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Allotment gardens and spatial development – two case studies from the Katowice conurbation, Poland

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ABSTRACT

Allotment gardens are a characteristic feature of the industrial landscape of Upper Silesia. The purpose of the study has been to present various aspects of allotment location in the urban landscape. A more than a 100-year-old development process has shaped the contemporary structure of the allotments which constitute a multi-functional part of the development. In the historical development, there have coexisted the following functions: economic, recreational, ecological, landscape and socio-educational. Under the existing administrative restrictions, they were developed as a result of an unfavourable economic situation and focused on food production. Allotment gardens usually developed without the interference of urban planners, which had, and still have, many organizational consequences. Distance from the centre is the main factor influencing the spatial distribution of allotment gardens in urban areas. The detailed location is determined by the environmental conditions and administrative decisions that are usually taken, albeit under pressure, due to the high demand for allotments. Distance-related profiles demonstrate the relationship between the distance from the centre and the share of allotments in the land surface as well as the size of the time-space changes resulting from the development of the city. In many cities, there are concentric concentration zones at a certain distance from the centre. Analysis has shown that allotments are quite clearly linked to the structural units of the city. Larger concentrations are formed on the outskirts of residential multi-family buildings. The results of the research confirm compliance with the design recommendations that the distance should not cause too much time loss for users.

KEY WORDS: land management, urban landscape, Upper Silesia

1. Introduction

An allotment garden is a plots of land made available for individual, non-commercial gardening or growing food plants. Such plots are formed by subdividing a piece of land into a few or up to several hundreds land parcels that are assigned to individuals or families. The first allotment garden was established in Copenhagen in 1891. At present, allotment gardens are a characteristic element of the landscape of many cities, mainly in Europe - in Denmark, Germany, Great Britain, France, the Netherlands, Norway, Sweden, Finland, Portugal, the Czech Republic, Slovakia, and Poland. *The Office International du Coin de Terre des Jardins Familiaux* describes the socio-cultural and economic functions of allotment gardens as follows: a better quality

of urban life through reducing noise, binding dust, making open green spaces in densely populated areas; conserving biotopes and creating linked biotopes; a meaningful leisure activity and the personal experience of sowing, growing, cultivating and harvesting healthy vegetables among high-rise buildings and the concrete jungle; relaxing from the stress of work; a place to communicate with people having the same interests and an opportunity for self-fulfilment during retirement. Allotment gardens have been the subject of many scientific studies in the field of urban and landscape planning, landscape management, environmental protection, horticulture, agriculture, pedology, and other (THORPE, 1975; GRAHN, 1985; BURGESS ET AL., 1988; DRESCHER, 2001; CHIESURA, 2004; HURSTHOUSE ET AL., 2004;

CROUCH & WARD, 2007; RUBINO, 2007; VAN DEN BERG ET AL., 2010).

The purpose of the study is to present the current status of allotment gardening in the Katowice conurbation, while taking into consideration historical development. It also aims at the presentation of the issue of the allotment location in the urban area, with the focus on the process characteristics and the dynamics of change over time. The analysis covers various aspects of the spatial distribution of allotments in the Katowice conurbation and their place in the changing social and economic situation. An important goal of the research is also a description of urban planning as well as organisational problems related to the evolution of allotment gardening.

The province of Silesia is the most populated, as well as the most industrialised and urbanised region in Poland. On an area of 12.3 thousand square kilometres, there are 71 cities, including 12 with more than 100,000 people. The scope of research covers the central part of the province with cities that form the biggest population called the Katowice conurbation (Fig. 1). The core part is inhabited by 2083.7 thousand people and comprises 16 cities, including 14 with the county rights (KRZYSZTOFIK, 2008). It is characterised by the continuity of the urban administration area with a high population density (1640 people/km²) and a large concentration of high level investment areas (technical use of land) that make up 36.6% of the whole area.

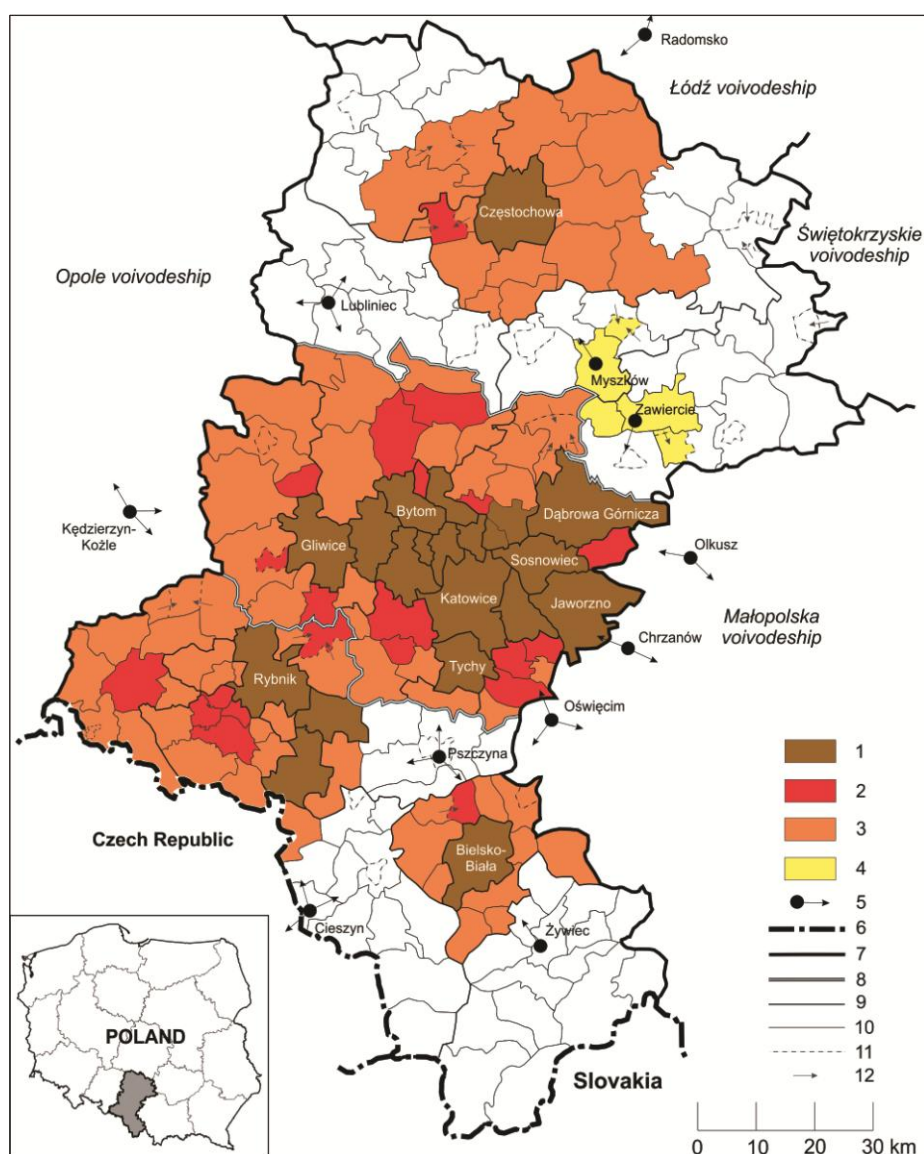


Fig. 1. Urban agglomerations of the Silesian voivodeship. Spatial-administrative structure (by Krzysztofik, 2008)
 1 - core of agglomeration or conurbation; 2 - inner-zone of agglomeration or conurbation; 3 - outer-zone of agglomeration or conurbation; 4 - other agglomerated unit; 5 - subregional town and directions of gravitation to the nearest agglomerations; 6 - boundary of Poland; 7 - voivodeship boundaries; 8 - Katowice conurbation boundaries; 9 - district boundaries; 10 - community boundaries; 11 - boundary between the rural and urban area of the urban-and-rural community; 12 - membership of the rural area to the urban-and-rural community

In 2011, in the studied area, there were 391 allotments that covered 2,764 ha, which constituted 2.2% of the registered space. In this small area, 6.4% of allotments and 7.2% of allotment users in Poland are concentrated (POLSKI ZWIĄZEK DZIAŁKOWCÓW, 2011). Garden plots are cultivated by 69.1 thousand people, which makes up 10.9% of the total number of households in the Katowice conurbation.

2. Material and research methods

Research material used in this study is based on both published and non-published statistical information, research articles and other scientific publications, official documents and historical maps. Different time-frame reports from The Provincial Board of Employee Allotments as well as from the Polish Association of Allotment Owners in Katowice, set up in 1981, were an important source of information. The subject-related bibliography is also very scarce. The issues concerning allotment gardening are usually touched upon in older studies, but rather of marginal interest by authors from different scientific disciplines, mainly urban studies, geography, urban planning, social studies or ecology. Depending on the time frame, they cover only some aspects of the interest area of the publication authors.

The basis of the research is the empirical material collected for four time periods (1939, 1958, 1981, 2011), the choice of which was partly determined by the available information (map publication, statistical data), but at the same time they are also crucial dates in the evolution of allotments. Because of the great dynamics of the phenomenon, each of the time frames demonstrates crucial changes in the spatial development process. Cartographic material was based on topographic maps on a 1:25,000 scale and city plans from different times, which helped in the identification of the allotment space.

The undertaken study required the invention of the idea, the nomination of the research hypotheses and the collection of the information that was necessary to execute the goal of the dissertation. To determine the existing regularities related to the location of the allotments, as well as the time-and-space changes, a method of distance from the city centre was used, where the physical distance from the city centre was set as an independent variable. From a point that was the centre of the historical development, circles of a 0.5 km radius were drawn inside of which both the area and the share of gardening allotments for the chosen time frames were calculated.

3. From the past of allotment gardens

Since the old ages gardens have been a crucial element in the function of the city. Their main role was to provide food supplies and they were usually located in close proximity to the city yet seldom in the city itself. Changes resulting from the industrial revolution as well as from urban processes led to the deterioration of hygiene in the cities, which forced the development of the green areas (TOŁWIŃSKI, 1963; CZARNECKI, 1968; GASIDŁO, 2007; MAJDECKI, 2008). Garden allotments set up in the quickly developing industrial cities were to form a gardening foundation that was available for more inhabitants. They were also the only natural element of area development because the process of creating public parks was very slow.

The contemporary status of allotment gardening was shaped by two trends; feeding and recreation functions, which were the main reasons for setting up allotments. Feeding and economic functions had the biggest impact, as almost throughout the whole historical development process, the basic role of allotments was to deliver provisions to the owners (ARNHOLD, 1959-1960; RILEY, 1979; DUŚ, 1993; GASIDŁO, 2007; PAWLKOWSKA-PIECHOTKA, 2009; MATCZAK & SZKUP, 2010). Under huge social pressure, during economic crises, but especially food crises, land owners tolerated the taking over of land for the development of new allotment colonies.

In Upper Silesia, a majority of the allotments before the World War II were set up on land from the industrial communities, which granted the garden plots to their employees to let them grow vegetables and potatoes. It was a form of charitable activity, the purpose of which was to improve the economic situation of the employees and to strengthen the relationship between the employee and the employer at the same time. These gardens were poorly invested and the temporary character of the location was a destructive factor in the proper development of the garden allotment idea. Factories, very often land owners, were not always interested in setting up permanent garden allotments. For example, in 1939, 53% of gardens located in the Silesian Province had lease contracts for a period shorter than 5 years, and they were extended each year. Only a few allotments could exist for more than 20 years, which constituted a relatively durable, better equipped and used urban element (DUŚ, 1990). They had day rooms where summer semi-camps were organised for children from poor families.

The difficult food situation which continued after the World War II, and the tradition of garden plots cultivation during the war raised the demand for allotments. Significant growth was possible thanks to the allocation of parcelled land taken from industrial societies for gardening purposes. Also during 1980-1990, a period of serious food crisis, a significant growth of allotment areas was noted. Since then, a quantity status of allotment gardening has clearly stabilised.

In over a hundred-year-old development process, a contemporary form of urban gardens has evolved and they are now a characteristic feature of the industrial landscape of Upper Silesia. Gardens are a multi-functional element of the urban landscape, and changes in the usage of individual hobby gardens as well as in the cultivation of gardens are the reflection of the important role that they fill (DUŚ, 1992). Five fundamental functions of allotments coexisted in Upper Silesia, namely: food and economic, recreational and health, ecological, landscape and socio-educational. The evolution speed of particular functions and their importance depended on the origin and development conditions in various areas and time periods. A limited scope of this study makes it impossible to even roughly present the diversity existing in the past.

The progressing socio-economic transformation led to gradual changes in the way urban gardens were cultivated and garden plots used. In this long-term process, there has been a clear tendency for a gradual reduction of edible crop, especially vegetables. In 1980, vegetables occupied an average of 25.0% of the allotment area, and in 1993, only 8.4% (DUŚ, 1993). The amount of vegetables produced decreases with the increase in the duration of allotment usage. For example, in the oldest garden in Upper Silesia called "A. Czarnecki" in Chorzów, the share of vegetables grown in the years 1980-1995 decreased from 19.9% to 3.8%, and at the same time the areas with flowers increased from 16.3% to 24.1% (DUŚ, 1996). The existing trend in the cultivation of garden plots is highly desirable due to soil and plant pollution, with compounds harmful to human health (KUCHARSKI, 1988).

A switch to a recreational form is an alternative way of using garden plots. Currently, both in the old and the new gardens, one can see a well maintained lawn with more and more planted trees and decorative flowers. The construction of bigger and more comfortable arbours and houses is a visible sign of the recreational use of hobby gardens, though it sometimes contradicts the idea of allotment gardening and its organizational rules.

4. Problems of allotment planning and location in urban areas

Either a lack of, or insufficient scope of laws regulating legal status were an obstacle to the proper development of the allotment gardening idea throughout time. The first law passed on 9th March 1949 was an act on employee allotments, and the implementation acts that described the rules of design, development and operation passed in the following years. The act on The Employee Allotments from 6th May 1981, and the Polish Association of Allotment Users established on its basis, started the process of organizing the legal status connected with the use of land and fixed assets. As a consequence of the statutory regulations, the Union took sole patronage of a large group of gardens belonging to companies. Political transformations in Poland after 1989 required new regulations described in the act on family allotments from 8th July 2005. Some regulations were questioned by the Constitutional Court which demanded new solutions by end of January 2014.

In the Katowice conurbation, the legal status was complicated by bad location decisions taken previously, as well as by the changing land use due to the coal mining industry. A significant growth of the acreage as well as limited investment led to the insufficient level of equipment of allotments. From the current point of view, the unfavourable organizational solution, quite common in Poland and other countries in the past, was the development of sponsored urban gardens, which limited their multifunctional character to a certain extent. This has caused a lot of legal ownership and social problems, as restructuring processes have changed the character of company workers and no longer guarantee the stability of the allotment worker-user relation (MATCZAK & SZKUP, 2010; DUŚ, 2011). Land belonging to companies is an indivisible asset, the separation of which is a serious problem in the case of allotment users who are no longer company employees. On one hand, companies treat the owned land as part of business, but on the other, they want to get rid of land that is considered a redundant part of the business.

The location of allotments in the urban environment has been an issue since the beginning, which is a result of the conflict between their multifunctional character and urban development needs. Areas for allotment gardening are taken into consideration during urban planning, and when they are missing, city governments choose them. Missing land-use development plans made it difficult to prepare

documentation and obtain a permanent location. Gardens should not be treated as temporary, as this will also have a negative effect on the way they are used. Such gardens sometimes constitute a significant part of the city (GROCHOWSKA & PLIT, 1985; LUCHTER, 1990). Regardless of the character, the gardens were subject to disappearance throughout their evolution process, which resulted in various conflicts with investors.

Up till now, the development of allotment gardening has been set up in such a way that it led to liquidation through expropriation and allotment user protests during the times of dynamic economic development. At the same time, there appeared offers of new areas in more remote, and in generally less favourable locations (DUŚ, 1990; PAWLKOWSKA-PIECHOTKA, 2009). Officials and urban planners have always been reluctant to the idea of allotment gardening because of its poor appearance and limited functional value as an area of recreation for city inhabitants. In some cases, gardens once located on the outskirts of the city, because of their location, utilities and commuting availability, have become an important and valuable area with strong interest from investors. On one hand, under the pressure of urbanization and under the current economic conditions, it is difficult to prevent the land use transformation in the most attractive locations. On the other hand, family hobby gardens are protected by the law as described in the regulations on the protection of farm and forest land as well as environmental protection.

Planning rules (WEJCHERT, 1969; PIĄTKOWSKA, 1972; LENDHOLT, 1975; ORZESZEK-GAJEWSKA, 1982) used in the location process promote the idea of counting allotments as part of the green recreational areas connected with a particular unit of the city. They may be a part of a housing estate park or sports centre, or a wedge splitting residential areas. According to the planners, there is no concept defining the future of allotments in the structure of the Katowice urban conurbation, their role, and location in space in particular. The structure has been changing constantly, hence the different needs and different social pressure. A broader context of regional development, in relation to the environmental aspects and food economy in the contaminated and polluted areas, as well as housing issues and social policy have not been considered (KAMIŃSKI, 1988; DUŚ, 1993). Ecological conditions spoke for the liquidation of some gardens, even though it would have been against the need to improve sanitary conditions of the environment and, contrary to the widespread support for the idea of the allotment gardening movement.

Allotments are an integral part of the city settlement system and in most cases they are located near residential areas. Easy access from the house determines the greater scope of their functions, as it extends the range of users to a group of people with small children and with reduced physical ability. It also increases the frequency of staying at the allotments, which enhances their recreational and ecological values. Excessive distance reduces the scope of their functions and increases the burden of commuting in the city. The author's study shows that 54% of allotment owners have gardens located less than 1 km from the place of living, which is in line with the range set by the 15-minute isochrone based on walking. On the other hand, 10% of users have garden plots located just over 3 km from their houses.

Allotments show a high level of concentration in the area of big investment in the cities of the Katowice conurbation (DUŚ, 1990, 2011). One can thus put forward a hypothesis that allotments should occupy a place in the urban landscape that allows them to fulfil multiple functions at the same time. Their convenient location, close to residential areas, is a result of a little compacted and relatively diversified settlement system, since in the past, many settlements developed as separate units which were incorporated into the administrative borders of bigger cities. Their specific location was determined by administrative decisions, usually taken under pressure, due to the high demand for hobby gardens and terrain conditions.

5. Allotment gardens in the Katowice conurbation

Cities with a dominant industrial function are characterized by a green area structure with a predominance of hobby gardens (ZIÓŁKOWSKI, 1960; LISZEWSKI, 1973; PAWLKOWSKA-PIECHOTKA, 2009; MATCZAK & SZKUP, 2010). Allotments with a share of 23.3% occupied the main position in the structure of green area in Krakow, whereas in the 1980's they noted a three and a half fold increase in space (LUCHTER, 1990). In the cities of the Katowice conurbation they dominated the structure of green spaces in the twentieth century, and now, with a share of 46.3%, they are often the main element. Bytom, Gliwice, Zabrze and Piekary Śląskie note the highest rates of approximately 70%. Some authors suggest changes to the existing disproportions by reducing the area of allotments in urban conurbations (TCHÓRZ, 1977). From an ecological point of view, allotments make up an

efficient complex which requires a bigger green territory to maintain the state of the environment at the current level. This, in turn, requires increased investment in the care and the processing capabilities of municipal services. Another effect could probably be lowering the quality of the urban greenery. Thanks to the existence of allotments, the municipal economy is relieved from maintaining large areas of green spaces in the cities.

In the years 1981-2011 there was an increase, by 26.4%, in the garden area of the Katowice conurbation. The highest growth was recorded in Sosnowiec – 62.3% and in Gliwice and Tychy, approximately 53%, while in other places growth did not exceed 30%, compared to 1981. In most cases, it was the growth from the 1980's, which was a result of the crisis, especially on the food market, and which has so far been a general rule in the development of allotment gardening. More dynamic growth was observed in the cities located in the outer zone of the conurbation, where local authorities had more non-invested land. In the 1990's, cities located in the central part of the conurbation generally noted small declines in land areas, which supports the thesis that during times of economic stability, an interest in allotment use decreases. This trend is likely to continue in the future as a result of the reduction process of free land availability for this purpose.

In the Katowice conurbation, allotments occupy 2.2% of the city area, although this percentage varies widely in the range of 0.5% in Dąbrowa Górnicza to 6.3% in Chorzów. High rates are noted in Czeladź – 4.6%, Siemianowice Śląskie – 4.5%, Zabrze – 4.3% and 4.0% in Sosnowiec and Świętochłowice. These cities are characterized by the small area they occupy, strong technical investment and a relatively high population density, which indicates a high level of urbanization. A high correlation coefficient ($r_{yx}=0.94$) between the population density and the spatial distributions of urban gardens in the urban area supports the hypothesis that allotments are a consubstantial element of the urban-industrial land usage. The number of inhabitants is the main factor for their location in the Katowice conurbation. The correlation coefficient ($r_{yx}=0.82$) between these characteristics slightly decreases over time, but it still remains highly significant from a statistical point of view. In 2011, the largest area of 398.56 hectares was occupied in Gliwice, and in Sosnowiec, 367.98 ha. The lowest in was in Świętochłowice – 53.48 hectares, and in Mysłowice, 61.19 hectares.

The study area is characterized by an uneven spatial distribution of allotments, which is reflected

by a considerable number of indicators ranging from 22.2 square metres in Czeladź and 20.7 square metres in Gliwice, to the lowest value in Katowice – 6.9 square metres and 7.5 square metres in Dąbrowa Górnicza (garden area per 1 inhabitant). In 1958 the ratio was 11.0 square metres and dropped to 9.4 square metres in 1981 and increased to 13.5 square metres in 2011. A significant increase in this ratio is a result of both a very substantial growth of garden areas as well as a decrease in the population of the Katowice conurbation. There is no clear relation between the size and character of the city and meeting social needs. Lower results are usually in cities located in the central part of the Katowice conurbation.

Factors determining the spatial distribution of gardens in the past, apart from the population of inhabitants, include: the share of people living in multi-family housing, capabilities of the municipal institutions to provide land for this purpose and the share of those employed in heavy industry. The growth of multi-family housing as a result of the rapid development of the coal mining and steel industries, as well as big industrial investments in the period of real socialism, led to a significant increase in the garden land area in most cities. Economic pressure from the industry, along with the existing high social demand helped to overcome administrative barriers and acquire new land despite the scarcity of land in the centre of the conurbation. The following features of the cities play an important role: gardening traditions in the area, the age structure of the population and physiographic conditions defining opportunities for land use.

6. Results of empirical research. Case studies: Gliwice and Sosnowiec

The study takes the cities of Gliwice and Sosnowiec, which have the largest area and the highest dynamics of allotment land growth. In addition, to obtain correct results and reduce the role of the random factor, in both cases the analysis has covered the biggest number of existing and liquidated garden colonies in the conurbation. Currently, Gliwice has 97 and Sosnowiec, with its slightly smaller area, 67 colonies of allotment gardens, which are a characteristic element of the urban landscape in both cities.

6.1. Allotment gardens in Gliwice

Gliwice forms a concentric and more compact settlement structure developed around the historic centre of the medieval town, and it is

supplemented by elements of 19th century industrialization. The spatial arrangement was split by the Kłodnica River valley; the shape of the railway infrastructure, as well as urban investment, reflect this with their slight deformation in the eastern part. The city housing system is complemented by a number of smaller and more

remote settlements (Fig. 2). Compared to other cities of the Katowice conurbation, Gliwice has a larger administrative area with a big share of agricultural land in its southern and western parts, and forested areas and parks in the northern and eastern parts. Being located on the outskirts of the Katowice conurbation results in bigger open land areas.

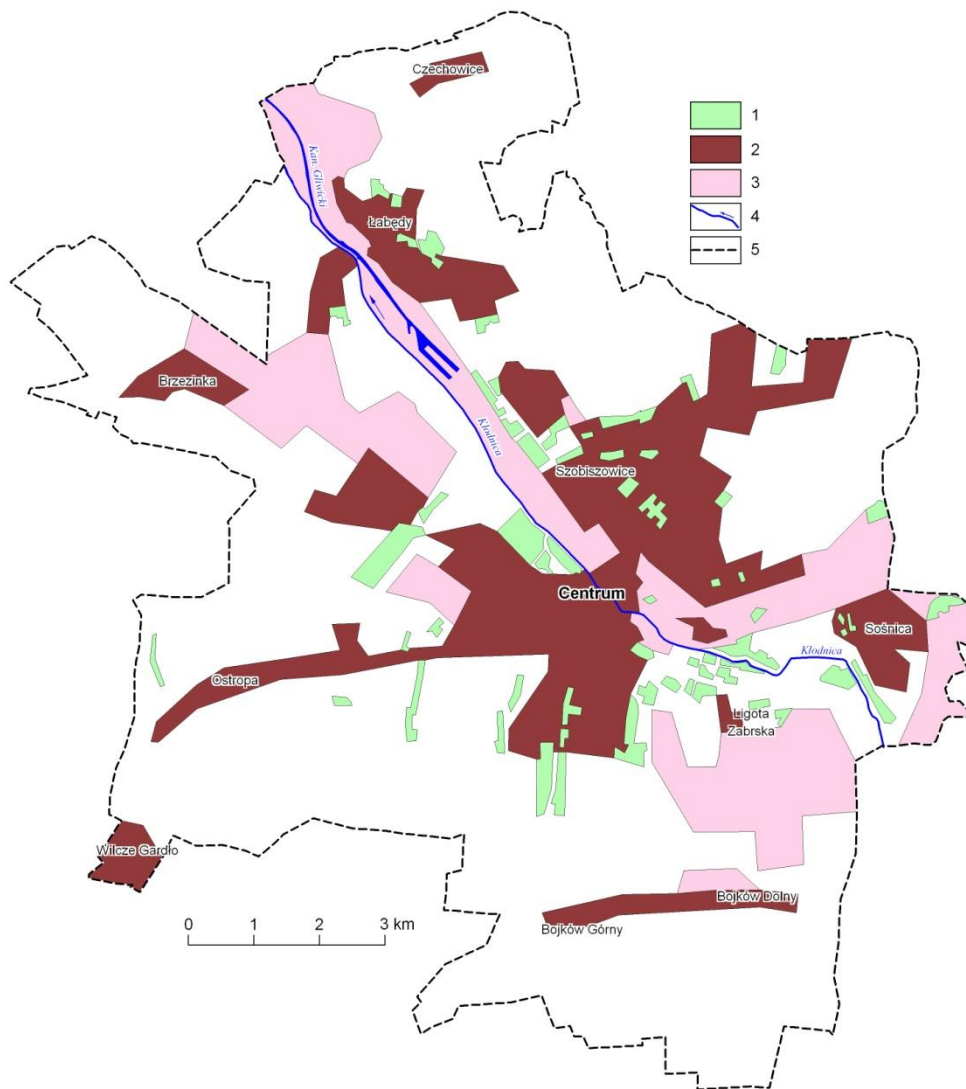


Fig. 2. Allotment gardens against the background of major forms of urban disposal in Gliwice (made by author)
 1 - allotment gardens; 2 - residential building; 3 - other areas of urban disposal; 4 - Kłodnica river; 5 - town borders

In the spatial structure of Gliwice there is a clear concentration of allotments in the Kłodnica River valley and the adjacent areas, which were sometimes areas degraded as a result of business activities. Clearer concentration areas include peripheries of the housing estates of Szobiszowice, Sośnica and Łabędy. There is a clear link between allotments with structural units of the city that form housing estates with multi-family buildings. This ensures the location of allotments at less than 1 km from the house, which is in line with better pedestrian accessibility proposed by planners.

Distance from the city centre is the main factor influencing the spatial distribution of allotments in urban areas. The profile method used in the study informs about the location of allotments and helps to determine the trends and dynamics of changes in the urban area in the analysed time periods. To obtain comparable results, the research has adopted the administrative borders of city. The spatial distribution of allotments in Gliwice shows their clear concentration within 0.5–3.0 km from the centre, especially at a distance of 2–3 km from the city centre, where they constitute over

10% of the zone area. A smaller number in the range of 5–7% occurs within 0.5–2 km from the city centre and less than 2% of the surface area in the peripheral settlements.

Changes over time demonstrate that before 1938 the zone within 0.5–1.5 km, with its share of 6%, was of the highest concentration; and in the initial phase, areas with a distance of 3 km from the centre clearly constituted a lower share of 1–2%. A clear development and concentration took place after the end of the World War II in the zone closest to the centre, where the share of the distance between 0.5–1.5 km increased to about 10%, and zones within 1.5–3.5 km from the centre had a lower share of 7–3%. A different tendency connected with big infrastructure investments took place in the years 1958–1981, when the changes involved the loss of gardens and the decline in their share in areas closer to the centre and growth in a more distant zone. As a result of the land use transformation within 2 km and the development of new ones further from the centre in the 0.5–3 km zone, there was an offset to the level of 6–7% of the land. Relatively small changes took place on the outskirts of the city. The crisis of the 1980's was the continuation of this trend, when the expansion of urban gardens took place, mainly in the zone of 2–3 km, reaching the highest level in history with a share of over 10% of the land area. But at the same time, there were no major losses that are most likely to occur with a double force during the potential prosperity phase.

6.2. Allotment gardens in Sosnowiec

The city of Sosnowiec is characterized by a relatively low settlement density, consisting of more than twenty urban areas (ZIOŁKOWSKI, 1960; SZAJNOWSKA-WYSOCKA & KULESZA, 2007; KRZYSZTOFIK ET AL., 2013). Although it is not a feature of Sosnowiec to have a concentric spatial system characteristic of the old cities, it still has a clearly formed city centre around which outer zones were formed, creating a more or less regular structure of a big city. Compared to other cities of the Katowice conurbation, Sosnowiec is characterized by a high population density and high level of investment with 42.4% share of permanent use of land, which indicates a high degree of urbanisation.

The locating of allotments in Sosnowiec took place in a slightly different way, where the largest concentration, with more than 10% occurs within 2–3.5 km from the city centre and has the shape of a ring around the core part of the city. Spatial distributions of urban gardens in the studied time periods indicate relatively high dynamics of

transformation. Due to the less concentrated spatial arrangement of the city, the initial phase in the development of allotment gardening before 1938 took place within 2.5–3 km, reaching 5% of the zone area. Throughout all the time periods, the most important feature of the spatial distribution of the gardens is the clear concentration within a distance of 2.0–3.0 (3.5) km from the city centre (Fig. 3). This is proof of the adaptation of the location to the needs of the allotment owners, as new colonies of gardens set up next to the liquidated ones filled the empty areas between existing elements of the development.

In the years 1938–1958 allotments were concentrated in the area within 0.5–3 km from the centre. In each concentric zone their share increased to a maximum capacity of nearly 13% within 2.5–3 km from the city centre. Clear growth also took place near the centre, which was part of the process of filling up the free grounds in the low-compacted spatial structure of the city.

The most significant changes occurred in the years 1958–1981, when within 0.5–3 km there followed significant losses which were slightly offset by the growth of grounds in the area of 4–5.5 km from the centre. Allotment gardens reached a maximum point and entered a recession phase; and their share decreased, though the 2–3.5 km zone remained the main concentration area. Gardens once developed in the outer zone, were constantly taken over by estates in the years 1958–1981. These changes were connected with the reconstruction of the city, mainly the construction of new housing. In the 1970's more than 20 thousand flats were built, which constituted approximately 25% of the city housing stock with the simultaneous replacement of old housing and demolition resulting from the reconstruction of transport infrastructure.

A significant growth of land in the peripheral area took place after 1981. 140 ha of new gardens appeared, which was the biggest growth rate among the cities of the Katowice conurbation. The share of gardens increased again to 10–11% in the 2–3.5 km zone, and to 8–9% in the 4.5–5.5 km zone and slightly less than 2–5% within 5.5–7 km from the centre. In the spatial arrangement within 4.5–6.5 km there has emerged another semi-circular area with a high concentration of more than 7% of allotments. It was the area of the most numerous garden locations in close vicinity to the new housing estates as well as a clear extension of the area of their spatial distribution. As a result, there has been a significant shift of the allotments to the outside of the urban estate setting.

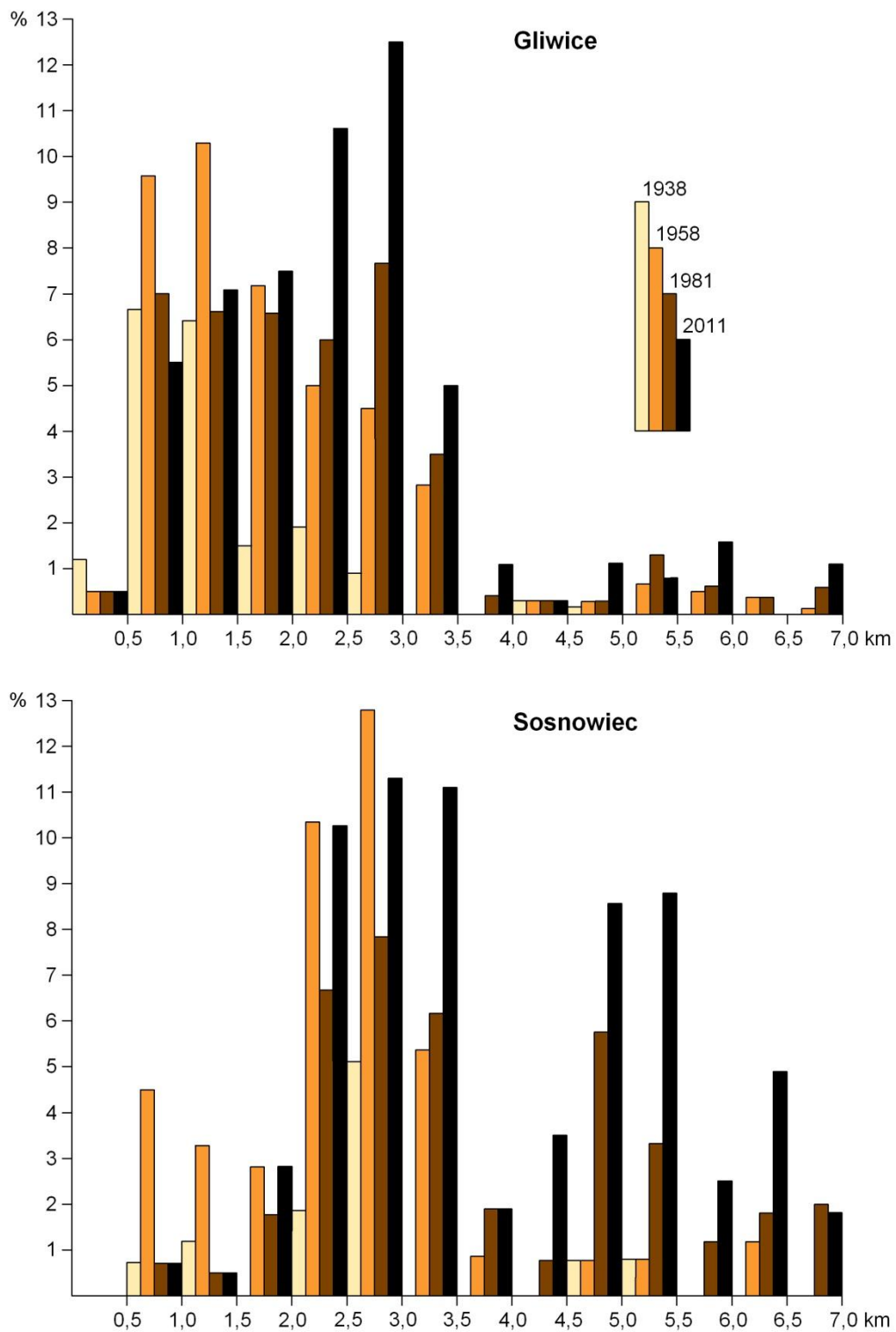


Fig. 3. Allotment gardens share vis a vis distance profiles from Gliwice and Sosnowiec centres between years 1938-2011 (made by author)

The need for a more intensive use of urban land leads to the displacement of less intensive land use forms. The expansion and modernization of settlement systems have led to the disappearance of the urban gardens, the areas of which do not require big spending in order to remove existing development, and they are beneficial for the setting up of new investments. At the same time,

a slow growth of garden share in the area of concentric zones farther away from the centre has taken place. In the whole period of the study, the rate of change in the surface of the gardens in the cities of the Katowice conurbation was uneven. Periods of economic crisis were characterised by an increase in allotment grounds, whereas increased investment had a negative impact.

7. Discussion

Research on land use shows that the allotment gardens have a specific location in the urban landscape. In Warsaw, an increase in the distance from the centre results in a growth of the share of the green areas by more than 1% per 1-km distance, which then indicates that the larger green areas are generally located on the peripheries (GROCHOLSKA, 1974). LUCHTER study (1990) showed that there were no allotments within a radius of 1.5 km and over 10 km from the Main Square in Krakow. In most cases, they were located at a distance of 3-4 km from the centre, and in some cadastral units, the share was over 10%, or even 15% in the land use structure. A concentric structure of allotments is characteristic of Poznań, where they form a ring shape located at a distance of 3-4 km from the city centre (KOZACKI, 1985).

In studies on the spatial structure of Krakow, BROMEK (1975) and MYDEL (1979) distinguished a pre-urban zone, and in Łódź, LISZEWSKI (1977) described an area of the developing urban grounds with a clear concentration of allotments. In the years 1945-1974, this zone moved from a distance of 1.5-2 to 2.5-3 km from the centre of Łódź. In the described areas, quite rapid changes have taken place with regards to the forms of land cultivation, which is connected with highly developed investment and fast succession processes. This is evidence of big changes in the ways of ground land use compared to the outer zones of the city.

In the cities of the Katowice conurbation, the area of allotment concentration includes peripheral areas of intense downtown housing. Allotments are always located in the areas where the distance from the dwelling is not an obstacle in the fulfilment of their various functions. A transformation process in the allotment location, similar to that of Gliwice, effects most major cities from the Katowice conurbation. A system similar to that of Sosnowiec exists in cities with less compact and distributed settlement systems (Chorzów, Ruda Śląska). Spatial changes are more evident in large cities with a more compact and concentric structure (Krakow, Poznań), where a random factor in location plays a minor role in the big area of allotments.

8. Conclusions

Distribution of allotments and changes over time are a reflection of the spatial development process of the cities. Various forms of land use undergo a process of concentration and dispersion in some areas. The dispersion process caused by

the liquidation of hobby gardens is a result of investment, the purpose of which is to satisfy housing, commercial, industrial and transportation needs, which is the primary role of the city.

The succession of technical land in place of allotments is a result of the dominance of the centrifugal forces over centripetal ones. Processes of diffusion and succession in land use, happening from the centre to the outside, are based on the substitution of less intensive land use forms. In the future, allotment gardens located in the area of the highest concentration will fall into recession; stabilisation will be followed by slow liquidation. Phases of filling up and satiation will move further outside. Planning and economic activities related to the development of the city should take into account different social goals arising from the need to shape the human environment. It requires taking into account the spatial aspects of allotment gardening in the local land use plans.

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