</td>
<td>3 913</td>
<td>8 150</td>
<td>4 075</td>
<td>10 489</td>
</tr>
<tr>
<td>6</td>
<td>7 333</td>
<td>3 667</td>
<td>7 636</td>
<td>3 818</td>
<td>9 827</td>
</tr>
<tr>
<td>7</td>
<td>12 342</td>
<td>6 171</td>
<td>12 852</td>
<td>6 426</td>
<td>16 541</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>-</td>
<td>9 850</td>
<td>4 925</td>
<td>12 678</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>-</td>
<td>14 296</td>
<td>7 148</td>
<td>18 399</td>
</tr>
<tr>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8 757</td>
</tr>
<tr>
<td>13</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 953</td>
</tr>
<tr>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 699</td>
</tr>
<tr>
<td>15</td>
<td>12 342</td>
<td>6 171</td>
<td>12 852</td>
<td>6 426</td>
<td>16 541</td>
</tr>
<tr>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5 838</td>
</tr>
<tr>
<td>income own the municipality</td>
<td>23 552</td>
<td>43 780</td>
<td>75 77</td>
<td>18 003</td>
<td>7 318</td>
</tr>
</tbody>
</table>

Source: own Elaboration based on [Jasiołek J., 2012]


Collect any fees associated with the possession and management of real estate and other disposal of the rights assigned to them would not have been possible without adoption of appropriate measures and concepts of appropriate registries collecting the pre-filled item information for these activities. The data available today from the mortgage, land records and buildings and local spatial plans (in future from ZSIN) are the basis for determining the amounts of taxes or charges against the owners. With a long list you mention even if property tax, tax on agriculture and forestry, the fees for use of perpetual or permanent board or fees associated with the purchase or sale of real estate.

The criterion of fees associated with real estate to meet those charges which are determined as a result of the increase in the value of real estate as a result of the implementation of selected management processes. The agricultural and forestry, property taxes are an example of import duties charged on the basis surface property and using the data collected in these records. In turn, the amount of adjacent and planning fees are today based on property value which must be assessed by an expert individually for each property, as soon as the need arises – is not in fact systematically updated element of any previously created databases of information about real estate.

Creation of a cadastral system for integrating and harmonising the legal state data, coverage of the assigned rights and property values are concerned would facilitate the implementation of administrative procedures and processes and actions taken by participants in real estate market. In case of local billing would no longer need individual estimate [figure 2], which greatly reduce costs associated with fixing them, and thereby increase profitability of charging adjacent and planning fees.
Local governments in most tasks in their obligations must face with inhabitants - property owners. This fact is so important that most of activities and implementation of municipalities shall be broken down just about the property and its value. Consequently, there is another alternative to use of the information registered in cadastre. Cadastral value as determined in a uniform manner throughout the municipality, would be undoubtedly the feature that will speed up the implementation of a number of proceedings.

Assuming possibility using cadastral value for the purposes of determining local fees in respect of property value increasing (as demonstrated by this work) to estimate the value of proposed estimation procedures may be used in [Parzych P., 2009]. Adjacent and planning fees are determined for the property, which in the local zoning plan are not intended for agricultural and forestry purposes, nor in such a manner. In practice, however, number of cases of real estate, which in its entirety are intended for purposes other than agricultural and forestry is relatively small. Much more often, especially in the municipalities of the urban-rural and rural areas (parsed case), we have to deal with real estate, which include not only the various components but also ground surfaces with different purpose. In the event of grounds to charge related to change in the value of such property should know the value of each parts of different purposes in local plan. Subject to adoption of following assumptions:

- taxing unit is assumed to be part of parcels for purposes different from the adjacent parcels or the rest of the plot, in accordance with provisions of [42],
- zone taxing boundaries (in the municipality) coincide with borders of areas with different purposes at the local zoning plan:
  - about to meet this condition, it is necessary to the existence of these local plans,
- using parametric estimation models, unit prices of properties [Parzych P., 2009]
- using the appropriate methods for common taxation of real estate, it can be determine the unit value of elementary real estate for the purpose of different parts of entries in local plan. This is a proposal for the next tool for local and regional authorities, which can improve implementation of the management processes in their own tasks.

7. Conclusions.

Local authorities, in exercising powers statutorily granted - in the framework of spatial policy, economy and socio-economic development policy, both indirectly and directly affect the property value. Through a system of fees from real estate this is reflected in resident portfolios and municipal budget. Although the value is an abstract concept, it is assigned to this property, which can be regarded as useful, rare and interchangeable [Cymerman J., 2011]. Such a criterion would no doubt meet real estate, whose potential is not fully exploited. The System of fees from real estate cadastre creates a wide range of accounts receivable [Cymerman J., 2011]:

- fees for providing the right to use immovable property,
- fees for making legal transactions concerning real estate,
- fees for performance of activities that cause development of real estate
- fees associated with possession of a property (property taxes).

Taxes, usage fees and rent are the most common form of above. The issue of charging planning fee is strongly depends on existence of current zoning plan and regulations for the issue of the so-called "pension planning". Adjacent fees of above mentioned, are the least common. There are also not charged in analyzed municipality. Reasons for such a situation is the need to involve too much financial resources in process determining property value for purposes of this task. Although the idea of the fees are the costs incurred by the commune to improve the infrastructure, but faced with
rising costs of subsequent valuations and inability to predict the amount of any fees local authorities to forgo this option.

Assuming that cadastral system is a complete and functioning smoothly, use of proposed how to determine fees for increase in property value will allow partial elimination of subjective factor this process and to improve and consolidate the process procedures for calculating fees. Rationale for charged and fixed fees should be legible and understandable for everyone – for officials and residents. In addition, taking steps aimed at establishing fees for increase property value will cease to be for local governments "uneconomic", and then proceeds with this title to municipal budgets will undoubtedly increase.

This study shows the possibility of using the cadastral value by charging local fees. The proposed solution involves the use of values recorded in findings as a basis for charging amounts ZSIN even if by virtue of increase in the value of property. These fees are currently based on estimated individually and market values of real estate. Basing on cadastral values would facilitate process of calculating these fees and costs associated with the municipality would undoubtedly valuation of real estate. In addition, it would allow prediction of impacts related to the management of real estate on the territory of the municipality. Another possibility is the use of cadastral value of real estate by the redemption of land users in emergency situations and in cases of expropriation.
6. THE ASPECTS OF MANAGEMENT OF AGRICULTURAL REAL PROPERTIES IN POLAND*

Abstract
The land which is considered to be agricultural land accounts for over 60% of the Polish territory. Although this is not a basic branch of the national economy, agricultural real properties in Poland, are subject to specific regulations in the field of their management.

This paper analyzes the structure of agricultural land in the years 2002-2011, as well as current regulations on public and private agricultural land. The analysis highlighted a disparity between the amount of the land excluded from agricultural production and the changing acreage of agricultural land. The sources of this condition were identified. The existence of regulations aimed at reducing the fragmentation of agricultural holdings and at preventing excessive accumulation of agricultural land was demonstrated as well.

Keywords: agricultural land, management of agricultural properties.

1. Introduction
The land which constitutes agricultural land accounts for more than 60% of the Poland's territory. After the change of the political system in 1989, there was a significant liberalization of the regulations on the management of agricultural properties. The standard which defined the minimum area of a real estate in order to be treated as agricultural property has been abolished. Also, most of the provisions restricting the trading in agricultural properties was repealed. Instead, a definition of agricultural property appeared in the Civil Code [Ustawa 1964]. In accordance with Art. 46¹ “agricultural properties (agricultural land) constitute properties that are or may be used to carry out productive activities in agriculture in the scope of crop and livestock production, including the production of horticulture, fruit growing and fish”. As it can be seen from the definition, special emphasis was put on the possibility to conduct agricultural productive activities on the property. In practice, however, the definition worded in that way did not allow for a simple identification which property was an agricultural one, and which was not. It is used mainly by the courts in legal proceedings. However, the administrative bodies that deal with agricultural properties in the scope of broad-based management, change of use, imposition of taxes, should be able to clearly determine whether the land is an agricultural property. The definition contained in the Civil Code does not give a clear answer. Therefore, in practice, in Poland the following rules are adopted:
- the local zoning plan determines to allocate a property for agricultural purposes;
- the entries in the register of land and buildings decide about the use of a property.

Local zoning plans are adopted under the Law on Spatial Planning and Development [Ustawa 2003b] by the municipal authorities and they determine the allocation of land for specific purposes. A property allocated in the local plan for agricultural purposes can not be used differently, e.g. for housing development. The land built-up by a farmer with buildings used for agricultural purposes does not change its purpose – it is still an agricultural property. Local zoning plans identify target zoning, whereas the current use is recorded in the record of land and buildings. Agricultural land allocated for construction purposes in the local plan may still be marked as agricultural property in the record of land and buildings if the owner uses it in that way. In this case, the area is considered in all administrative procedures as held for investment, but for tax purposes the actual use of the land is decisive. The adoption of the local zoning plan by the municipality is not mandatory. In the absence of the local plan, it is possible to change the use of land from an agricultural purpose to an investment one by the issuance of a zoning permit [Kwartnik-Pruc 2011, 2012]. If the municipality failed to adopt a local plan, and for a given property there is no zoning permit issued, as to whether the land is agricultural property or not is determined by the information recorded in the register of land and buildings.

In the course of time, regulations restricting agricultural real property transactions were introduced. In 1991, a law was passed on the management of the State Treasury agricultural properties [Ustawa 1991]. Prior to the signing of the Treaty of Accession to the European Union, the Act on shaping the agricultural system was passed in 2003 [Ustawa 2003a]. However, in 2004,
provisions of the Real Estate Management Act were amended [Ustawa 1997]. The structure of agricultural land is also influenced by the provisions of the Law on Geodesy and Cartography [Ustawa 1989] in the scope of the changes to arable land, the Law on the protection of farm and forest land in the scope of agricultural land-use change, and the above-mentioned Law on spatial planning and development [Ustawa 2003b].

The purpose of this paper is to analyze the existing legislation on agricultural land in relation to changes in the structure of land in Poland. The analysis highlights the continued decline in the agricultural area and the disparity in the amount of land reclassified to non-agricultural use, and the changing area of agricultural land. The sources of this condition have been identified. The existence of regulations aimed at reducing the fragmentation of farms, and preventing excessive accumulation of agricultural land have been demonstrated as well.

2. Analysis of the land structure in Poland

Agricultural land account for a vast majority of land in Poland. The pie chart in Figure 1 presents land use in our country. Agricultural land occupies more than 60% of the area of our country, and urbanized as well as built-up land - only 5%.

![Figure 1. Structure of land use in Poland.]

Source: Own study based on CSO data.

Agricultural real properties are divided into seven types of agricultural land: arable land, orchards, meadows, pastures, built-up agricultural land, land under ponds, land under ditches. Figure 2 depicts the size of agricultural land-use for different types of land.

![Figure 2. The structure of agricultural land in Poland.]

Source: Own study based on CSO data.

It is apparent that arable land accounting for over 70% of land area dominate in the structure of agricultural real properties. The size of arable land has been declining steadily since 2002 (Figure 3). It is a natural process, however, it should be carried out in a controlled manner.
According to the Law on the protection of farm and forest land [Ustawa 1995], the reclassification of agricultural land of good quality (quality classes I-III) to non-agricultural use requires an administrative procedure. The amount of agricultural land converted under this procedure has been increasing since 2007. In 2008 there was a similar amount of reclassified land. The end of this year saw a significant amendment to the Law on the protection of agricultural and forest land, which invalidated the effect of this act in urban areas. Since then, good quality agricultural land located in urban areas can be allocated for construction purposes without an administrative procedure, which significantly contributed to the reduction in land reclassification.

Between the years 2011 and 2012, the area of agricultural land in Poland decreased by 44,885 ha. However, since 2002, 336,876 hectares have already disappeared. Comparing the data regarding changes in agricultural land in Poland with the amount of land permanently converted under the Law on the protection of agricultural and forest land (in 2011 - 2905 ha), it can be concluded that the areas reclassified to non-agricultural use accounted for 12-13% between 2006-2008, and currently 5-6% of all agricultural land changing its use.

Reclassification to non-agricultural use carried out pursuant to an administrative procedure represents a fraction of the total agricultural land changing its use. The rest of this land, mainly of medium and low quality (quality classes IV-VI), is no longer agricultural land as a result of the modernization of the cadastre, or surveying which ends up an investment process and defines new boundaries of a land. A problem faced by surveyors in practice are descriptive, imprecise definitions of various pieces of land contained in Appendix 6 to the Regulation on the record of land and buildings [Rozporządzenie 2001]. For example, “arable land includes land subject to constant mechanical cultivation aimed at the production of agricultural or horticultural crops, including the land which feature allotment gardens as well as greenhouses and hotheds ...”. A fragment of the definition of agricultural land demonstrates interpretation problems that surveyors face in determining changes to boundaries of agricultural land. As part of the modernization of land
records, agricultural land boundaries are changed according to the above definition, but also according to specific guidelines of individual governors engaged in a record of land and buildings. Because of imprecise definitions, these guidelines are different. In particular, this problem affects the owners of large parcels in single-family housing areas. These plots are mostly allocated for gardens or orchards, and often are classified as construction land. Additionally, in one municipality a fenced plot is entirely classified as construction land, and in the other one – only a part with the house. Public administrative authorities in Poland are designated for a strict implementation of the law. As part of their activities there should not be a place for this type of discretion, as each of their decisions should be based on the specific provision of the law.

3. Analysis of the existing regulations referring to the management of agricultural properties.

Transfer of ownership rights to an agricultural property may be regulated by the general rules of the Civil Code, or based on specific rules. On October 1st, 1990 restrictions on agricultural property transactions were repealed in the Civil Code [Ustawa 1964]. Only the regulations regarding dissolution of co-ownership rights to an agricultural property (articles 213-218), and specific rules governing the inheritance of a farm, valid until 14 February 2001, remained. The aforementioned regulations regarding dissolution of co-ownership rights to an agricultural property apply only when the court decides on the dissolution. They provide that in the case when the physical division of a farm would be contrary to the principles of sound farming practices, the court grants it to that co-owner, who the other co-owners agree to, but it is his/her duty to repay the shares. In the event of disagreement between the co-owners, the court grants it to the one who runs the farm, or may also decide to sell the farm. The regulations regarding the limitations as to the inheritance of a farm apply only to those opened before 14 February 2001, carried out under the provisions of the Civil Code (when there is no will). They require heirs to have qualifications to run a farm – degree in agricultural sciences or working on a farm for a period of at least five years. Minors and permanently disabled persons are also authorized to farm inheritance. Other heirs are excluded from inheritance of a farm.

3.1. Specific rules on management of public agricultural properties.

Just a year after the repeal of the Civil Code restrictions on trading in agricultural property, a law on the management of agricultural land of the State Treasury was passed [Ustawa 1991]. This act contains rules for managing properties of the State Treasury assigned to the agricultural economy, which belong to the Agricultural Property Stock of the State Treasury. At the same time, a state legal person was created - Agricultural Property Agency, which manages the resource on behalf of the State Treasury. First, the Agency focused on managing the property remaining after liquidation of state-owned farms, and the creation of the Agricultural Property Stock of the State Treasury. The final acquisition of the rights and obligations of the agricultural land of the State Treasury by the Agency was established to be on 30 June 2000. Before that date it was necessary to enter into new contracts with natural persons and legal persons as well as organizational units wielding this land. In the case of a use, failure to sign new contracts until that date resulted in their termination. Termination of contracts for use, confirmed by an administrative decision, resulted in the transfer of the property to the Agricultural Property Stock of the State Treasury. If, however, this procedure was not maintained, agricultural land became ex officio property of a commune in which they were located.

However, over time, the legislature subsequently amending the law on the management of agricultural land of the State Treasury, set broader tasks for the State Treasury Agency, such as:
1) creating and improving the area structure of family farms;
2) initiating rural development activities on the land of the State Treasury, and promoting the organization of private farms on the land of the State Treasury;
3) restructuring and privatization of State Treasury property used for agricultural purposes;
4) creating conditions conducive to the rational use of the productive potential of the Agricultural Property Stock of the Treasury;
5) trading in real estate and in other components of the State Treasury assets used for agricultural purposes.
Agricultural Property Agency has the task of managing the Stock, including agricultural land, in the best possible manner, and it can:
1) sell the whole or parts thereof;
2) lend for payable use to legal or natural persons for a fixed period of time;
3) bring them in whole or in part into a company in which the State Treasury or a research institute
holds the majority of shares;
4) lend to the administrator the whole or part of the property for farming purposes for a fixed period of time;
5) hand over for management;
7) exchange.

Agricultural land included in the Stock can also be set aside in economically justified cases. The Law on the management of agricultural land of the State Treasury also allows for a free of charge transfer of agricultural land to: local government units for public purposes specified in the act, such as flood control structures, the unemployed without benefit rights that for a period of at least five years were employees of state farms, for purposes related to afforestation, and to the State Forests also for afforestation.

The sale of state-owned agricultural land is the basic form of management of the Stock. The main limitation that exists in the Law on the management of agricultural land of the State Treasury is that the sale can take place only if the total area of agricultural land owned by the purchaser does not exceed 500 hectares as a result of the sale. The pre-emptive right of was established in favor of:
1) a former owner of the transferred property or their heir, if the property was taken by the Treasury before 1 January 1992;
2) agricultural production cooperatives, actually in command of the property being sold, the use of which was established for the benefit of this cooperative;
3) the lessee of the property being sold, if the lease in fact lasted for at least three years;
4) a manager of a special economic zone with reference to a property located within the special economic zones.

In addition, with the sale of a property by tender, the Agency may reserve that only the entities listed below, whose purpose is to set up or run a family farm, may participate in the tender:
1) individual farmers,
2) people with agricultural skills,
3) employees of liquidated state agricultural enterprises,
4) members of agricultural cooperatives in liquidation or bankruptcy.

On 16 July 2003, the Act on shaping the agricultural system [Ustawa 2003a] came into force, which contains provisions regulating trading in agricultural land to a large extent. A family farm has become the basis of the agricultural system under this Act, which is defined as a farm run by an individual farmer, where the area of agricultural land is not less than 1 ha and not more than 300 hectares. An individual farmer mentioned in the above definition is a natural person with agricultural skills and living in the community for a minimum of 5 years, in an area where one of the agricultural properties belonging to the farm is located, and personally running this farm for that time. In 2011, the Act significantly clarified the concept of agricultural qualifications. Currently, people with higher education degree, other than in agricultural sciences, must absolutely demonstrate their work experience in agriculture - 3 or 5 years, depending on the level of education.

The main content of the Act on shaping the agricultural system is the establishment of a statutory pre-emptive right to purchase agricultural land by the State Treasury and modification of the pre-emptive rights of the lessee. In the case of a sale of agricultural land by a natural or legal person other than the Agricultural Property Agency, the right of pre-emption under the Act is granted to:
1) the lessee, if all of the following conditions are met:
   - the lease agreement was concluded in a written form and has a date certain, and was performed for at least three years, starting from that date;
   - the purchased property is part of a family farm of the lessee or it is leased by the agricultural production cooperatives.
In the absence of a lessee who is entitled to pre-emption, or the failure to exercise this right, under the Act the right of pre-emption is acquired by the Agricultural Property Agency, acting on behalf of the State Treasury. From the Act on shaping the agricultural system taking effect, until 8 July 2010, the Agency was entitled to the pre-emptive right with respect to any property. From that date this right is granted only when the property being sold is agricultural land of the area of not less than five hectares. In case of the price of a property significantly differing from its market value, a person exercising their pre-emption right may, within 14 days from the date of the declaration of exercising this right, apply to the court to determine the price of the property. The court determines the market value of a property using methods for its determination provided for in the Act on Real Estate Management.

Family farms are treated by the Act on shaping the agricultural system in a special manner, because the pre-emption right in favor of the Agency shall not be granted if the acquisition of agricultural land has enlarged the family farm up to 300 hectares, and the purchased agricultural property is located in the municipality in which he purchaser resides, or in a neighboring municipality.

The Act also gives the right to the Agency to exercise their pre-emption with respect to a property that is a subject of another contract such as donation, for the payment of the monetary equivalent. The aforementioned right of pre-emption does not apply if:

1) the purchaser of the property is a person close to the seller, within the meaning of the provisions of the Act on Real Estate Management,
2) the sale applies to an agricultural property which is the land contribution of an agricultural production cooperative member to another member of the cooperative;
3) the purchaser of the agricultural property is an agricultural production cooperative - in the case of a sale by its member of an agricultural property which is the land contribution of the cooperative;
4) the purchaser of the agricultural property is a local government unit.

The Act on shaping the agricultural system has a unique regulation in the light of the Polish law, which provides that agreements on agricultural properties effected contrary to its provisions or without notice to the person entitled to the pre-emptive right are void. The Agricultural Property Agency, in addition to persons with a legitimate interest, may bring in an action for a declaration of the nullity. Other cases of pre-emption rights in the Polish law are not subject to an absolute invalidity of a legal action executed without its observation.

3.3. Restrictions under the Act on shaping the agricultural system

On October 1, 1990, the Civil Code [Ustawa 1964] restrictions on agricultural property trading, including the provisions limiting their division, were repealed. From that date, until 24 September 2004, the division of agricultural land was conducted as a technical activity, carried out by an authorized surveyor, in accordance with the will of the property owner. It was even possible to divide agricultural land into tiny plots, which, due to their surface, could not be properly used for agricultural production. The divisions of agricultural properties were not subject to any administrative control. On September 24, 2004, a significant amendment to the Law on Real Estate Management came into force [Ustawa 1997]. It introduced a ban on the division of properties designated in the zoning plan as farmland, and in the absence of a master plan, those being used for agricultural purposes, into parts smaller than 0.3000 hectares. The exception is when a separate small agricultural property will be used to increase the area of a neighboring property or adjustment of boundaries will be made between the neighboring properties. The division of agricultural land into parcels of less than 0.3000 ha is necessarily carried out under the administrative procedure. In those proceedings, the administrative authority shall verify the purpose of the implemented division. Administrative decisions terminating the proceedings are conditional decisions. During the period specified in the decision (a maximum of 6 months) the purpose of the division must be carried out within the framework of civil law transactions.

4. Conclusions

Land constituting agricultural land accounts for more than 60% of the Polish territory. The number of such properties is continuously decreasing. It is a natural process associated with the industrialization of space, but it is often irreversible as well. Liberalization of the regulations governing the process of conversion of land from agricultural to construction one, and imprecise records of land boundary changes, may adversely affect the emerging structure of the land in Poland.
Analysis of the legal provisions governing agricultural real estate management processes has shown that in the Polish law exist applicable legal provisions aimed at reducing fragmentation of farms, and preventing excessive accumulation of agricultural land. The former can include the Civil Code provisions regarding the dissolution of farm co-ownership, restrictions on the division of agricultural land contained in the Law on Real Estate Management, and determining a minimum size of a family farm included in the Act on shaping the agricultural system. On the other hand we have the provisions of the Law on the management of agricultural land of the State Treasury, which prohibits the sale of land from the Stock, if the purchaser is a holder of more than 500 hectares of agricultural land, and the Act on shaping the agricultural system, which determines the maximum area of a family farm at the level of 300 hectares. It should also be noted that both the Act on shaping the agricultural system, and the Law on the management of agricultural land of the State Treasury prefer those with a degree in agricultural sciences or with relevant experience to run a farm.

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7. PROPOSALS CONCERNING MANAGEMENT OF MARGINAL LANDS IN THE LAND CONSOLIDATION PROCESS IN POLAND

Abstract:
Rural areas cover more than 90% of Poland, and, therefore, they include almost the entire geographic space. Arable lands of less favourable agricultural conditions cover about 10% of arable lands. This is mainly caused by the low quality of the agricultural production space, which is the effect in disadvantageous, natural-and-soil properties. The objective of this paper is to present the terminology concerning marginal lands, and, considering their low use value, to point to the possibilities of alternative management of such lands. Proposals concerning the land use should result from the allocation of the given area for playing specified functions, as well as they should follow legal regulations.

Key words: marginal lands, land consolidation, forestation, ecological lands, energy plants.

1. Introduction
Following the development of rural areas in Poland, as well as the accession to the European Union, it became necessary to widely consider the essence of land consolidation processes. The land consolidation works in Poland covered about 400,000 hectares in the seventies, but nowadays such works are performed for the area of several thousand hectares per year. Land consolidation works cover, first of all, elements related to the improvement of the agrarian structure of farms, by minimising the number of parcels in farms and the improvement of field extension; the system of roads, which serve for the agriculture, is also changed.
However, the trends of land consolidation works are frequently not limited to elimination of the large number of parcels in farms; they also concern the consideration of demands of local societies and the widely understood, the nationwide economic interest. In order to achieve these purposes, legal regulations concerning land consolidation and practical operations should be directed towards the effective (and corresponding to social demands) utilisation of natural resources of the rural space and active introduction of other functions into this space (such as agrotourism) and the infrastructure.
Rural areas in Poland create about 90% of the country, and thus, they cover almost the entire geographic space, and the lands of less favourable agricultural conditions cover approximately 10% of arable lands.
Fig. 1 Land use in Poland

Source: http://www.wiking.edu.pl/article.php?id=273 (użytki rolne - agricultural lands, grunty orne - arable lands, sady - orchards, łąki i pastwiska - meadows and pastures, lasy - forests, tereny przemysłowe - industrial and transportation areas, zabudowa... - urban built-up areas, nieużytki – wasteland)

The low quality of the agricultural production space results from disadvantageous natural and soil conditions. Such lands occur within the areas which are defective with respect to:

- implementation of the agricultural production,
- the terrain relief; they are, among others, mountainous areas, lands damaged by the erosion, lands hazarded by land stepping, wetlands or stony lands.

The main directions of the development of rural areas and the agriculture, might result from the idea of the multifunctional development of rural areas; they should consider:

1. Modernisation and changes of the structure of farms, in order to increase their possibilities to generate incomes,
2. Protection and maintenance of the natural and landscape values,
3. Development of the technical and social infrastructure of villages.

The agricultural usefulness of arable lands depends on the natural and man-made conditions (Hopfer et.al., 1999). The neighbourhood of big industrial plants, the express roads and highways, also contributes to creation of the less favourable rural conditions.

Considering the above, it is important that management of areas, which are not useful for the agriculture, should be performed with the use of rational spatial planning, with respect to spatial arrangement, the environmental protection, economic values of the space, property rights (Bielska, 2012). Therefore, this would allow for revival of those areas. All changes should correspond to the natural environment, since the rule of sustainable development is of great importance, i.e. the relations between three components: the agriculture - the village - the environment (Sobolewska-Mikulska, 2009).

2. Characteristics of marginal lands in Poland

In Poland, the agricultural and other than agricultural management of the poorest soils was the responsibility of the Ministry of Agriculture and Food Economy (MAFE) and the Institute of Soli Science and Plant Cultivation (IUNG) in Puławy. That is why, the Department of Management of Lands and Agricultural Installations of the MAFE developed in 1992 the set of criteria concerning distinguishing lands characterised by the low usefulness for agriculture, i.e. marginal lands, within arable lands. Marginal lands are defined as lands, which are still used for agricultural purposes, or which are registered as arable lands in the lands register and which - due to their disadvantageous natural, man-made and economic conditions - are characterised by the low agricultural
productivity or which cannot be used for production of the healthy food (Józefaciuk and Józefaciuk, 1996a). For this reason such land should be reclassified into other land use forms, for example transferred for forestation, building purposes or used as ecological lands or recreation areas. In Poland marginal lands cover the area of about 2.3 million hectares, what equals to 12.4% of arable lands. In this group 90% are very light, dry and jejune soils. In total they occupy about 1,700,000 hectares. Such soils also include erosive lands, which are mainly located in Małopolska and Podlarspacka provinces and cover the area of about 370,000 hectares. Soil of diversified values also occur, but they are chemically polluted; they cover the area of 140,000 hectares. Degraded areas, as well as mechanically transformed areas, without removed humus layers, cover the area of approximately 50,000 hectares and areas of disadvantageous natural-and-territorial conditions include arable lands characterised by difficult access or difficult mechanical cultivation.

In 1966 the IUNG in Puławy developed the detailed guidelines concerning distinguishing marginal lands from arable lands (Józefaciuk i in., 1996). Following this criterion, four groups of soils are distinguished (Kotańska, 1999):

- jejune soils of arable lands, where the agricultural production is not cost-effective due to disadvantageous natural conditions and erosion,
- soils of diversified value, chemically polluted as a result economic activities of humans,
- degrade soils or soils mechanically transferred, without the fertile layer,
- soils of disadvantageous natural-and-territorial conditions, i.e. arable lands with difficult access or poor conditions for mechanical cultivation.

In order to determine the quality of soils, the soil value is determined; it is illustrated in Figure 2.

![Soil evaluation structure in Poland (klasa - class)](image)

**Figure 2.** Soil evaluation structure in Poland (klasa - class)

**Source:** The author's own work

The class groups V and VI are described as poor soils. However, the discussed criterion is highly generalised. That is why the Ministry together with the IUNG in Puławy specified the detailed criterion concerning distinguishing marginal lands from arable lands. In the process of delineation of marginal lands, areas covered by the poorest sandy soils are determined, as well as the areas of erosion (soils hazarded by strong water erosion, soils in gullies and located close to gullies, soils of large gully fans, soils hazarded by strong wind erosion). Besides, marginal lands are divided into:

1) basic marginal lands, i.e. lands which are not useful for the agriculture due to disadvantageous location, erosion or pollution,

2) alternative marginal lands, i.e. arable lands, which may be transformed in green areas or which may be cultivated in the period of increasing economic trends, with consideration of economic or weather limitations.

Marginal habitats are distinguished in green areas; due to disadvantageous soil and water conditions, as well as terrain relief and violation of environmental values, it is not recommended to maintain the agricultural production within such areas. (Ostrowski and Podlacha, 2000).
3. Proposals concerning management of marginal lands

Due to disadvantageous natural, man-made and economic conditions marginal lands are characterised by the low productivity, therefore it is important to alternatively manage these areas. However, many important information should be acquired prior to making appropriate decisions concerning the management of the poorest soils. This information should cover:

- the current size of marginal lands in particular municipalities and cities,
- the conditions and structure of erosion hazards,
- physical and chemical properties with consideration of water relations,
- determination of possibilities of improvements, by examining neighbouring soils,
- acquisition of information concerning the management of the marginal soils at the provincial and municipal levels,
- specification of demands for management for purposes other than the agriculture.

Natural, landscape, ecological, social and economic aspects should be considered in the course of land management operations.

Following the Instruction No.1 of the Minister of Agriculture and Food Economy on land consolidation of March 29, 1983, such lands may be used for:

1) playing forest functions, i.e. forestation, development of tree stands,
2) non-agricultural and non-forest purposes, for example, as future built-up areas, for the technical infrastructure, agrotourism, recreation, etc.,
3) transformation into ecological lands,
   as well as:
4) cultivation of plants for energetic purpose (Sajnóg and Wójcik, 2013),
5) creation of shooting sites.

3.1. Playing forest functions, i.e. forestation, development of tree stands

Issues concerning forestation are regulated, first of all by the act of September 29, 1991 on forests. It specifies wastelands, arable lands, which are not useful for the agricultural production and arable lands, which are not used for the agricultural production and other lands for forestation. However, it should be remembered, that according to legal requirements, allocation of lands for forest functions must result from the provisions of the local spatial management plan, and, in the case when such a plan is missing, they must be in agreement with the decision on building conditions and land management.

Forestation of marginal lands in Poland seems to be the best activity, due to the natural values and the requirements of the natural environment protection. At present, the afforestation rate (the ratio of forested areas to the areas of the country) is too low and equals to about 28%, whilst in Europe in equals to 32%. One of the basic objectives of the Forest State Policy is to increase afforestation of Poland up to 30% in 2020 and up to 33% after 2050, as well as to achieve the optimum structure of forests in the landscape, by means of protection and complete implementation of opportunities of habitats.

Marginal lands, used in the past for agricultural purposes and not useful for the agricultural at present, cover up to 4.6 million hectares, what equals to approximately 15% of Poland. Some of those areas have been already forested, attempts to restore the agricultural production are undertaken in remaining areas. Distinguishing the area of 1,5 million hectares of the current arable lands, which are located on the poorest soils, which are not useful for the agricultural production, is planned by 2015.

The National Programme for Expanding of Forest Cover, approved by the Council of Ministers on June 23, 1995 is the document, which aims at implementation of the State Ecological Policy. It contains forest management of lands excluded from the agricultural production, areas of forested sites, as well as locations and ways of afforestation. Independently on legal regulations, included in the act on forests, and on regulations included in the National Programme for Expanding of Forest Cover, in the process of forestation it is forbidden to perform such activities which could adversely influence the natural habitats and the species, for which the given Natura 2000 site was created (Plotkowski K, 2008).

Forestation leads to many advantages, which concern, among others, protection against soil degradation and stimulation of positive processes of soil generation, erosion and landscape stepping processes, soil exhaustion, percolation of pollution into water, creation of new and restoration of old ecological networks and corridors between existing forest complexes, which enable migration of animals, plants and mushrooms, as well as strengthening and protection of areas of high natural values. Besides, it also concerns improvements in the humans’ life value
within urban and industrial areas, as well as meeting the demands in the field of recreation in the clean natural environment.

Photograph 1. Example of forestation

Source: The photographs taken by the author

Forestation of marginal lands, presented in Photograph 1, results in many advantages, which concerns protection against, among others, degradation of soils and stimulation of soil generation processes, processes of erosion and landscape stepping, soil exhaustion, percolation of pollution into waters, creation of new and restoration of old ecological networks and corridors between existing forest complexes, which enable migration of animals, plants and mushrooms, as well as strengthening and protection of areas of high natural values.

For those areas, where forestation would be not recommended, plantation of trees should be developed. Introduction of trees should be considered as the equivalent for forestation mean of protection and use of the natural space. Participation and distribution of trees should become an integral element of the idea and programme for spatial management of provinces and municipalities in the field of environmental protection and rural management.

An important element is also to implement the rural-and-forest border, which is specified for particular lands register districts in the study of conditions and directions of spatial management of municipalities. It is often created as the road along the wall of the forest, being a part of the rural-and-forest border, i.e. the road which serve the fields. Such solutions are justified due to the natural and environmental reasons, since they are a very good insulation for various ecosystems, the agrosystem and forests.

The proposal of land management by forestation is illustrated in Photograph 2, on which areas of the low classes of soils are delineated. Such areas are located close to forests and trees and rural management is not possible; therefore the above solution is highly advantageous for the natural environment. Arrangement of shooting sites minimise losses, i.e. stops animals in forests, and, thus, minimises the volume of losses in crops in farms.
3.2. Allocation of lands for non-rural and non-forest purposes, eg. for buildings, transportation infrastructure, agrotourism, recreation etc.

Allocation of lands for non-agricultural and non-forest purposes is understood as setting the use of arable lands other than the agricultural or forest land use. According to the act of February 3, 1995, first of all wastelands, and, if wastelands are missing, other lands of the lowest production suitability, may be destined for non-agricultural and non-forest purposes. Marginal lands, are qualified as soils (for which the agricultural management is not cost-effective, due to the very low production values of lands), and lands which are not suitable for production of consumer plants. It seems that the best solution would be to modify the use of such lands and manage them as lands for the future built-up areas, transportation infrastructure, agrotourism, recreation etc. However, the land use change should be performed with consideration of the natural, ecological and landscape aspects. The problem of location of the given investment must result from the economic, social and economic demands and conditions of the given investment. The photograph below presents the community centre, which was built during the land consolidation works; this community centre enables the meetings of the local society.

Photograph 2. The proposal of management by means of playing forest function

Source: The author's own work
For the local society an important issue is creation attractive places, for example close to water reservoirs, which allow for recreation and development of sporting passions; it is illustrated in Photograph 4.

**Photograph 4.** The proposal concerning management by allocating the lands for non-rural and non-forest purposes

*Source:* The author’s own work

3.3. *Transformations into ecological lands*
According to the act of April 16, 2004, ecological lands are remainders of ecosystems, which deserve protection, such as: natural water reservoirs, field and forest water bodies, groups of trees and bushes, swamps and peat bogs, dunes, patches of unutilised plants, old river beds, outcrops, escarpments, natural habitats and places of living of rare or protected species of animals and mushrooms (their mainstays, places of reproduction and seasonalstay).

According to data published by the Main Statistical Office, 6628 ecological lands existed in Poland in 2009 and 6952 in 2011; they covered the area of 51,653.1 hectares. Basing on this data the increase of the number of such lands may be observed. Ecological lands are created within areas of the natural disasters, where plant succession may occur, or within marginal lands, whether their restitution may lead to creation of biocenosis, which may become ecological lands (Koreleski, 2005).

In particular, lands of the high natural value, on which occur species which could become extinct, which are protected, which rarely occur and which are characterised by biodiversification or high landscape values, should be re-qualified into ecological lands.

The ecological land is established by the municipal council, basing on the special resolution, which specifies, among others: the name of the given area, its location, the authority and particular objectives of the natural protection. Such resolution must be agreed with the Regional Director of Environmental Protection (RDOS). If the ecological land lost its natural value or in the case when it remains in conflict with the public investment, the municipal council may cancel the ecological land, in co-ordination with the RDOS.

Photograph 5. An example of the ecological land
Source: http://owyszkowie.blox.pl/2008/05/Uzytki-ekologiczne-w-Puszczy-Bialej.html

3.4. **Allocation for cultivation of plans for energetic purposes**

Jejune soils of lower soil evaluation classes, geotechnically devastated areas, reclaimed areas with the humus layer of poor conditions and soils polluted by heavy metals may be allocated for production of the biomass. This is illustrated in Photograph 6.

Acquisition of lands to be allocated for many-year plantation of plants cultivated for energetic purposes is justified with respect to provisions of the act of April 13, 2007 on prevention and elimination of environmental losses. The method itself is highly important for management of arable lands, which are chemically polluted, as well as post-industrial wastelands.

The first plantations of energy plants (plants which gain high increase of the biomass within relatively short time, which produce heat energy as a result of burning) were created in Poland less than twenty years ago. At present, plantations of energy plants cover about 10,000 hectares, including more than 7,000 hectares of plantations of Salix viminalis.
Such management of lands became very important when Poland accessed the European Union, as well as a result of obligations of our country concerning the participation in production of renewable energy in the primary use.

Photograph 6. The proposal of management by allocating for cultivation of plants for energetic purposes

Source: The author’s own work

3.5. Allocation for creation of shooting sites

One of the basic elements of hunting is location of shooting sites. Shooting sites of self-sown or planted crops which are used as food by animals living in forests. Creation of such sites improves conditions of animals, but also results in limitation of losses, which are often caused by animals in arable fields. It is estimated that 5 hectares of shooting sites should be created for every 1,000 hectares of forested areas. Such areas are created on soils of low soil evaluation classes, since cultivated plants do not require special treatment or high classes of soils.

Photograph 7. Example of the shooting site
4. Final remarks and conclusions

The presented proposals concerning management of marginal lands, as the possibility to improve the structure of rural areas (in the land consolidation process) in Poland have been implemented with the increasing frequency. Performed activities result from the environmental demands, as well as from the necessity of adaptation to the European Union. In order to achieve effective results, permanent cooperation of all institution, which are responsible for implementation of such activities with owners of farms, is required. The owner decide about the final allocation of lands qualified as marginal lands, since they decide about the ways of management of their properties.

The traditional form of management of marginal lands is forestation. However, it should be remembered that other possibilities of utilisation of these areas also exist, such as allocation them for plantation of energy plants, transformation of marginal lands into ecological lands or for non-rural and non-forest purposes. Therefore, the demand to develop the non-agricultural programme, which will allow for acquisition of a series of benefits resulting from the appropriate management of marginal lands, exists. Such management should be performed according to natural, ecological and landscape values, as well as economic and social aspects.
8. ISSUES CONCERNING INCONSISTENCIES IN QUALIFICATION OF LANDS IN FORESTS

Abstract

The paper presents inconsistencies between provisions concerning qualification of lands, which exist in the real estate cadastre, comparing to the same types of land, which exist within the area of the State Forests National Forest Holding.

The problem of inconsistencies in classification of lands, being forested areas, to particular groups of lands, which result in losses of various information concerning the real status of land management in forested areas.

The paper also analyses types of land, i.e. roads, built-up areas, lands beneath power supply lines, ditches, etc.

Keywords: land, real estate cadastre

1. Introduction

The real estate cadastre, defined in the Act of May 17, 1989, The Geodetic and Cartographic Law\textsuperscript{10} as the uniform, at the nationwide level, systematically updated set of information on lands, buildings and remises, their owners and other individuals or legal entities, which possess those lands, buildings and premises (Art.2, item 8) is the basic public register, which stores information on the above objects. The real estate cadastre is to serve many purposes, which are specified in the Geodetic and Cartographic Law, which include: economic planning and spatial planning, calculation of taxes and payments, designation of real estates in property registers, the public statistics, real estate management and the register of farms. The land and buildings registration describes land, building and premises real estates; this supports modern management and the real estate market.

The real estate cadastre, as well as other databases (e.g. the underground technical infrastructure network, the state register of borders and territories of the administrative division, the state register of geographic names, the register of localities, streets and addresses, the register of prices and real estate values etc.) create the basis of the national land information system, which is the element of the spatial information infrastructure, defined in Art.3 item 2 of the Act of March 4, 2010 on the spatial information infrastructure\textsuperscript{11}. It is also to become the element of the integrated real estate information system. The Surveyor General of Poland is responsible for creation, implementation and coordination of activities related with this system. The act of 1989, the Geodetic and Cartographic Law obliged the Surveyor General to maintain databases concerning the state register of borders and territories of the administrative division of the country, integrated with the real estate cadastre, including, among others, borders of forest districts and regional directorates of the State Forests.

One of the public registers, which is created to meet the demands of one of the national economy sectors, is the State Forests Spatial Information System. This System, both, in its descriptive part (in the State Forests Information System), and in the graphical part (in forest numerical maps) stores data which describes all phenomena, which occur in forests, being the property of the State Treasury, the management of which has been transferred to the State Forests National Forests Holding. The sectoral registration of the state Forests is widely developed, since it concerns events resulting from economic (production), ecological (protection) and social-and-economic functions of forests. The obligation to maintain the sectoral registration by the State Forests results from provisions of the Act of 1991 on forests\textsuperscript{12}; its Art.4, item 3 reads: „within the performed managerial functions, the State Forests implement the forest management, they manage lands and other real estates connected with the forest management, as well as they implement the register of properties of the State Treasure and determine their value”.

\textsuperscript{11} The act of March 4, 2010 on spatial information infrastructure (Off. J., 2010, no. 76 item 489)
\textsuperscript{12} Act of September 28, 1991 on forests (Off. J. 2011, no.12 item. 59, with amendments)
The act on forests includes also statements concerning consideration of provisions of the forest management plans concerning borders and sizes of forests (Art.20, item 2) in the land and buildings registration. The technical guidelines concerning the land and buildings registration - the G5 Instruction\textsuperscript{13}, include comments concerning the registration performed in forested areas: \textit{borders of cadastral parcels in forest areas are delineated with consideration of forest management plans, which is discussed in Act of September 28, 1991 on forests (§ 66).}

There is no doubt that it is not the real estate cadastre, which should be adapted to the series of other sectoral registers, which are to improve management and administration of given estates, but the sectoral registers - in the part concerning lands, buildings and premises - should be maintained as consistent with the obligatory decree of 2011 on the land and buildings registrations. When such consistency is achieved it will be possible to properly exchange information between the real estate cadastre and other sectoral registers, and, therefore, to create the integrated real estate information system.

In the course of investigations of methods used for maintaining the real estate cadastre within the State Forests areas, as well as the consistency of data stored in the real estate cadastre and in sectoral forest registrations, certain discrepancies occur in relation to qualification of forest lands to particular groups of lands. The special attention was paid in those investigations to the structure of lands in forested areas and to the ways of their qualification in the sectoral registrations, which are maintained by the State Forests National Forests Holding and in the real estate cadastre.

2. \textbf{Lands}

The Geodetic and Cartographic Law, in its Section 4, which discusses the land and buildings registration, the general rules concerning the maintenance of the registration, information concerning data, which describes particular subjects of the registration. With respect to lands, the real estate cadastre stores information concerning their location, size, types of lands and soil evaluation classes, designation of the property registers or sets of documents, if they have been created for the given property, which include the lands (Art. 21 item 1 point 1). The division of lands into groups, description of lands qualified to particular groups of lands and permitted designation of land on the cadastral map, are included in the Decree of 2001 on the land and buildings registration\textsuperscript{14}. Arable and forest lands are included in the soil classification of lands, which are maintained in the uniform way for the entire country, basing on the official table of land classes (Art. 20 item 3 of the Geodetic and Cartographic Law). The land and buildings registration, in its part, which concerns forests, is maintained with consideration of provisions on forests (Art. 20 item 3a).

It is worth to stress the way of registering the land, which is called "forest areas and areas with hedges and bushes". In the real estate cadastre this group has been divided into two types: forests and areas with hedges and bushes. However, the sectoral registration of the State Forests presents this group of lands in a more detailed way, dividing particular types into groups of land use categories and land use categories, storing more detailed information about the management of the area of forests. Such more detailed presentation of the real management of forested areas in the sectoral registration results directly from the definition of forest, which is included in the Act of September 28, 1991 on forests, in its Art.3: \textit{a forest is land of contiguous area greater than or equal to 0.10 ha, covered with forest vegetation (or plantation forest) – trees and shrubs and ground cover, or else in part deprived thereof, that is designated for forest production, or constituting a nature reserve or integral part of a national park, or entered on the register of monuments; associated with forest management, but occupied in the name thereof by buildings or building sites, melioration installations and systems, forest division lines, forest roads, land beneath power lines, forest nurseries and timber stores; or else put to use as forest car parks or tourist infrastructure\textsuperscript{15}. In the real estate cadastre each way of forest area management, described in the forest definition, should be (according to the decree on the land and buildings registration) designated as Ls (forest, "Las" in Polish). However, the detailed visualisation of all details of the real management of forest areas is included in the sectoral registration; the example is the fragment of the economic map, presented below (Fig. 1).

\textsuperscript{13} Technical G-5 Instruction The land and buildings registration

\textsuperscript{14} Decree of the Minister for Regional Development and Construction of March 29, 2001 on the land and buildings registration (Off. J. 2001, no. 38 item 454)
**Fig. 1 An example of the forest of the State Forests - a fragment of the economic map of the forest district**

Remaining lands, which exist within the areas administered by the State Forests, are designated in accordance with the division of lands, described in the decree on the land and buildings registration.

The table below presents division of lands with consideration of lands listed in the real estate cadastre and in the sectoral registration of the State Forest.

**Table 1**

<table>
<thead>
<tr>
<th>Group of lands</th>
<th>Type of lands</th>
<th>Group of land use category</th>
<th>Land use category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest lands and lands with trees and bushes</td>
<td>Forests (Ls)</td>
<td>Forest lands, forested</td>
<td>Tree stands</td>
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<td></td>
<td></td>
<td>Forest lands, non forested</td>
<td>Plantations of trees</td>
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<td></td>
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<td>Forest lands, non forested</td>
<td>By-production</td>
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<td>Forest lands, non forested</td>
<td>To be renewed</td>
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<td>Forest lands, non forested</td>
<td>remaining</td>
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<td>Lands connected with forest economy</td>
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<td>Forest lands, non forested</td>
<td>Buildings and constructions</td>
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<td></td>
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<td>Forest lands, non forested</td>
<td>Water melioration installations</td>
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<td>Forest lands, non forested</td>
<td>Lines of spatial division</td>
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<td>Forest lands, non forested</td>
<td>Forest roads</td>
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<td>Forest lands, non forested</td>
<td>Lands beneath power supply lines</td>
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<td>Forest lands, non forested</td>
<td>Forest nurseries</td>
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<tr>
<td>Lands with trees and bushes (Lz; Lz-R, Lz-L, Lz-Ps)</td>
<td>Lands with trees and bushes</td>
<td>Hedges and bushes</td>
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<td><strong>Arable lands</strong></td>
<td><strong>Arable lands (R)</strong></td>
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<td>Orchards (S: S-R, S-Ps, S-L)</td>
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<td>Permanent meadows (Ł)</td>
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<td>Permanent pastures (Ps)</td>
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<td>Arable built-up lands (B-R, B-Ps, B-Ł)</td>
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<td>Lands beneath ponds (Wsr)</td>
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<td>Lands beneath ditches (W)</td>
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<td><strong>Built-up and urban areas</strong></td>
<td><strong>Housing areas (B)</strong></td>
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<td><strong>Industrial areas (Ba)</strong></td>
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<td><strong>Other built-up areas (Bi)</strong></td>
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<td><strong>Urban, non built-up areas (Bp)</strong></td>
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<td><strong>Recreation areas (Bz)</strong></td>
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<td><strong>Minerals (K)</strong></td>
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<td></td>
<td><strong>Transportation areas (dr, Tk, Ti)</strong></td>
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<tr>
<td><strong>Lands beneath waters</strong></td>
<td><strong>Lands beneath sea inland waters (Wm)</strong></td>
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<td><strong>Lands beneath flowing surface waters (Wp)</strong></td>
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<td><strong>Lands beneath surface stagnant waters (Ws)</strong></td>
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<td>Variouls lands (Tr)</td>
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<tr>
<td>Wastelands (N)</td>
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<td>Ecological lands</td>
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</tbody>
</table>

**Source: Own research.**

As it may be seen from the above table, the sectoral forest registration presents the real management of forested areas at the high level of details. On the other hand, in the real estate cadastre, lands specified as forests in the Act on forests (covered by forest vegetation, as well as deprived of vegetation, or being the nature reserve or constituting a national park, or registered into the register of monuments, as well as associated with forest economy) will be designed as Ls.

### 3. Inconsistencies in designation of lands in the real estate cadastre within the areas of the State Forests

The real estate cadastre maintained for the areas of the State Forests does not often reflect - with respect to lands - important situations which exist on forest lands and which are related to management of these lands; errors in records which exist in the cadastre and which are related to forests may be also noticed. The decree of 2001 on lands and building distinguishes forest lands, designated as "Ls", and as the definition of forest it assumes provisions of the act on forests. This act, besides typically forest lands, also specifies lands associated with the forest economy, i.e. lands occupied by buildings and building sites, water melioration installations, forest spatial division lines, forest roads, lands beneath power lines, forest nurseries, timber store, as well as lands used for forest car parking places and tourist infrastructure, utilised for the needs of forest economy. In the real estate cadastre each way of land management, mentioned above, should be designated as Ls -- forest lands, what results in loss of various information concerning the real situation existing in the field.

The next problem, concerning presentation of forest lands in the real estate cadastre, is connected with assigning lands associated with forest economy to groups of lands, which occur in the real estate cadastre, but which are other than the group "forest lands with trees and bushes". This leads to inconsistencies in the ways of maintenance of the real estate cadastre in forests in the entire Poland, what is opposite to its basic definition, included in the act of 1989 The Geodetic and Cartographic Law. It says that the real estate cadastre is the registration maintained in the uniform way for the entire Poland.

During performed research many inconsistencies in ways of presentation of lands within the areas of the State Forests National Forests Holding have been observed.

#### 3.1 Materials and methods

In the course of research data from the real estate cadastre, as well as from the sectoral registration of the State Forests was used. The territorial extension of analysed forest districts was determined basing on provisions included in regulations of the General Director of the State Forest, which were the bases for establishment particular forest districts. Location of forest complexes within forest districts was determined basing on the numerical map, which was made accessible by the State Forests National Forests Holding. Other information concerning the sectoral forest registration, was acquired from various cartographic products: economic, general and thematic maps and numerical maps.

Data concerning cadastral parcels, their approximate identification and spatial location, as well as area estimation were assumed on the basis of the Spatial Information Infrastructure Geoportal, which is accessible at: www.geoportal.gov.pl. According to regulations presented on the Internet page of the Geoportal, "it has been created and maintained by the Surveyor GEneral of Poland, as the central access point to services, discussed on Art. 9 item 1 of the act of March 4, 2010 on the spatial information infrastructure, in the complete thematic and territorial extension of this infrastructure".

For the more detailed analysis of cadastral content, data acquired from the land and buildings registration, from the selected district (powiat) starost, was used; analogue cadastral maps at the scale of 1: 5000 illustrating compact forest complexes and the cadastral map in the numerical form were available for this district. Extracts from the list of cadastral parcels were also available, as well as information from property registers, maintained for selected forest real estates, being the
As a result of research and analyses of the above materials, numerous inconsistencies were observed, concerning forest lands classification into particular land groups in the real estate cadastre. Examples of such ambiguities are discussed below.

1. Assignment of the entire forest complex to the land group "forests", which results in loss of many information concerning this land (loss of information concerning forest roads, ditches, built-up forested lands, forest lands allocated to forest car parking areas, places connected with tourism and recreation in forests, lands beneath power supply lines, land occupied by forest nurseries or timber stores).

2. Designation on the cadastral map of lands with buildings associated with the forest management (as the forest district headquarters) as forest lands and lands with trees and bushes „Ls". On one hand such designation is consistent with provisions of the decree on the land and buildings registration, but, on the other hand, it results in losses of information on the real status of forest land management.

Fig. 2 An example of the information loss concerning the real land management

3. Introduction on the cadastral map of the designation „B·Ls” as the built-up land with buildings associated with the forest economy, what is not compliant with the obligatory decree on the land and buildings registration, since such lands have not been defined by this decree.

4. Problematic presentation of roads within forested areas
Annex 6 to the decree on the land and buildings registration, distinguishes, among others, "transportation lands" in the group "built-up and urban lands", including:
   a) roads (lands within road belts of public roads and internal roads, as understood by provisions of the act of March 21,1985 on public roads\textsuperscript{15}, in particular, national roads, voivodship (provincial)

\textsuperscript{15} Act of March 21,1985 on public roads (Off. J. 2007, no. 19 item 115)
roads, district (powiat) roads, municipal roads, roads in housing districts, access roads to arable and forest lands and to public service objects, parking areas, shunting yards located close to railway stations, bus stations, airports, sea harbours, river ports, and generally accessible accesses to unloading ramps and storing yards.

*Lands occupied by internal transportation between farms, forest lands and particular real estates, are not roads, as understood by the decree. Such lands are assigned to the neighbouring lands:*

b) railway lands (lands occupied by objects, constructions and other installations dedicated for servicing the railway transport);

c) other transportation lands (lands occupied by: airports and other constructions and installations servicing aviation, harbour installations, marinas, objects and construction servicing water transport, on-the-ground objects, constructions and installations of the mountain cablecars, tramway tracks outside street and road belts, as well as objects and installations associated with city transportation, arranged parking places outside the state forests, bus stations, flood banks adapted to road traffic).

The following ambiguities in presentation of "built-up and urban lands - roads", designated as "dr" in the real estate cadastre within forested areas, may be noticed:

1. qualification of forest area division lines as "built-up and urban lands - roads" designated as "dr" (lack of consistency, even in one municipality one deals with such assignment and inclusion of the area division line into the neighbouring land, i.e. into the forest and designating such lands as „Ls”),

![Fig. 5 Qualification of the forest surface division line as the land “built-up are urban areas - roads” designed as “dr”.](image)

*Source: a fragment of the scanned cadastral map of the Legionowo District.*

2. qualification of the forest area division line into the „built-up and urban areas - railway lands”, designated as "Tk" in the real estate cadastre,

3. qualification of lands used for car parking areas into the group „forest lands and lands with trees and bushes – forests” designated as "Ls" on the cadastral map, or into the „built-up and urban lands - other transportation areas”, designated as "Ti" or as ” various lands”, designated as „Tr” – it is incompatible with the content of Annex 6 to the decree of land and buildings registration,
Fig. 6 Qualification of the land used as the forest car parking area as the "diversified areas" designed as „Tr”.

Source: a fragment of the scanned cadastral map of the Legionowo District.

4. qualification of lands beneath power supply lines in forests to the group "forest lands and lands with trees and bushes – forests" designated as "Ls" on the cadastral map – following the act on forests or to the group "various lands" designated as „Tr”.

The above examples prove that considerable inconsistencies exist in the real estate cadastre, which concern presentation of lands within forested areas in the entire country. We mainly deal with two cases:

1. designation of the real land management in a way which is incompliant with obligatory legal regulations, being an experiment aiming at assignment of lands associated with forest management to various groups of lands,

2. designation of forested areas of State Forests National Forests Holding, in accordance with the definition of forests, included in the act on forests, and with the decree on land and buildings registration; however, this results in losses of information concerning land management.

There is no doubt that attempts should be made in order to achieve the full consistency in presentation of content, in the real estate cadastre, concerning lands in the entire Poland. However, it should be considered, whether qualification of all lands associated with forest management into the group "forest lands and lands with trees and bushes - forests", designated as "Ls" on the cadastral map, will not result in too high information losses concerning the lands.

4. Final remarks and conclusions

The real estate cadastre, which correctly performs its operations and the consistency of data stored in the cadastre with data stored in other sectoral registers, are the guarantee of the efficient management of the space. The cadastral system is to serve the general, nation-wide objectives and it should be the source of information on lands, buildings and premises for other sectors, institutions and companies.

It turns out from performed research, that the real estate cadastre, existing in forested areas, which are administered by the State Forests National Forests Holding, is performed in the non-uniform and ambiguous way with respect qualification of the real land management into particular groups of lands.

In order to enable correct operations of the cadastral system, it is necessary to achieve the full consistency of data stored in this system. Performed research proved the amount of mistakes and
errors, which exist in the real estate cadastre within forested areas, i.e. on about 30% of the country area. It is also worth to make some considerations concerning the scope of cadastral data, which describes the forest space, whether the narrow group of lands, "forest lands and lands with trees and bushes" does not result in too high information losses about the lands.
9. LEGAL PROTECTION OF SPATIAL DATABASES

Abstract

The analysis of the EU directives and the manner in which they were implemented into the Polish law proves that database protection causes many problems. Extensive national spatial databases created and modernized by public authorities in the public interest have become attractive sources of information not only to the public and public organizations but also to some business entities which create their own databases for profit. It calls for the re-definition of the public interest and the methods of its protection.

Keywords: spatial databases, database protection.

1. Introduction

Since 1996 the legal protection of databases within the European Union have had common legal grounds which are laid down by the Directive 96/9/EC of the European Parliament and of the Council\textsuperscript{16}. The domestic laws of the Member States shall ensure that the objectives set out by the Directive are attained. The legal protection of databases, both under copyright laws and under sui generis rights is especially complicated with respect to public spatial databases.

At the same time the importance of protection of such databases has been increasing, which results from, among other things, the fact the INSPIRE Directive and its implementation into the domestic laws of the Member States intensified the process of digitalization of spatial information and making it available on-line via the internet.

2. The protection of databases in the European Union law

In the EU law, Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases\textsuperscript{17}, defines database as “a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means.”

In the recitals to Directive 96/9 it was emphasized that databases are a vital tool in the development of an information market within the Community and this tool will also be of use in many other fields.\textsuperscript{[9]} “An investment in modern information storage and processing systems will not take place within the Community unless a stable and uniform legal protection regime is introduced for the protection of the rights of makers of databases\textsuperscript{[10]} “The criteria used to determine whether a database should be protected by copyright should be defined to the fact that the selection or the arrangement of the contents of the database is the author’s own intellectual creation; whereas such protection should cover the structure of the database\textsuperscript{[15]} “In addition to aiming to protect the copyright in the original selection or arrangement of the contents of a database, this Directive seeks to safeguard the position of makers of databases against misappropriation of the results of the financial and professional investment made in obtaining and [collecting] the contents by protecting the whole or substantial parts of a database against certain acts by a user or competitor”\textsuperscript{[39]}

Under chapter II, entitled “Copyright”, Article 3, which defines the object of protection, states that: “1. In accordance with this Directive, databases which, by reason of the selection or arrangement of their contents, constitute the author’s own intellectual creation shall be protected as such by copyright. No other criteria shall be applied to determine their eligibility for that protection. 2. The copyright protection of databases provided for by this Directive shall not extend to their contents and shall be without prejudice to any rights subsisting in those contents themselves”.

In the international law, article 5 of the World Intellectual Property Organization (WIPO) Copyright Treaty, adopted in Geneva on 20 December 1996, which relates to Compilations of Data

\textsuperscript{16} Copyright in the internet is also governed by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society.

\textsuperscript{17} OJ 1996 L 77, p. 20
(Databases), also provides: “compilations of data or other material, in any form, which by reason of the selection or arrangement of their contents constitute intellectual creations, are protected as such. This protection does not extend to the data or the material itself and is without prejudice to any copyright subsisting in the data or material contained in the compilation.”

Under chapter III of the Directive 96/9, entitled “Sui generis right”, article 7 of Directive, states in paragraphs 1 and 4: “1. Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.[...] 4. The right provided for in paragraph 1 shall apply irrespective of the eligibility of that database for protection by copyright or by other rights”.

3. **The copyright protection of databases**

The principles of copyright protection laid down in the international law by the Berne Convention of 9 September 1886 for the Protection of Literary and Artistic Works as well as by the WIPO Copyright Treaty on copyright, adopted in Geneva on 20 December 1996, were implemented into the Polish law by the Act of 4 February 1994 on copyright and related rights. The object of copyright protection includes any manifestation of creative activity which is of individual nature, expressed in any form, regardless of its value, purpose or manner of expression (work). Under this Act the object of copyright protection includes, for example, works expressed in words, mathematical symbols, graphic signs (scientific, cartographic as well as computer programmes). Pursuant to article 3 the object of copyright protection also includes collections and databases which have the features necessary to be deemed works, even if they contain unprotected materials, provided that the used selection, arrangement or composition is creative, without prejudice to the rights of the used works. Thus only the databases, including public ones, which meet the requirements necessary to be considered works are protected by copyright; they include both databases whose contents are the object of copyright protection and the ones whose contents are not protected by copyright. The latter include many public databases, because pursuant to article 4 of the Act, for example, public documents and materials are not the objects of copyright protection.

As a rule, the author is the holder of the copyright, which includes the non-transferable and unlimited in time moral rights [to: be identified as the author of the work, sign the work with the author’s name or pseudonym or disseminate it unanimously, the integrity of the contents of the work and its form as well as proper exploitation thereof, decide on making the work available to the public for the first time and control the manner in which the work is used] as well as the economic rights of the author [exclusive right to use the work and to dispose of it on all fields of exploitation and to receive remuneration for use of the work].

The limited copyright protection of databases means that elaboration or multiplication of a database which has the necessary features to be deemed a work, by the legal user of such database or its copy, does not require a permission from the author of such database if it is necessary for the access to the contents of the database and the normal use thereof. If the user is entitled to use the database only in part, the right regards only such part. Furthermore, no permission from the author is required to use, fee of charge, electronic databases which have the features necessary to be deemed works, for one’s own personal use for scientific purposes only and not for profit-gaining purposes as well as for the purposes of the public security or administrative, court or legislative

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18 Likewise: Article 10(2) of the Agreement on Trade-Related Aspects of Intellectual Property Rights, which constitutes Annex 1C to the Agreement establishing the World Trade Organization, signed in Marrakech on 15 April 1994 and approved by Council Decision 94/800/EC of 22 December 1994 concerning the conclusion on behalf of the European Community, as regards matters within its competence, of the agreements reached in the Uruguay Round multilateral negotiations (1986-1994) (OJ 1994 L 336, p. 1);

19 The Convention sets out the minimum protection levels (the signatories shall guarantee in respective domestic laws such level of copyright protection which is at least equivalent to the one set out by the Convention) and provides for equal protection (the author who is not a national of the country of origin of the work shall enjoy in that country the same rights as national authors).


21 An exception includes, e.g. works created by employees, it is the employer who holds copyright in such works.

22 Authors of computer programmes have only the right to be identified as the author of the works and to sign them with their name.
proceedings and reports thereon. The author’s economic copyright may be transferred to other persons under a written agreement or may be inherited. The author may also make an agreement authorising another person to use their work, which is called a “licence” and includes only these fields of exploitation which are expressly named therein. Separate fields of exploitation include, eg. production of copies of the work with any technique, including digital recording as well as public disclosure of the work in such a manner that any person at any place and at any time may access it. Public authorities may hold economic copyright in databases which have the necessary features to be deemed works under relevant agreements or as a result of such databases being created by their employees in the course of performing their responsibilities under the employment contract.

In practice, it was rare for the public authorities to create databases on their own because of low budgets and staff shortages, which raised criticism towards various databases created in such a manner, e.g. in the IT Project Centre of the Ministry of Internal Affairs and Administration. On the other hand, many agreements under which databases were acquired from individuals turned out to be defective and they did not protect the public interest properly. For example, some of such agreements were in fact only licence agreements because they did not expressly stated that copyright is transferred, no distinction was made between copyright in databases and computer programmes, some of the agreements also lacked specific provisions on liability for defective works, especially providing for the obligation to correct such works. The problem concerned, e.g. the spatial databases of the Agency for Restructuring and Modernization of Agriculture and resulted in the European Commission demanding repayment of some agricultural subsidies. Other problems were caused by the authorities not being able to make up their minds whether to create databases on their own or commission the task to companies specializing in creation of database and in the latter case – whether to run competitive tenders for such services or not, with the police as an example. In comparison, the agreements for creation of the biggest national spatial databases made by the Minister of Justice and the President of the Main Geodesy and Cartography Office are regarded to be a considerable success, though the centralization of spatial databases is considered to be too great (Boni, 2011). The creation of the central database of villages, towns and cities, streets and addresses has recently come under fire; the critics point out that the administration of such database would be more effective if it was created and updated by the local government authorities (Szpor et al, 2013).

Administrative courts as well as legal authorities were not always consistent in their approach to protection of the contents of public spatial databases under copyright law. An argument against such protection was that the contents of these databases are considered to be public documents or materials, which – subject to some exceptions – are not protected by copyright under article 4 of the Act on copyright and related rights. The rulings of both the Voivodeship and Supreme Administrative Court in Warsaw of 2013 stated that maps from public spatial databases constitute the public information. However, the Supreme Administrative Court (NSA) did not share the opinion of the Voivodeship Administrative Court that such maps, obtained against a charge in accordance with the Geodesy and Cartography Law23, under the Act of 6 September 2001 on access to public information should be made available by the Main Geodesy and Cartography Office to business entities for re-use purposes free of charge.

Though chapter 2a, added to the Act on the re-use of public information24 in 2011, makes the position of the Polish public authorities considerably worse than the directive of 2003 on public sector information25 required, NSA noted that article 1(2) of the Act on access to public information states that the provisions of this Act shall be without prejudice to other acts which lay down the principles and procedures of accessing public information in a different manner and that this general conflict-of-laws provision applies to any access to public information specified therein, including access for re-use purposes. “Thus, if a separate act (here: Geology and Cartography Law) provides for different principles and procedure of accessing information, it this regard the Act on access to public information do not apply”; moreover the conflict-of-laws special provision of article 23a (5) of the Act on access to public information, pursuant to which the provisions of the chapter

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24 Act of 16 September 2011 amending the Act on access to public information and other certain acts.
25 The Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information do not presume the right to re-use if the authority do not reserve restriction and allows for the charges to take into account “a reasonable return on investment”, which has been left out in the Polish regulation.
Sui generis protection of databases

In the opinion on the advantages and costs of the digital agenda, Piotr Waglowski submits that it does not concern the problem of the status of works which were created as "public materials" or in connection with the public funding as well as the works whose copyright is held by the State Treasury. According to the quoted author the process of digitalization and making the contents available in the public domain is an opportunity to "open the contents" and the directive on the re-use of public sector information should not be considered to be only a stimulant to business growth. He calls for the verification of the "axiology allowing for a lawful collection of charges for public information access and use". He submits that the State should not act like a business entity and because it performs specific tasks which are in the public interest – it cannot be "a shop in which public information may be bought". In his opinion, a similar approach should be taken when considering the call for lack of sui generis protection of public (thus the ones which are created as a result of performing public tasks) databases.

In the Polish law a separate Act of 27 July 2001 on database protection, which also applies to databases not protected by copyright, provides that the maker of a database holds an exclusive and transferrable right to extract or re-use data in entirety or in substantial part, as to the quality or quantity. The maker of a database made in any manner available to the public may not prohibit the lawful user of such database from extracting or re-utilizing any insubstantial part, evaluated qualitatively and/or quantitatively, of the database for any purpose whatsoever. However, such a lawful user may not use the database in such a manner which would conflict with the normal exploitation of the database or infringe upon the legitimate interests of the maker of a database. For example, it shall not be permitted to repeatedly or systematically extract or re-use the database in a manner that would conflict with the normal exploitation and cause unjustified infringement of the legitimate interests of the database maker. The database is protected for 15 years following the year in which it was created or made available to the public. Any substantial change, evaluated qualitatively or quantitatively, to the contents of a database, including additions, deletions or alterations, which would result in the database being considered to be a substantial new investment, evaluated qualitatively or quantitatively, shall qualify the database resulting from that investment for its own separate term of protection. Within the meaning of the Act, "database" shall mean a collection of data or any other materials and elements arranged systematically or methodically, individually accessible by any means, including electronic means, where substantial investment, evaluated qualitatively and/or quantitatively, is required for its production, revision or presentation of its contents; which is narrower than the definition contained in the Directive 96/9/EC, under which "database" means "a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means." Experts on databases call it improper implementation (Polański, 2008). The Polish definition of "maker of a database" is also different to the one contained in the directive. The Polish law defines the maker of a database as "a natural or legal person or an organizational unit without legal personality who bears the risk of investment involved in the production of the database", whereas the directive refers to investment, but not the risk. This additional word was used to question the legal protection of public databases under this Act and though the opinions are conflicting, publications on this subject refer to "databases whose sui generis rights are held by the State Treasury or a local government unit".

Based on the judgment of the European Court of Justice, the databases which were created by public authorities as "a result of a principal activity consisting in collecting information" are not protected while expenses for teleinformation search and review systems are considered to be investments which are subject to sui generis protection (Monarcha-Matlak, 2008; Felchner, 2013).

27 Dz.U. [Polish Journal of Laws], No 128, item 1402, as amended
There is a view that: “article 23b (3) of the Act on access to public information allows public authorities, regardless of imposing requirements under article 23b (2) of the Act, to determine the manner of use of public information protected by copyright or by right of the maker of a database”. The term “manner of use” refers mostly to the list of the fields of exploitation as defined in article 50 of the Act on copyright and related rights or manners of use of a database within the meaning of article 2(1)(2) and (3) [of the Act of 2001 on database protection] (extraction, re-use of data).

The author thinks that any territorial restrictions to licences seem impossible and therefore licences should be considered to be valid worldwide.” (Felchner, 2013). Another author emphasises that since websites containing links were deemed to be databases subject to protection, some web portals may also be considered to be databases subject to protection under the Act on database protection, and it is especially true in the case of search portals (Michalak, 2010).

The land and mortgage register is an example of the problems of „sucking in” whole spatial databases or their substantial parts. The land and mortgage register is public and may be accessed, for example, via the website of the Ministry of Justice but to find out who owns a certain real estate and whether it is encumbered one needs to know the number under which such property is registered. A portal registered in Seychelles, for a charge of 29 PLN, enables to review a chosen real estate using only its address or the registration number of the plot of land. “The search engine boasts on giving access to over 16.3 mln real estates; it has collected information on 26 mln plots of land, 1.4 mln buildings and nearly 6.3 mln premises. It claims that each day it can extract data concerning 100,000 real estates on business days and about 0.5 mln on weekends.” The General Inspector for the Protection of Personal Data fears that we are only one step away from the search engine which will make it possible to link a certain person to their real estates, like in one of the portals, which constitutes a violation of the right to privacy while the vice-minister of justice announced that he will verify whether companies creating search engines similar to the one which is registered in Seychelles, do not violate the right to privacy and the Act on the protection of personal data.

In the discussed publication Robert Horbaczewski cites a view that such search engines may be used by criminal to look for victims and concludes that “companies which are draining and personalizing databases (e.g. National Court Register) maintained by the public authorities are more and more popular. Legitimately, by using different methods, they process and use data in the public domain because there is no provision which would forbid re-processing of public information. The operations of such companies mean that we are more and more infiltrated without even knowing it, for example by insurance companies and banks. There are no provisions which would protect us.” (Horbaczewski, 2013). Finding a solution to the problem of the access to public spatial databases is the result of the state policy regarding commercialization of the public sector information. In the short term, the idea to open the databases conflicts with the budget crisis and the public authorities looking for additional sources of income, eg the Institute of Meteorology and Water Management (Waglowski, 2013).

5. Conclusions

The analysis of the EU directives and the manner in which they were implemented into the Polish law proves that database protection causes many problems. Extensive national spatial databases created and modernized by public authorities in the public interest have become attractive sources of information not only to the public and public organizations but also to some business entities which create their own databases for profit. It calls for the re-definition of the public interest and the methods of its protection.
10. GEODETIC AND LEGAL ASPECTS OF REAL PROPERTY IN THE INFORMATION AREA

Abstract

In Poland, just as in Croatia, and in many countries in Europe, there are two public registers, where information about real estate is included. First - Land Registers – the register of ownership and other legal rights to properties. Second - Cadastre – the register of the locations, areas and boundaries of plots.

This paper shows problematic of ownership range in context of clear title and technological and legal area of boundaries plot. The proposition of a cadastre model where data duplication in two registers is eliminated is also presented.

Keywords: cadastre, land register, boundary point, boundary line, technological and legal area of borders of plots

1. Introduction

According to Art. 21 of the Geodetic and Cartographic Law [Act of May 17, 1989, The Geodetic and Cartographic Law], data included in the property cadastre is the bases for designation of properties in property registers. According to the act on property registers and the mortgage system [Act of July 6, 1982 on Property registers and mortgage], property registers are maintained in order to establish the legal status of properties. The legal status presented in the property register in covered by the warranty of reliability (verity) by presumption that, that the open right has been introduced from the property register in accordance with existing legal status. However, the warranty of verity of entries in property registers concerns to the legal status of a property, which is understood as the status of material rights and encumbrances concerning the property. It does not prevent the legal status of property boundaries (entries in the I-O section, concerning designation of the property), understood as the legal status of approval of the specified course of the borderlines. Documentation which specifies the course of the borderlines is presented in the cadastre; confirmation that it meets the requirements concerning the legal subspace [Łuczyński R. 2009] depends on situation whether the course of the borderlines has been appropriately approved (following administrative or civil procedures).

Similarly to the situation when the property register (KW) prevents the entries with the warranty of verity with respect to the property legal status, the cadaster should also cover boudary points and lines, which were established with maintenance of the technological-and-legal space of boundaries of plots, by the warranty of verity. Unfortunately, the Polish cadastre does not ensure neither the guarantee of explicit determination of location of points and the course of borderlines, nor it guarantees the possibility to explicitly restore the location of points and the course of borderlines in the field.

2. Legal standing of property, technical standing of boundary plots and legal standing of boundary plots

The ordinance on delimitation of properties [Ordinance of the Ministers of Internal Affairs and the Agriculture and Food Economy of April 14, 1999 on delimitation of real estates] classifies the types of documents, being the basis for determination of the course of borderlines as follows:

1) documents which confirm the property legal status (copies from property registers, extracts from notarial acts, valid court sentences and consents, final administrative decisions),

2) documents which specify location of boundary points and the course of borderlines (geodetic documents which include numerical data for establishment of the course of borderlines and maps and plans, which cover the boundaries or other elements allowing for restoration or analysis of the course of borderlines).

The above provisions, specified in the Act [Act on Property registers and mortgage] and in the ordinance [Ordinance of the Ministers of Internal Affairs and the Agriculture and Food Economy of April 14, 1999 on delimitation of real estates], explicitly indicate that the legal status related to the ownership of a property should be separated from the technical conditions and the legal status of borderlines.
The course of the borderlines of cadastral parcels should be considered in the technological-and-legal space, the coherence of which is represented by the area, being the common part of the technological and legal subspaces (Figure 1).

**Figure 1.** Technologically – legal area of borders of parcels. (Technological-and-legal subspace of borders of parcels)

**Source:** [Łuczyński, 2009].

The technological subspace is a set of boundary points, specified by surveys and appropriate documentation, which allows for explicit restoration of location of boundary points in the field; the X,Y co-ordinates of such points were determined following the rules of uniformity of surveying and cartographic works. The uniformity of surveying and cartographic works is understood as a uniform system of measures, the uniform, state spatial reference system and uniform technical standards. The legal subspace is a set of administrative and court procedures, resulting in legal approval of the determined location of boundary points and borderlines.

The property was presented as an object in space by Adamczewski [Adamczewski Z. 2011] (Figure 2).
Adamczewski has distinguished three independent co-ordinates of the information space: M - matter, P - law and W - value. The technological-and-legal space of borderlines is the component of the property matter M. Matter is a term, which is wider than the space of borderlines, since it is responsible for all physical attributes of a property, as a 3D object, related with the ownership and other material rights, assigned to this matter.

The distribution of the Matter (M) of a land property may be presented as follows:
- the property area, limited by borderlines; the status of establishment and confirmation of the course of borderlines depends on the coherence of the technological-and-legal space,
- components of the property, including the 3D cadaster, responsible for geometric attributes in the 3D space (x, y, z).

Implementation of geodetic surveys for the cadastral purposes (in the twodimensional space) is closely connected with the determination of the course of borderlines - both in the case of works concerning the existing borderlines (delimitation of properties, restoration of border signs, determination of location of boundary points), as well as in works which are completed with delineation of new borderlines (division of properties, land consolidation and division of properties). Such works require implementation of research concerning the technological-and-legal space of borderlines, as well as the legal status of properties, since apart from specification who is the subject of material rights, it should be also stated whether the extension of such rights has been determined and legally approved for the given property. In order to establish the complete legal status - the property legal status and the technical and legal status of boundaries of the property - all types of documents listed in the ordinance [The Ordinance of the Ministers of Internal Affairs and the Agriculture and Food Economy of April 14,1999 on delimitation of real estates] should be reviewed. Besides, it should be stressed, that documents, which approve the course of borderlines - which are responsible for the legal subspace of the borderlines, may be, at the same time, the documents, which establish the property legal status.

An example of the document, which establishes the legal status of the property and, at the same time, approves the course of borderlines - which is precisely determined in the attached surveying documentation -- is illustrated in Figure 3, which presents a fragment of the court decision concerning acquisitive prescription. From this decision it results that the court decided:

1. to state that the daughter, her husband and son acquired on November 4,1971, by right, the ownership of the property being the non built-up parcel, located in Ożarów.
Mazowiecki, designated on the map created on March 21, 1995 and received to the state geodetic-and-cartographic resource on March 31, 1995, with the number KEM - the concealed number, as the cadastral parcel - the concealed number, of the area of 893 sq.m., which boundaries are determined by points 5716-5793-5800-5724-5716 - in accordance to the rules of the joint property of husband and wife.

2. to consider the map described in item 1 as the integral part of the decision.
3. to cancel the costs of the court proceedings between the parties.

Figure 3. Decision of court.

Source: Łuczyński – own research.

It should be added that the property subdivision map does not include all required data. An example of the property subdivision map is presented in Figure 4.

Figure 4. Contemporary partition map. (map of property subdivision)
As it turns out from Figure 4, the drawing of the subdivision map includes:
- designation of property registers (e.g. „WA1G/0006/3”) with numbers of cadastral parcels before the division (e.g. „dz. ew. 55/5”; in the case „dz. ew. 72/4”, being the public road – „dr” type of land, it was noticed „land not included in the mortgage” – what means, that the parcel is not presented in the property register),
- number of designed parcels (in red, e.g. „55/7”),
- sizes of existing and designed parcels - in hectares (e.g. „55/7 0.0014 ha”),
- number of boundary points (e.g. „A”, „B”), and
- surveys of frontages between boundary points (e.g. „23.00” between points E – B).

Measures, which could not be placed in the map drawing, are listed in the list of measures („List of measures”, e.g. the distance between points A – 98 equals to 2.00).

Co-ordinates of boundary points are not specified; their list is included in a separate document, included in the technical documentation. The registration number KEM of the map is the connection between the map and the complete documentation, which was created as a result of implementation of geodetic works and which was set in the form of technical documentation.

The technical documentation, after checks performed at the geodetic and cartographic documentation centre, is received by the state geodetic and cartographic resources; only the map, which has been approved by the valid administrative decision of by the valid court decision, allows, in particular, for the access to co-ordinates of boundary points, specified in the “2000” state coordinate system. Also modifications resulting from the design of division, may be introduced as the new status to the cadastral and to the property registers, only after it is approved.

Therefore, the regulated legal status concerning the documentation which states the legal status of the property (e.g. basing on the established property register) does not mean the legal establishment of the physical extension of this right. The property legal status - in the field of subjects of material rights of the property and the legal status of boundaries may be regulated by separate documents. One of the documents which state the legal status of the property, is the property register, but only with respect to the subjects of material rights (the warranty of verity does not prevent entries in the I-O section of the register). The legal status of the property boundaries requires both, the technical documentation, which specifies the course of borderlines, and the legal documents, which is the basis for the approval of the course of border lines, specified in the technical documentation (technical establishment of the course of borderlines and its legal approval). Technical establishment of the course of the property borderlines is performed as a result of implementation of specified geodetic works (technological operations). Legal establishment of those borderlines is performed as a result of implementation of specified legal procedures. Geodetic works are connected with development of required technical documentation, which allows for explicit delineation of the course of the cadastral borderlines in the field. On the other hand, legal actions consist of the approval of the established course of borderlines by means of the administrative decision, the court decision or - in the special case of delimitation proceedings - by the border agreement; however this does not mean whether the technological criteria, which influence the possibility to explicitly restore the primary location of boundary points and the course of the cadastral parcels borders lines, are met.

An example of "legal boundaries” - which do not meet the conditions of the technological subspace - are illustrated in Fig.5. It is a sketch attached to the deed of ownership (AWZ), issued on the basis of the act on regulation of ownership of farms [Act of October 26,1971 on regulations of ownership of farms], which confirm the informal division of the parcel 103 into parcels 103/1 and 103/2, for which separate enfranchisement decisions were issued. Any survey documentation has not been attached to the sketch, it also does not contain any points of the geodetic control, to be used for connection of surveys. Probably, only those operations, which were performed in the field, were performed earlier, during works related to the establishment of the land and buildings registration, in accordance with the ordinance on the land and buildings registration [The ordinance of February 2,1955 on the land and buildings registration].

Source: Łuczynski – own product.
Figure 5. Old partition sketch.

Source: Łuczyński – own research.

On this sketch (Fig. 5) the complete connection with the cadastral documentation is not presented. Only the numbers of parcels are listed. It is not known, whether measures of frontages, which were crossed out many times, are in agreement with measures presented in the course of surveys connected with the establishment of the cadastre. Moreover, during field measurements connected with the establishment of the cadastre in rural areas, parcels borders were measured in agreement with the real status in the field. Owners were not always present when the measurements were performed, since the corresponding obligatory legal regulations – the ordinance [The ordinance of February 2, 1955 on the land and buildings registration] and the ordinance on land classification [The ordinance of land classification] – did not assume the necessity of notification of the owners. Any reports have not been prepared in the field. Later, reports concerning the proclamation of the possession status, where owners and possessors confirmed only the possession of parcels, described by the numbers, which were listed in the cadastre.

The deed of ownership does not contain information of the course of borderlines; however, using the numbers of listed parcels, it corresponds to the cadastral documentation. Besides the numbers of parcels, the enfranchisement decision presented their total area, which was assumed to be in agreement with the size presented in the land register. The deed of ownership, which is undoubtedly the document which states the legal status of the property, does not legally approve the listed boundaries; those boundaries are also not approved by the fact of establishment of the property register. In order to approve the course of borderlines, an appropriate report is required in many cases, which is prepared by the surveyor in the field, and which documents the amicable confirmation of the course of borderlines by the owners. For the legal approval of the course of borderlines the administrative decision or the court decision, concerning the performed technological operations, related with the determination of the course of borderlines, are required.

An example of documentation, which explicitly specifies the course of borderlines, which was not, however, legally approved, may be the technical documentation created as a result of works concerning the establishment of the cadastre, following the ordinance [The ordinance of February 2, 1955 on the land and buildings registration]. Figure 6 illustrates the fragment of the survey sketch, included in the documentation required for the establishment of the cadastre within urban areas.
The sketch (Fig. 6), was created in the frames of works related to the establishment of the cadastre in the urban area, in accordance with the provisions of the ordinance [The ordinance of February 2,1955 on the land and buildings registration]. The horizontal control was developed in the obligatory state system; it was the basis for direct surveys of the course of parcel borderlines. The course of borderlines was pointed by the parties, which were earlier informed about the field operations. Those operations were confirmed by signatures of the parties and by the surveyor in the report. However, due to the fact, that the technical documentation received by the state geodetic and cartographic resources, was not approved by the administrative decision, it may meet the requirements of the technological subspace only. This documentation allows for explicit restoration of surveyed boundary points in the field, following the procedure of determination of boundary points. Therefore, the cadastral parcel surveyed as a result of the above works, will be characterised by the approved technical status of its boundaries - the possibility to explicitly restore the location of boundary points, but location of those points will not be legally approved (no legal approval of the boundaries). A separate issue concerns the legal status of the cadastral parcel (a property), which depends on the introduction of this parcel to the property register, to the set of documents or to other documents, which might be the basis for determination of individuals, who may have the assigned material rights to the property.

3. **Cadastre and land register connection**

The property registers are maintained in order to establish the legal status of the property. However, the precise determination of the extension of the ownership right, basing on the documentation allowing for explicit determination of location of points and the course of borderlines in the field, is required for the establishment of the technical and legal status of the property boundaries. The legal status (with respect to the establishment of the ownership status) is recorded in the property registers, maintained by regional courts, and the documentation, which specifies the course of borderlines is included in the cadastre, which is maintained by the district (powiat) starosts.

Following the ordinance on maintenance of property registers and files of documents [The ordinance of the Minister of Justice of September 17, 2001 on maintenance of property registers and files of documents], data concerning land and building properties are recorded in the property register on the basis of the copy from the cadastral map, created o the basis of regulations concerning the real estate cadastre (obligatory since 2001, the Ordinance of the land and buildings registration), and the extract from the land register or from the list of land changes.

The act [Act of July 6,1982 on Property registers and mortgage] ensures two warranties: the warranty of verity (presumption that the open right from the property register has been introduced in agreement with the real legal status) and the warranty of the public faith of the
property registers (in the case of inconsistency between the legal status of the property, specified in the property register and the real legal status - the content of the property register content decides in favour of this individual who acquired the ownership or another material right as a result of the legal operation with the authorised individual). However, as it is confirmed by the decision [The ordinance of the Minister of Regional Development and Construction of March 29, 2001 on the land and buildings registration], these warranties do not include the section I-0 of the property register.

In the section I-0 „Designation of properties” of the property register maintained for a land property the following information are entered:

- Column 1 „Information on the application”,
- Column 2 „The current number of the property”,
- Column 3 „Location”,
- Column 4 „Map and description”,
- Column 5 „Way of use”,
- Column 6 „Area”,
- Column 7 „To the current number of the property”,
- Column 8 „Status at the time of establishment of the property register, connections and disconnections”.

The area of the property, specified in column 6, is the total of areas of the cadastral parcels, which are included in the property, specified in the property register. It is not necessary to present the total of the areas of cadastral parcels in the property register, since - besides the copy from the property register - an extract from the real estate cadastre is required for every operation related to the transfer of the rights to this property. It contains areas of particular parcels.

4. **Proposition of changing**

Considering that the warranty of reliability of property registers does not prevent the records in the section I-0, concerning in column 4 the documents included in the real estate cadastre - data concerning the way of use (column 5) and the area (column 6), which are presented in another public register, should not be repeated in the property register. If the property register prevents, by the warranty, records concerning the ownership, it may be the basis for establishment of the legal status of the property with respect to the material rights only. Presentation of information concerning the area and the way of the use, as well as the necessity to update this data in the property registers results in the data redundancy, in development of administrative procedures and it creates the probability to make errors in the process of transferring information between two registers.

Problems resulting from presentation in the property register of data which is not covered by the warranty of verity, which should be the responsibility of the body which maintains the real estate cadastre, often occur in proceedings related to division of properties. The ordinance of December 7, 2004 on the methods and ways of division of real estates assigns the higher priority to the documentation included in the property registers and other documents which specify the legal status of properties, than to documents, which determine the real course of borderlines - included in the real estate cadastre. At the same time, the copy of the cadastral map, included in the documentation of the property register, cannot be - due to technical reasons connected with the accuracy - the basis for approval of boundaries. In the case when inconsistencies between data presented in the real estate cadastre with data included in the property register, the boundaries of the property, which is to be divided, should be assumed on the basis of data presented in the property register (in accordance with the ordinance of December 7, 2004 on the methods and ways of division of real estates). This regulation, which reverses the legal order, resulting from the Act of July 6, 1982 on Property registers and mortgage, should not never be included in legal regulations.

In order to solve the discussed problems, I do recommend to implement the following variants:

1. The temporary variant. Only the cadastre is responsible for designation of a property. The property register is responsible only for the legal status with respect to the establishment the subjects of rights. Connection of the cadastre, which would present cadastral parcels, with property registers, which would record land properties, consisting of cadastral parcels, would be performed by means of:

- presentation of the number of the property register in the cadastre (without the need to enter the data about the owner, who is listed in the property register),
- presentation of numbers of cadastral parcels, included in the land property in the property register (without the need to enter the data on the areas and way of use, which are presented in the cadastre).
II. The final variant. Connection of the institution of the cadastre and property registers. The present definition of the real estate cadastre cannot be fully justified, since the cadastre presents cadastral parcels instead of real estates. The cadastre should be the public register, which would ensure the following three, mutually independent warranties of reliability:

1. The warranty of reliability of determination of point location and the course of borderlines.
2. The warranty of reliability of the legal approval of the course of borderlines.
3. The warranty of reliability of the status of material rights and encumbrances.

The issue whether it would be reasonable, in the case of this variant, to continue to maintain two territorial objects in legal proceedings, i.e. the cadastral parcel (a unit specified in the cadastre) and the land property (a unit consisting of at least one cadastral parcel, presented in the property register) remains for further discussions.

5. Conclusions

The following data is required for connection between the cadastre and the property registers: in property registers - numbers of parcels included in the cadastre, and in the cadastre - numbers of property registers.

It is not necessary to present other data in both registers, except for this data, which are required for connection of two registers - since it results in data redundancy and creates the possibility of errors - inconsistencies between the same information included in two various registers.

Elimination of data redundancy is advantageous due to simplification of administrative and civil procedures - elimination of the necessity of notification concerning changes in data, which are unnecessarily recorded on two public registers.
11. TRANSITION OF 2D CADAstral OBJECTS INTO 3D ONES – PRELIMINARY PROPOSAL*

Abstract

The 3D cadastral ideas have been very popular recently all around the world. They are also getting attention in Poland. The author proposes three dimensional (3D) cadastral objects, basing on the existing ones, that are “Cadastral Parcel”, “Building” and “Premises”. “Cadastral Parcels” and “Buildings” objects of Polish cadastre have been used to propose new three dimensional objects. For “Premises”, it was suggested to focus on its visualization basing on experiences from other countries. The ISO 19152 “Land Administration Domain Model ” is suppose to be helpful in these works, as a reference model. Its application is also required in some way by INSPIRE Directive.

Keywords: 3D cadastre, ISO 19152, LADM, UML.

1. Introduction

We can assume that interest in 3D cadastre received wide popularity since the first international workshop on 3D cadastre, that took place in Delft, in November 2001 (WWW, 2001). According to the later opinion of its organizers, rising this subject in 2001 was premature, if we take into account technical, organizational conditions and knowledge popularization. The second international workshop concerning 3D cadastre was organized also in Delft, in November 2011 (WWW, 2011). It revitalized discussion on multidimensional cadastre, in both cadastre and GIS communities around the world. Since then, the third workshop on 3D cadastre took place in Shenzhen, in October 2012. The sessions concerning 3D cadastre have been organized at FIG conferences, as well. Many papers having influence on 3D cadastre development have been published recently. They describe either general solutions or give answers for particular countries. The country solutions are too numerous to mention them. If we mean general researches, the important ones seem papers concerning both 3D cadastre and Land Administration Domain Model (Thomson and van Oosterom, 2012) and (Ying S. et al., 2011) and the paper concerning definition of valid 3D parcels (Thomson and van Oosterom, 2012). The very interesting survey concerning 3D cadastre around the world was described in (van Oosterom et al., 2011).

Researches on 3D cadastre are also conducted in Poland. The problems of 3D cadastre objects registration including rules and possible data sources in Poland were described in (Karabin, 2011) and (Karabin, 2012). The present state of cadastre in Poland, situations where 3D cadastre introduction seems necessary and preliminary possible scenarios for future 3D cadastre developments in Poland were presented in (Bydłosz, 2012a) and (Bydłosz, 2012c).

2. The Land Administration Domain Model

Works concerning ISO 19152 “Land Administration Domain Model” (LADM) have been conducted since the FIG congress, that took place in Washington in 2002. In 2008, FIG proposed Land Administration Domain Model in the Technical Committee 211 of International Organization for Standardization (ISO). Land Administration Domain Model received status of Draft International Standard in December 2009 and was formally published by ISO on the 1st of December 2012 as ISO 19152 (LADM, 2012). The Land Administration Domain Model has been also proceeded in European Committee for Standardization (CEN) and became a European standard as well.

The Land Administration Domain Model is a descriptive standard. It provides the reference model that is supposed to serve two targets (LADM, 2012). One is providing the extensive basis for development and refinement for efficient and effective land administration systems, based on Model Driven Architecture, while the other is to enable involved parties, both within one country and between different countries to communicate.

The Land Administration Domain Model is a conceptual schema, written with Unified Modelling Language (UML) notation. It is performed according to ISO 1900 series standards methodology. The Land Administration Domain Model is based on four basic classes.

They are class LA_Party (instances of this class are parties), class LA_RRR (LA_RRR subclasses are rights, restrictions and responsibilities), class LA_BAUnit (instances are basic administrative units) and class LA_SpatialUnit (having spatial units as instances). The classes of
LADM are grouped in four packages. They are Party Package, Administrative Package, Spatial Unit Package plus Surveying and Spatial Representation Subpackage.

The most significant class concerning 3D situations seems to be LA_SpatialUnit. Instances of LA_SpatialUnit are spatial units. The spatial unit is the single area (or multiple areas) of land and/or water, or a single volume (or multiple volumes) of space. The spatial unit can be 2-dimensional (2D), 3-dimensional (3D), or mixed (2D and 3D) one (figure 1).

The class LA_LegalSpaceBuildingUnit is destined to represent legal spaces concerning buildings. The class LA_LegalSpaceBuildingUnit is a subclass of LA_SpatialUnit. Classes LA_SpatialUnit and LA_LegalSpaceBuildingUnit and connection between them are shown on the figure 2.

Figure 1. Top and slide views of mixed 2D and 3D representations (source: (LADM, 2012)).
The 3D parcels can also be represented by volumes, that have non vertical boundaries. In such cases the boundary face strings may be used for boundary representations. Such a representation let us to describe various real 3D objects. For example, we can describe objects having wider top than bottom using boundary face strings. The concept of boundary face string is presented on the figure 3.

![Figure 3. Boundary face string concepts (source: (LADM, 2012)).](image)

The Land Administration Domain model also includes mixed spatial profile configurations. The 3D topological based profile is among them. This profile include pure 3D topology structure. The instance of 3D spatial unit is also given in informative annex of LADM.

The European Union member states are obliged to implement the Directive establishing an Infrastructure for Spatial Information in the European Community (INSPIRE, 2007). According to the article 7 of the Directive, implementing rules laying down technical arrangements for the interoperability and, where practicable, harmonization of spatial data sets and services, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted. The international standards, that are in favour for the harmonisation of spatial data sets shall be taken into account in the development of implementing rules. Moreover, where organizations established
under international law have adopted relevant standards to ensure interoperability or harmonization of spatial data sets and services, these standards shall be integrated, and the existing technical means shall be referred to, if appropriate, in the implementing rules mentioned in this paragraph. So the ISO 19152 should be taken into account, when building the 3D cadastral system in European Union Countries. The 3D cadastre aspects in international standards and legal acts are described in (Bydłosz, 2012b).

3. The cadastral system in Poland and its objects (including UML description)

There are two systems containing information on real estates in Poland. The first is the Land Register, whereas the other is the Cadastre for Grounds and Buildings.

The Land Register in Poland (The Act, 1982) captures, keeps and reveals information concerning legal objects (real estates). This information generally concerns description and designation, rights, responsibilities and restrictions (including mortgage). The Land Register is managed by the courts of law. The Land Register objects in Poland are mainly real estates. The real estate may consist of land parcels, buildings or premises. The most typical real estate includes land parcel (parcels) and building (buildings).

The Cadastre for Grounds and Buildings (The Act, 1989) data are mainly objects spatial description, cadastral objects attributes, values and corresponding official documents. The Ground and Building Cadastre is managed by the local authorities at the county (powiat) level. The Ground and Building Cadastre objects are cadastral parcels, buildings and premises being separately owned estates. The most common cadastral objects are land parcels. The cadastral objects definitions in Poland are as follows:

- The cadastral parcel – continuous area of land, situated in one cadastral precinct, legally homogenous, separated from surroundings with boundary lines.
- The building – it is such the building construction, that is permanently attached to the ground, separated from space with separating barriers. It has foundations and roof. Buildings are the roofed objects, that have built-in installations and technical devices, used for permanent human needs. They are adopted for staying of people, animals and protection of property.
- The premises are independent dwellings used for housing or other purposes. Independent premises consist of room or set of rooms, separated by permanent walls contained within one building, that are intended for human residence and together with auxiliary spaces meets their housing needs.

We can distinguish several types of real estates being either single object or the set of cadastral objects with relations between them. They are:
- cadastral parcel or set of parcels,
- cadastral parcel and building (the same owner),
- cadastral parcel and building (different owner) – parcel and building connected with long-term lease (perpetual usufruct) right,
- premises being separately owned estates – such premises consist of apartment (or other non residential area) itself, share of ownership in common parts of building and share of ownership in the cadastral parcel,
- premises being separately owned estates, when building is connected with cadastral parcel with long-term lease right – such premises consists of apartment (or as above) itself, share of ownership in common parts of building and share of long-term lease right to the cadastral parcel.

The schemas of Polish cadastral objects definitions (parcel, building and premises) are presented in the draft version of new order on ground and building cadastre (The Order (draft version), 2013). They are prepared applying Unified Modelling Language (UML) notation. The source of Cadastral Parcel, Building and Premises UML schemas is the Order of Ministry of Administration and Digitization changing the order on grounds and buildings (draft version from 20th of February 2013) and the translation of Polish names into English is done by the author. The “Cadastral parcel” in UML schema is shown on the picture 4.
The cadastral parcel (2D) schema in UML (source: The Order (draft version), 2013)

The object “Building” of Polish cadastre is shown on the picture 5.

The object “Premises” in UML is presented on the picture 6.
4. Possible options for realization of creating 3D cadastre in Poland

Two possible options of building 3D cadastre in Poland seems likely for realization. The first one is “transferring” existing objects (having two dimensional description presently) of present cadastre, into three dimensional objects. The second choice is creating new cadastral objects. The more acceptable way seems the first option, for it is possible to use already defined objects, which are cadastral parcel, building and premises and then use already existing data from present cadastral databases. Five options for realization of 3D cadastre are known in the literature (www, 2012). They are:

- Minimalistic 3D Cadastre.
- Topographic 3D Cadastre.
- Polyhedral Legal 3D Cadastre.
- Non-polyhedral Legal 3D Cadastre.
- Topological Legal 3D Cadastre.

The Minimalistic 3D Cadastre option for realization may be the simplest way possible, but in author’s opinion in today’s stage of knowledge, it is better to develop more sophisticated and thus having better functionality 3D cadastre. The realization of Topographical 3D cadastre option is not supposed to be an issue, for the topographical and cadastral objects in Poland differ. Apart from that, the premises are not the objects of topographical database in Poland, so they cannot be applied in cadastre deriving from there. The Polyhedral Legal 3D Cadastre seems quite reasonable, when taking into account both, scope of data managed in the polish cadastre, and biding regulations. The Non-polyhedral Legal 3D Cadastre option of realisation seems also not probable, since Polish legal regulations do not usually refer to very sophisticated objects description, for example non-linear. The Topological Legal 3D Cadastre appear also as not possible to implement in Poland, because of its complication and not sufficient present technological solutions.

As it is stated above, according to the author, the Polyhedral Legal 3D Cadastre seems a the only possible option for realization in Poland. However, it seems necessary to supply the Polish legal regulations with new definitions concerning the 3D situations. Some restrictions concerning polyhedrons may be necessary, as well.

4.1. Land parcels

The author suggests the new definition of a cadastral parcel (3D), where polyhedron can be restricted to the right prism. Such parcel being the right prism can be placed overground, underground or possibly both ways. In such definition the parameters $H_o$ (height overground), $H_u$ (height underground) and $V$ (Volume) should be added to the UML definition of parcel. Of course volume can be obtained from $H_o$, $H_u$ and area of the base, but giving such parameter is helpful in better understanding the object attributes. In the transition period when we have mixed representation of 2D/3D parcels such attributes may be voidable, for some values may be missing. Such an extending of cadastral parcel definition into 3D cadastral parcel should also have some restrictions especially resulting from Geological and Mining Law (The Act, 1994) concerning underground part of parcel and Airspace Law (The Act, 2002) concerning overground parcel part.
Therefore some constraints concerning maximum heights of underground and overground parts of parcel are added to the 3D parcel definition. The other constrain, is that the parcel cannot be suspended in space. It is recommended in the first stage of building 3D cadastre objects. Parcels having only subterranean part should not be allowed at first. This situations seems not very complicated, when we have parcels within not built-up areas.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure7.png}
\caption{The 3D Cadastral Parcel (only additional attributes and constraints) schema in UML (source: own work)}
\end{figure}

Such a new concept of 3D cadastral parcel may interfere with some present legal regulations in Poland. This new concept of 3D cadastral parcel have influence on definitions of rights, restrictions and responsibilities that may be connected with the parcel. The idea of land parcel definition is certainly open for discussion and some corrections are possible.

4.2. Buildings

In real word buildings are obviously 3D objects. There are generally two types of buildings in Poland if we take the same or differing ownership with land as a criteria. The most typical situation is when the owner of the building and the land is the same. The other case is when land parcel and the building have different owners. It usually happens when the owner of the building has the long term lease (perpetual usufruct) right to the ground.

In the first case the situation is simpler. The more complicated issue is describing it in 3D. Two possibilities appear here. The first is to remain land parcel as 2D object, and create 3D object - building. The second possibility is to create both land parcel and building as 3D objects. The new issue that appears here are relations between 3D land parcel and 3D building.

In the case with different ownership, the solution may be the same, but the parcel will be connected with building with the long term lease right. In the first stage of introducing the 3D cadastre, it is recommended that modelled object is the right prism, like the cadastral parcel. Some constraints are necessary here – the base of 3D building is vertical projection of building contour into the horizontal plane (ground level) and the height overground (Ho) of the object is the distance from the building base (bottom) to the building highest point. The height underground (Hu) is the distance from building base to the building substructure. Such a simplified definition of 3D building may cause interlacing of objects in space. Such problems should be solved in next stages of works on 3D cadastre.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure8.png}
\caption{The 3D Building (only additional attributes and constraints) schema in UML (source: own work)}
\end{figure}
4.3. **Premises**

The real estate premises consists of apartment itself, the share in the common part of the building and the share in the ground. It is also a real world object. As it is listed above premises consist of apartment (or other non residential area) itself, share of ownership in common parts of building and share of ownership in the cadastral parcel or share in long-term lease right. The author did not see necessity to suggest the new cadastral object basing on premises. Of course we can consider adding some parameter like heights of rooms or volume of premises and registration of some additional spaces like loggia, balcony and so like, but it can be done in later developments. The main issue concerning premises seems to be their visualization. Obviously, it seems worthy to use other countries experiences. The interesting idea seems the 3D cadastre project pilot, performed in Russia in the city of Nizhny Novgorod, where the very interesting solutions concerning 3D premises registration and visualization were developed (Vandyshcheva et al, 2012). There are also some other solutions that may be taken account, for example from the Netherlands (Stoter et al, 2012) and Sweden (Paulsson, 2012). Researches from Korea (Jeong et al, 2012) and China (Guo R., 2012) are also worth consideration, taking into account that such countries are much more densely urbanized.

5. **Recapitulation**

Building 3D cadastre seems not an easy task. The author suggest to start this, basing on existing objects of Polish cadastral system which are cadastral parcel, building and premises. We can create new three dimensional objects basing on both cadastral parcel and building, although this is not so simple and needs a lot of further work. It seems not necessary to built the new 3D cadastral abject, basing on premises, but much work must be done for premises proper visualization, where we can benefit from experiences gained from other countries. The new standard ISO 19152 “Land Administration Domain Model” should be taken into account there.

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