

Vol. 29/2021

No. 3

MORAVIAN GEOGRAPHICAL REPORTS

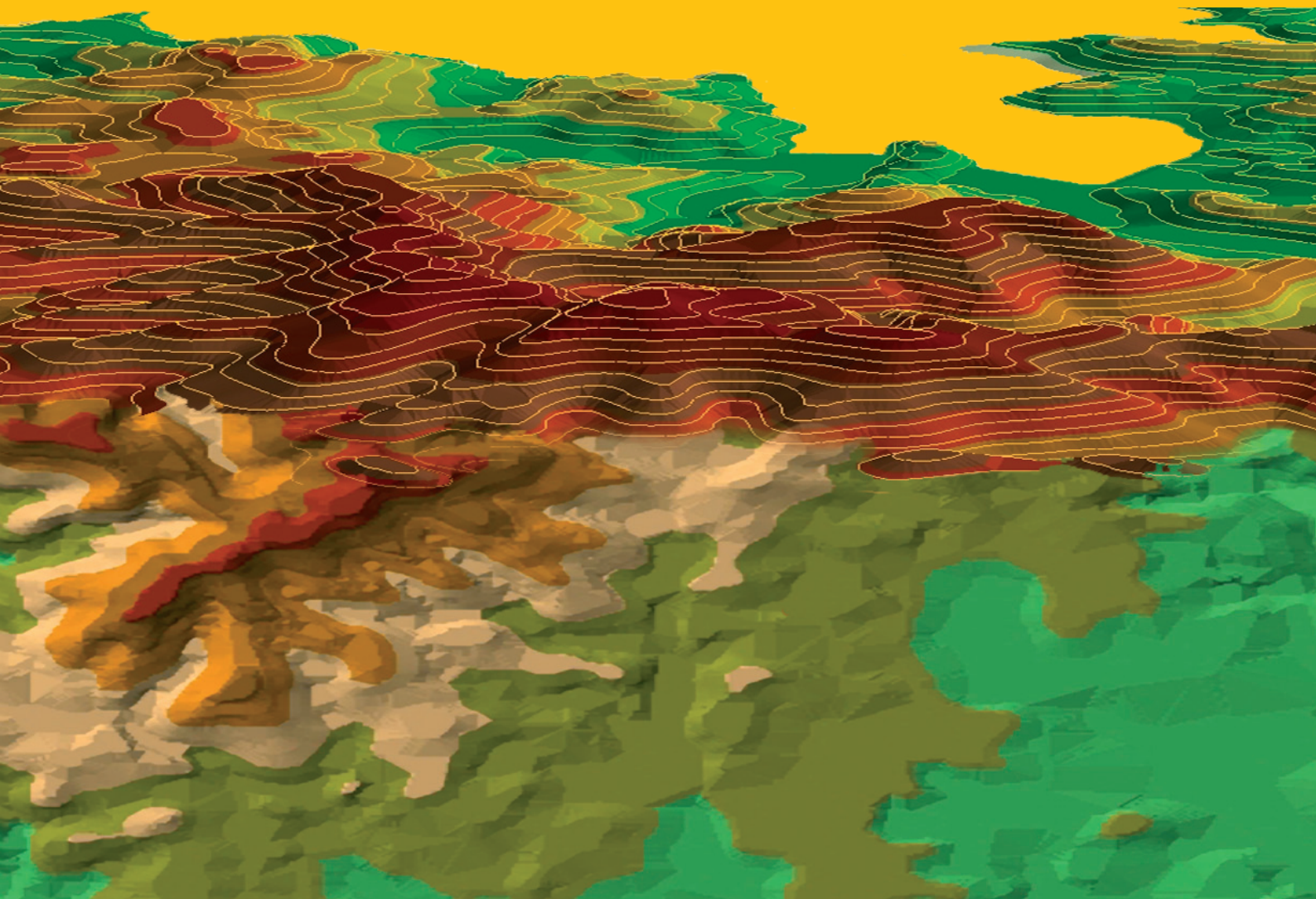




Fig. 8: Neo-renaissance building of the former Braník brewery. Its production was moved to the nearby Staropramen brewery in Smíchov in 2007. Currently, the building is used by the conservatory, cultural organisations, and a microbrewery (Photo: K. Materna)



Fig. 9: Entrance to the site of the brewery at Znojmo castle, where the Hostan was located before the production was moved to the Starobrno brewery in 2009. The buildings now serve the purposes of a microbrewery, a wine cellar, and the brewery museum (Photo: D. Hána)

MORAVIAN GEOGRAPHICAL REPORTS

EDITORIAL BOARD

Editor-in Chief:

Bryn GREER-WOOTTEN (York University, Toronto)

Executive Editor:

Bohumil FRANTÁL (Institute of Geonics CAS, Brno)

Technical & Marketing Editors:

Tomáš KREJČÍ (Institute of Geonics CAS, Brno)

Stanislav MARTINÁT (Institute of Geonics CAS, Ostrava)

Jana ZAPLETALOVÁ (Institute of Geonics CAS, Brno)

INTERNATIONAL ADVISORY BOARD

Marina FROLOVA (University of Granada)

Marián HALÁS (Palacký University Olomouc)

Lucie KUBALÍKOVÁ (Institute of Geonics CAS, Brno)

Josef KUNC (Masaryk University, Brno)

Sebastian LENTZ (Leibniz Institute for Regional Geography, Leipzig)

Damian MAYE (University of Gloucestershire, Cheltenham)

Ondřej MULÍČEK (Masaryk University, Brno)

Josef NAVRÁTIL (University of South Bohemia, České Budějovice)

Martin J. PASQUALETTI (Arizona State University, Tempe)

Pavel RAŠKA (J. E. Purkyně University, Ústí nad Labem)

Michael ROTH (Nürtingen-Geislingen University)

Serge SCHMITZ (University of Liege)

Miloslav ŠERÝ (Palacký University Olomouc)

Michael SOFER (University Bar Ilan, Ramat-Gan)

Martin ŠVEDA (Comenius University in Bratislava)

Kamila SVOBODOVÁ (The University of Queensland, Brisbane)

Steven TUFTS (York University, Toronto)

Dan VAN DER HORST (University of Edinburgh)

Miroslav VYSOUDIL (Palacký University Olomouc)

Maarten WOLSINK (University of Amsterdam)

Scientific papers:

Jiří HASMAN, David HÁNA, Kryštof MATERNA

Regional brands produced beyond the region:

An analysis of beer brands from recently closed

breweries in Europe 168

Jindřich FRAJER, Jana KREMLOVÁ, David FIEDOR,

Renata PAVELKOVÁ, Miroslav TRNKA

The importance of historical maps for man-made

pond research: From the past extent of ponds to

issues of the present landscape. A case study from

the Czech Republic 184

Oleksiy GNATIUK, Kostyantyn MEZENTSEV,

Nataliia PROVOTAR

From the agricultural station to a luxury village?

Changing and ambiguous everyday practices in the

suburb of Vinnytsia (Ukraine) 202

János PÉNZES, Gábor DEMETER

Peripheral areas and their distinctive characteristics:

The case of Hungary 217

Magdalena SZCZEPAŃSKA, Ewa KACPRZAK,

Barbara MAĆKIEWICZ, Lidia PONIŻY

How are allotment gardens managed? A comparative

study of usage and development in contemporary

urban space in Germany and Poland 231

PUBLISHER

The Czech Academy of Sciences, Institute of Geonics (ID: 68145535)

Department of Environmental Geography

Drobného 28, 602 00 Brno, Czech Republic

(e-mail) mgr@geonika.cz

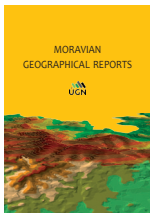
(home page) <http://www.geonika.cz>

ACCESS TO THIS JOURNAL

Information on the journal's aims and scope, instructions for authors, calls for special issues, and full contents are available free online at:

<http://www.geonika.cz/mgr.html>

<https://content.sciendo.com/view/journals/mgr/mgr-overview.xml>



Regional brands produced beyond the region: An analysis of beer brands from recently closed breweries in Europe

Jiří HASMAN^{a*}, David HÁNA^a, Kryštof MATERNA^a

Abstract

Global industry has been undergoing changes in the concentration of brand ownership and production, with acquisitions and closures being a major factor in this evolution. The impacts of such activities are commonly studied from an economic perspective and from the perspective of internal firm-level and deal-level factors, while the influence of external geographical factors is largely neglected. Our research focuses mainly on the importance of geographical cultural factors affecting beer brands whose production location was moved after the closure of the original breweries. The research includes a complete sample of 30 brands from recently closed breweries across Europe. Brands are divided into seven categories according to how their marketing strategy has (or has not) changed in terms of exploiting regional and national identity. The overall success of these brands is then measured in terms of the development of their share in the home countries' markets. Differences in brands' strategies and successes are explained through a wide range of country-level factors and the individual characteristics of the breweries. It is shown that the level of beer tradition or identity in the countries, as well as the country's beer life-cycle position, plays a crucial role in the evolution of the studied brands.

Keywords: acquisitions, brewing industry, globalisation, regional branding, spatial identity, Europe

Article history: Received 5 December 2020, Accepted 10 May 2021, Published 30 September 2021

1. Introduction

The intensification of globalisation since the 1960s has fundamentally changed transport and communication, the structure and division of production, and the lifestyles of many people. These processes may not always be understood positively, and their acceptance depends greatly on local conditions (Martin, 2011; Robertson, 1995; Swyngedouw, 2004). When these impacts are perceived as negative, they may be opposed by resistance in the form of so-called neolocalism. This is manifested by a return to the “local” – belonging to the local community, social and cultural traditions, and the increased preference for local products (Schnell, 2013; Schnell and Reese, 2003). To succeed, transnational corporations (TNCs) should thus understand the growing importance of “local” in contemporary markets and include it in their strategic thinking.

The brewing industry is suitable for research in this field as globalisation trends and subsequent neolocal reactions are manifested strongly here. During the last thirty years, after a series of brewery acquisitions (Fig. 1), closures, and the concentration of production by larger groups, only four TNCs have dominated the global beer production, controlling

between 50–60 percent of the market (Howard, 2014; Madsen, 2020). In response the phenomenon of establishing local microbreweries was noted, first described in the United States (Schnell and Reese, 2003), which has spilled over almost the whole world in the form of tens of thousands of new enterprises (e.g. Holtkamp et al., 2016; Limberger and Tulla, 2017; Materna, Hasman and Hána, 2014; Reid and Gatrell, 2017; Wojtyra, 2020). The diversity of beer supply has resulted in an extremely strong role for customers, who can choose from a plethora of beer brands. Particularly in regions where the beer tradition is strong, customers negatively perceive the homogenisation of the supply, which has been closely linked to production concentration (Cabras and Higgins, 2016; Swinnen, 2017). Thus, both small and large breweries have to constantly struggle for the favour of their customers, and in cases of an inappropriately chosen strategy, they can easily lose them.

These changes imply that the impacts of globalisation and the evolution of acquisitions in the brewing industry depend significantly on the context of the country where they occur, whether in terms of the country's past development or the attitudes of consumers and their interest and knowledge

^a Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czech Republic (*corresponding author: J. Hasman, e-mail: jiri.hasman@natur.cuni.cz)

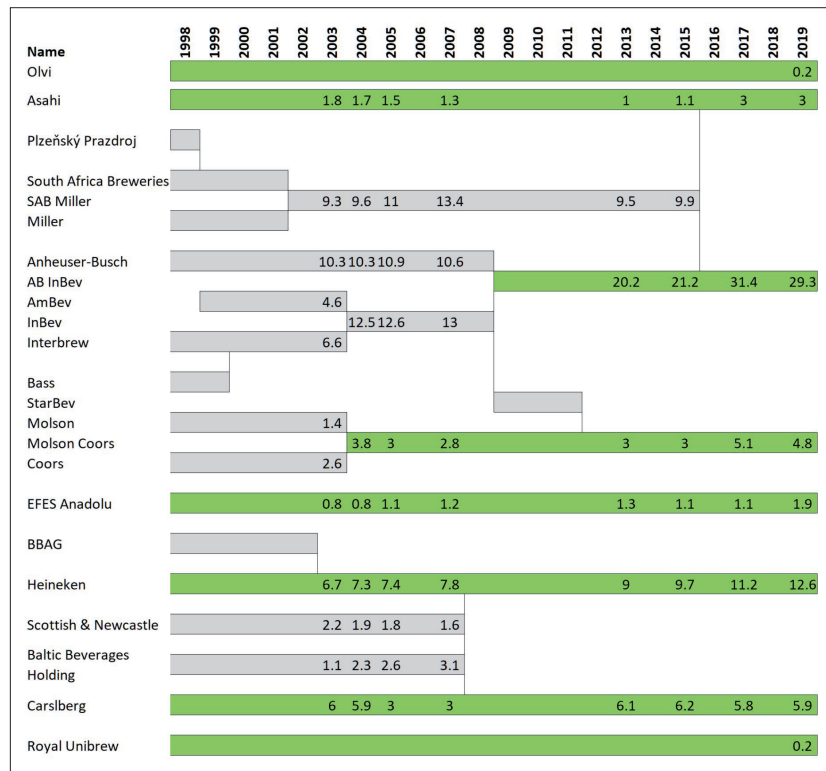


Fig. 1: Acquisitions of transnational brewing groups and their shares on the global beer production
Source: Barth Haas Group (1998–2020)

of beer. This is documented by Materna et al. (2019), who compared the impacts of the acquisitions and closures of breweries by Heineken. Consumers from the Czech Republic, a traditional brewing country, perceived very negatively the closure of the Kutná Hora brewery and the subsequent transfer of the production elsewhere, leading to a slump of interest in the brand. In the opposite case of the Piast and Królewskie brands in Poland, where beer is not so culturally embedded, customers did not seem to notice a transfer in production location, which allowed Heineken to continue promoting the brand as a regional product and combine the benefits of offering attractive "regional" products with the advantages of production concentration leading to economies of scale (cf. Harvey, 2010).

The purpose of this paper is to examine the external validity of the findings of Materna et al. (2019), and more generally the role that national context plays within a wider sample of brands and countries. We thus analysed all 30 brands across Europe whose production was relocated after acquisition. The impacts of such production relocation are analysed to show how the chosen strategies and subsequent evolution differ depending on national contexts and the brands' embeddedness in their respective regions¹. We insist that spatial identity plays an important role in the geographical study of acquisitions in conjunction with other cultural-geographical and economic-geographical factors. The following research questions arise:

1. Has the main marketing strategy of brands from closed breweries been changed in terms of utilisation of different hierarchical levels of identity?
2. Have the TNCs managed to keep their market share after closing newly-acquired breweries (in relation to the chosen main marketing strategy)?

3. How have the chosen marketing strategy and the acquisition success varied according to geographical factors?

The broad geographical scope is the main merit of the paper. While almost all research in brewing geography (as well as research on the acquisitions' success) is conducted on a national basis, comparative analyses that may point to the role of the national context are fundamentally absent. In particular, there is a lack of research that would include cases from Western and Eastern Europe, two parts of continent which have undergone fundamentally different political and economic developments.

The following section presents a review of the approaches which deals with the factors of the acquisitions' outcomes. It aims to propose a typology and provide an explanation of these factors, point out the importance of geographical factors and fill the gaps in previous studies. Methods and data (including their limitations) are introduced in the third section. The results present the typology of marketing strategies for the brand promotion and try to explain such a choice. The fifth section provides answers to the three research questions, followed by a conclusion summarising the main findings.

2. Acquisition outcomes from the perspective of brewery geography

Acquisition, as the takeover of one firm by another, is a corporate strategy that can be driven by the efforts of large companies to achieve economies of scale in production or distribution, reduce costs, and secure market dominance, or it can be the consequence of an extended period of economic difficulties for the firm being acquired (Stilwell, 2018). From

¹ The term "region" or "regional" refers to the sub-regions of individual countries

a purely economic point of view, it is a functional, rational, and effective strategy (Gammelgaard and Hobdari, 2013), which may, however, involve relatively problematic and painful social impacts such as job or business losses at the original production sites (Stilwell, 2018) or devaluation of local capital if the acquiring company decides to close the original production site (Harvey, 2010).

Local companies may be completely extinguished if production concentration of previously spatially dispersed products follows the acquisition (Harvey, 2010; Stilwell, 2018). If the local brand is preserved, there are two basic strategies of acquisitions regarding relations between TNCs and the acquired local company (Dicken, 2015). The first case is when a TNC buys a local producer but leaves its product and production site unchanged (Dicken, 2015; Madsen, Gammelgaard and Hobdari, 2020). This can preserve the link between the local producer and its consumers (Materna, Hasman and Hána, 2019). In the second case, after the acquisition, the local brand may only shield the production of a TNC's standardised global product (Dicken, 2015), or products which are adapted to economies of scale. From a geographic point of view, however, there could be a third strategy which intersects with the previous

ones. In accordance with the saving effort, a TNC closes the original factory to concentrate the production elsewhere. The product, however, still has the original production process (or the original recipe in the food sector) and the original brand. In doing so, it can be presented as a regional product from the original production site (Materna, Hasman and Hána, 2019), as will be discussed below.

2.1 The factors of acquisition outcomes: Typology and explanation

The evolution of acquired companies depends on many factors (see Tab. 1). So far, most studies are economic in nature and have focused on organisational factors of acquisition success (such as the degree of autonomy, cooperation, integration of the acquired companies) in sectors with a higher added value (see, for example: Al-Laham, Schweizer and Amburgey, 2010; Datta and Grant, 1990; Homburk and Bucerius, 2006; Kaplan and Weisbach, 1992). At first, these factors could be identified as either (1) internal or external, as in the case of a creative business environment (Bertoncelj and Kovac, 2007), which is made internally by firms themselves but could also be influenced by other external economic, human, cultural or institutional factors

Factors	Description	
<i>Internal factors (economic)</i>		
Firm-level factors (factors on the side of companies)	Hard factors	Companies' status, structure, organisation, economic aspects, such as professional and realistic assessment and planning, financial sources, speed of plan implementation (Bertoncelj and Kovac, 2007), competitive similarity between companies (Zeng and Schoenecker, 2015), type of TNC's ownership – concentrated family or bank vs. dispersed stock market ownership (Geppert et al., 2013), acquisition likelihood on the side of the acquired firm (Zeng, Douglas, and Wu, 2013)
	Soft factors	Organisational culture, quality of management, employees, communication (Bertoncelj and Kovac, 2007), organisational similarity between companies (Zeng and Schoenecker, 2015), acquisition likelihood on the side of the acquired firm (Zeng, Douglas, and Wu, 2013)
Deal-level factors (factors on the side of the acquisition)	Hard factors	Form of business agreement between companies, such as degree of autonomy, cooperation, integration of the acquired companies (Al-Laham, Schweizer and Amburgey, 2010; Datta and Grant, 1990; Homburk and Bucerius, 2006; Kaplan and Weisbach, 1992)
	Soft factors	Development of soft aspects as part of the contract, such as preservation of the production tradition or making a suitable environment for suppliers' development (Pavlínek, 2015)
<i>External factors (geographic)</i>		
Individual factors	Hard factors	Distribution strategies (Hasman, Hána, and Materna, 2016)
	Soft factors	Regional embeddedness (e.g. name and the age of the acquired company), marketing strategy (Materna, Hasman, and Hána, 2019)
Contextual factors (incl. institutional factors)	Hard factors	Position of country in the product life cycle or the stage of market development (Hána, Materna and Hasman, 2020), formal-institutional factors (Madsen, Gammelgaard and Hobdari, 2020) including legislation, international organisations, and the impact of the emergence of the Eurozone area (Muehlfeld, Weitzel and Witteloostuijn, 2011), coordinated vs. liberal market in the TNC's home country (Geppert et al., 2013)
	Soft factors	Consumers' strength of identity (Marks and Mirvis, 2011; Materna, Hasman and Hána, 2019), product tradition in the country (Materna, Hasman and Hána, 2019), and other informal-institutional factors such as historical consumption habits (Madsen, Gammelgaard and Hobdari, 2020) or societal concerns about alcohol abuse (Gammelgaard and Dörrenbächer, 2013)

Tab. 1: A typology of factors affecting the evolution of acquired companies (Note: Internal deal-level soft factors, external individual hard factors, and external contextual hard factors are not included in the content of previous studies on acquisition evolution, but we can infer them from the mentioned publications. Institutional factors are treated as contextual factors, but they are beyond the scope of this paper)

Source: authors' elaboration

(see also Madsen, Gammelgaard and Hobdari, 2020). These external factors are geographically specific while other, more partial social sciences (including economic sciences) focus on internal relationships within the system of the object of interest. Geography, as a complex science, is primarily focused on external relationships (Hampl, 1998). Therefore, we can see the internal-external dichotomy also as an economic-geographic one. Internal economic factors could be then divided into (2) firm-level and deal-level factors (Renneboog and Vansteenkiste, 2019), and (3) hard and soft ones (Bertoncelj and Kovac, 2007). Soft factors can also be labelled as human or cultural ones (Marks and Mirvis, 2011), and are on the external side of the typology which can influence success, as economic factors do. According to Marks and Mirvis (2011), the identity of consumers, which may be disrupted by the arrival of an “out-group” subject, also affects the success of acquisition.

The research on acquisition success (or profitability) in the beer industry is quite similar. The approach is based on economic (largely firm level) factors (Geppert et al., 2013; Muehlfeld, Weitzel and Witteloostuijn, 2011; Zeng, Douglas and Wu, 2013; Zeng and Schoenecker, 2015). There are only a few exceptions in the current research which examine the influence of external geographical factors on the success of brewery acquisitions, such as regional differences in institutional factors (Muehlfeld, Weitzel and Witteloostuijn, 2011) or the influence of institutional factors in the TNC’s home country on the decision for acquisition (Geppert et al., 2013). Materna, Hasman and Hána (2019) present cultural factors of regional and local identity which may influence the success of acquisitions of the Heineken TNC in three different central European countries.

This discussion highlights some gaps in the geographical study of brewery acquisition. Current studies are mainly economically oriented (see e.g. Muehlfeld, Weitzel and Witteloostuijn, 2011; Zeng and Schoenecker, 2015), but they do not deal sufficiently with external (geographical) factors which can be divided into (1) individual vs. contextual factors (Spencer, 2020; Vallbé, Magre and Tomàs, 2018), and (2) hard vs. soft factors (see e.g. Bertoncelj and Kovac, 2007), as shown in Table 1. Individual factors are basically connected to the external expression of the subject in space (external behaviour of an individual company), contextual factors include characteristics which are not directly related to the subject but create the context of the environment in which it operates. So far, studies examine soft cultural factors mainly as internally (economic) in connection with the companies themselves (Bertoncelj and Kovac, 2007). As Marks and Mirvis (2011) mention, however, there are also external cultural factors, like the identity of people, which may, similarly to economic factors, considerably influence the acquisition outcomes. We can call these external soft factors, cultural-geographical ones, just as external hard factors can be labelled as economic-geographical. Geographical factors also have specificity in their connection to every hierarchical level of space (local, regional, national), with interactions in a general sense.

2.2 Geographical factors of acquisition evolution

In the present time of a standardised global culture and economy, global brands have become symbols of quality, global life, culture, and prosperity for most consumers (Alashban et al., 2002; Holt, Quelch and Taylor, 2004). These effects also apply to beer, which has turned into an important commodity in international trade since the 1960s (Harvey, 2010),

like other beverages (Benson-Armer, Leibowitz and Ramachandran, 1999; Overton, Murray and Banks, 2012). This standardisation in the brewing industry has resulted in the concentration and rise of corporations on beer markets almost everywhere (Cabras and Higgins, 2016), and into a global convergence of tastes (Swinnen, 2017). A certain proportion of consumers from advanced markets, however, have negative views on the increasingly interconnected and complex world, the dominance of large corporations and the most successful regions, and standardised global consumption (Holt, Quelch and Taylor, 2004; Ozsomer, 2012; Garavaglia and Swinnen, 2020). This dissatisfaction leads them to withdraw into their home regions or localities (for a discussion of different aspects of localness, see Schmitt, Dominique and Six, 2017), purchasing diverse local food, developing local traditions and lifestyles, and supporting the local economy – which is the base of the neolocalism movement (Schnell, 2013; Schnell and Reese, 2003; Wojtyra, 2020) and may even grow into a fetishisation of the local (Naylor, 2000). The increasing popularity of local products could also be driven by their better quality (Naylor, 2000; Winter, 2003), or by ethical or environmental impacts of global production (Barnett et al., 2005; Hoalst-Pullen et al., 2014; Holtkamp et al., 2016). But as Amin (2002) points out, globalisation cannot simply be seen as “global-distant-theirs” and “local-near-ours” categories. Conversely, globalisation and neolocalism are interconnected concepts based on the glocalisation principle (Robertson, 1995; Swyngedouw, 2004), where both levels take advantage of each other (Martin, 2011). Peripheral regions can especially benefit from the growing popularity of local specialities which can fill the niche food market (Ilbery and Kneafsey, 1999; Pike and Pollard, 2010), or attract tourists to come and taste local products (Williams, 2009). As a result, the processes of global homogenisation and local differentiation take place side by side (Overton, Murray and Banks, 2012).

This shift in consumer behaviour is based on spatial identity, which can vary from international, national, and regional to local identities (see Lepič, 2017; Paasi, 2002; Tselios and Tomaney, 2019) and is already described as an important factor in acquisition evolution (Marks and Mirvis, 2011; Materna, Hasman and Hána, 2019). We can also distinguish between different scale levels of the identity of the acquired brands which are connected to the level of their production (Materna, Hasman and Hána, 2014). This level of identity can then be used by a TNC to make the acquisition more successful as local attitudes, regional symbols, and geographical indications used for marketing purposes can help to sell the product (Overton, Murray and Banks, 2012; Overton and Murray, 2016; Paasi, 2002; Rusten, Bryson and Aarflot, 2007). Geographical indications can be described as cultural or historical identities in a group of products associated with a specific locality (Bowen, 2010), and are the result of neolocalism (Overton and Murray, 2016). As every commodity includes its symbolic value, meaning the semiotic and moral narratives associated with it (Le Heron and Hayward, 2002), the commodities with geographical indications try to assert that only a particular location has the conditions suitable for the production process (Harvey, 2010; Reid and Gatrell, 2015), which can be supported also by the activities of state institutions (Wilkinson, Cerdan and Dorigon, 2017) and which includes both rational and emotional values (Lewis and Vickerstaff, 2000). Moreover, marketing using geographical indications could fundamentally change the perception of product linkages to a place, while it can create artificial constructions of

“traditional” and “local” (Rangnekar, 2011). Companies can refer to regions (Šifta and Chromý, 2017), even if they use extra-regional linkages for their production (Bowen, 2010) or produce completely outside the region (Materna, Hasman and Hána, 2019).

There are certain contradictions between the savings achieved through economies of scale and the higher profits achieved through the local production of more expensive specialities (Harvey, 2010). When local producers began to gain a larger market share, even TNCs want to participate in the profits made by advantage of locally rooted producers either through new false regional brands (similar to ‘faux craft’ or ‘crafty’ breweries: see Howard, 2018) or through acquisitions of traditional regional brands (Dicken, 2015; Howard, 2018; Garavaglia and Swinnen, 2020)². The management of these beer brands must be successful and efficient (Keenan, 2020; Pike and Pollard, 2010). If the local identity, general knowledge, and popularity of the production place are weak, the benefit from offering the local brand after its acquisition is too low to keep production going. If any identity exists, however, and the TNC wants to make production more efficient after acquisition, it could transfer production of the local brand into another plant in a different region but still use the original production place in the branding, despite having only indicative or fictive connections to the particular place (Overton and Murray, 2016). This type of local identification with a ‘regional’ product can be called a ‘false regional identity’ (Materna, Hasman and Hána, 2019) and is some kind of fictional local embeddedness (Bowen, 2010, 2011; Overton and Murray, 2016). Locals who have a weak feeling of spatial identity might not even notice this change in production. While they still identify themselves with the product, they may subjectively perceive the ‘false regional identity’ as completely genuine, as evidenced by Schnell and Reese (2003) and Materna, Hasman and Hána (2019).

It remains important to study identity as a geographical factor on many hierarchical levels, however, while even breweries can be divided into local, regional, national and international categories according to their sale area (see Hasman, Hána and Materna, 2016). For example, the strong position of beer in Czech, German, Belgian, Dutch, Austrian, British, or Irish national identity (for Czech identity: see Vinopal, 2006; for British: Cabras, 2011; for Dutch: Davids, 2015) may influence the identity of locals, make their identification to a local beer brand stronger (e.g. for Germany, see Loy, Glauben and Mongrowius, 2020) and the position of TNCs after acquisition harder than in other countries (see Materna, Hasman and Hána, 2019). But these countries have advanced beer markets which is not the most common goal of TNCs, which prefer to exploit growing emerging markets for their investments (Hána, Materna and Hasman, 2020; Limberger and Tulla, 2017). On the contrary, these countries are in several cases home countries of TNCs, which may also be part of their national identity and therefore their situation in the home market is different – they are not “out-group” subjects (c.f. Marks and Mirvis, 2011) but subjects with home development history (for the example of Heineken, see Davids, 2015). In the home country, where the beer market is stagnating, they no longer have many opportunities for investment, so they turn abroad (Hána, Materna and

Hasman, 2020; Keenan, 2020). On the other hand, the home country of a TNC is also important in terms of its abroad acquisition strategy. For a TNC from a small home country (like Heineken from the Netherlands, or Carlsberg from Denmark) internationalisation is a necessity, while they can develop a strong global position only abroad (Geppert et al., 2013). Their strategy is also more cautious than the strategies of TNCs from bigger countries such as Anheuser-Busch from the USA (before its fusion with Belgian InBev in 2008) or Scottish and Newcastle from the UK, which take a relatively high financial risk (Geppert et al., 2013).

3. Data, methods, and limitations

This research project was conducted with a sample of 30 breweries, which were closed by the TNCs after their acquisition, leading to the production of their brands being transferred to another TNC production site or, in a few cases, ceased (see Tab. 2). There was just one limiting factor for sampling – we included only breweries (and brands) for which we could obtain data from our main data source (Euromonitor database), indicating that we excluded small breweries and brands which were abandoned before 2007. The sample thus contains a very heterogeneous set of breweries located across Europe (Fig. 2), enabling us to make some basic generalisations from our findings.

Our first research question was answered by an analysis of brands’ market presentations. We focused particularly on brands’ visual presentations (labels, coasters, etc.) and slogans, as well as press statements of TNCs’ representatives. The extent to which this presentation articulates features of local, regional, and national identity and how this presentation has changed over time with an emphasis on changes related to the brewery acquisition and subsequent closure, was investigated. The websites of brands or entire TNCs were the basic sources of information. In general, however, these were insufficient, especially for older data. Many brands also do not have any official presentation today. Thus, we had to supplement these data with other information that we managed to find. The scarcity of information in some cases, particularly for those closed many years ago and/or located in the eastern parts of Europe, is one possible limitation of our analysis.

The second research question is whether the TNCs have managed to maintain the market share of the brand from the closed production site. This analysis utilised data from the Euromonitor database. Such data were only available for the period 2007–2016, which was limiting for brands whose former production sites had closed before 2007.

Two types of data were collected to answer the third question about contextual and individual factors of TNC’s success. Data related to individual brands came from the web portals www.europeanbeerguide.net and www.ratebeer.com, which provide basic information about breweries, their locations, and production volumes, and also from the brands’ web presentations and other available sources. Contextual data were based on six variables that describe the beer market at the country level. For a better interpretation, we merged these data into factors by principal component analysis. This method helped us to describe the national context for the interpretation of individual brands’ acquisition outcomes.

² Conversely, there is an interesting effort by small start-up breweries to take advantage of economies of scale through the so-called contract brewing, i.e. the production of their own “local” beer in a large brewery using their own recipe (e. g. Van Kerckhoven, van Meerten and Wellman, 2020).

Beer brand	Country	TNC	Founded	Closed	Former site	Current site	Approximate production before closure (hl)
Oranjeboom	Netherlands	InBev	1671	1990, 2005	Rotterdam, then Breda	Dommelen + Belgium	2,100,000
Burgasko	Bulgaria	InBev	1971	2002	Burgas	Haskovo	500,000
Plevensko	Bulgaria	InBev	1973	2005	Pleven	Haskovo	lower hundreds of thousands
Bramik	Czech Republic	InBev	1899	2007	Prague	Prague	1,000,000
Bass	UK	InBev	1777	2005	Burton-on-Trent	Samblesbury	4,000,000
Caffrey's	UK	InBev, since 2006 Molson Coors	1897	2004	Belfast	Burton-on-Trent	862,500
Bere Azuga	Romania	SAB Miller	1870	2009	Azuga	Cluj Napoca	120,000
Topvar	Slovakia	SAB Miller, since 2016 Asahi	1964	2009	Topoľčany	Velký Šariš	450,000
Dnipro	Ukraine	SAB Miller	2009	2009	Dnipropetrovsk	Donetsk	higher hundreds of thousands
Tetley's	UK	Carlsberg	1822	2011	Leeds	Northampton	3,000,000
Karhu	Finland	Carlsberg	1853	2009	Pori	Kerava	1,073,500
Piast	Poland	Carlsberg	1894	2003	Wroclaw	Szczecin	1,000,000
Pripps	Sweden	Carlsberg	1828	2004	Stockholm	Falkenberg	1,000,000
Cardinal	Switzerland	Carlsberg	1788	2011	Fribourg	Rheinfelden	1,725,000
Moretti	Italy	Heineken	1859	1997	Udine	Milano	lower hundreds of thousands
Beamish & Crawford	Ireland	Heineken	1792	2009	Cork	Cork	574,000
Hostan	Czech Republic	Heineken	1394	2009	Znojmo	Brno	100,508
Zlatopramen	Czech Republic	Heineken	1867	2012	Ústí nad Labem	Velké Březno	250,000
Królewskie	Poland	Heineken	1948	2004	Warszawa	Warka	1,000,000
Kujawiak	Poland	Heineken	1858	2006	Bydgoszcz	Elbląg	lower hundreds of thousands
Ariana	Bulgaria	Heineken	1884	2004	Sofia	Stara Zagora	250,000
Cogoň	Slovakia	Heineken	1896	2004	Nitra	Hurbanovo	573,600
Martiner	Slovakia	Heineken	1893	2003	Martin	Hurbanovo	332,780
Gemer	Slovakia	Heineken	1965	2006	Rimavská Sobota	Hurbanovo	399,100
Hateg	Romania	Heineken	1978	2010	Hateg	Miercurea Ciuc	1,000,000
Rechitskoye	Belarus	Heineken	1975	2013	Rechitsa	Bobruysk	285,000
Lapin Kulta	Finland	Heineken, since 2013 Royal Unibrew	1873	2010	Tornio	Lahti	100,000
Ceres	Denmark	Royal Unibrew	1856	2008	Arhus	Faxe + Odense	lower hundreds of thousands
Taurus	Lithuania	Royal Unibrew	1860	2006	Vilnius	Panevezys	lower hundreds of thousands
Lačplēša	Latvia	Royal Unibrew	1948	2008	Lielvarde	Liepāja	57,500

Tab. 2. Beer brands included in the research project. Sources: <https://www.ratebeer.com/>, <https://www.europeanbeerguide.net/>, <https://beerme.com/>

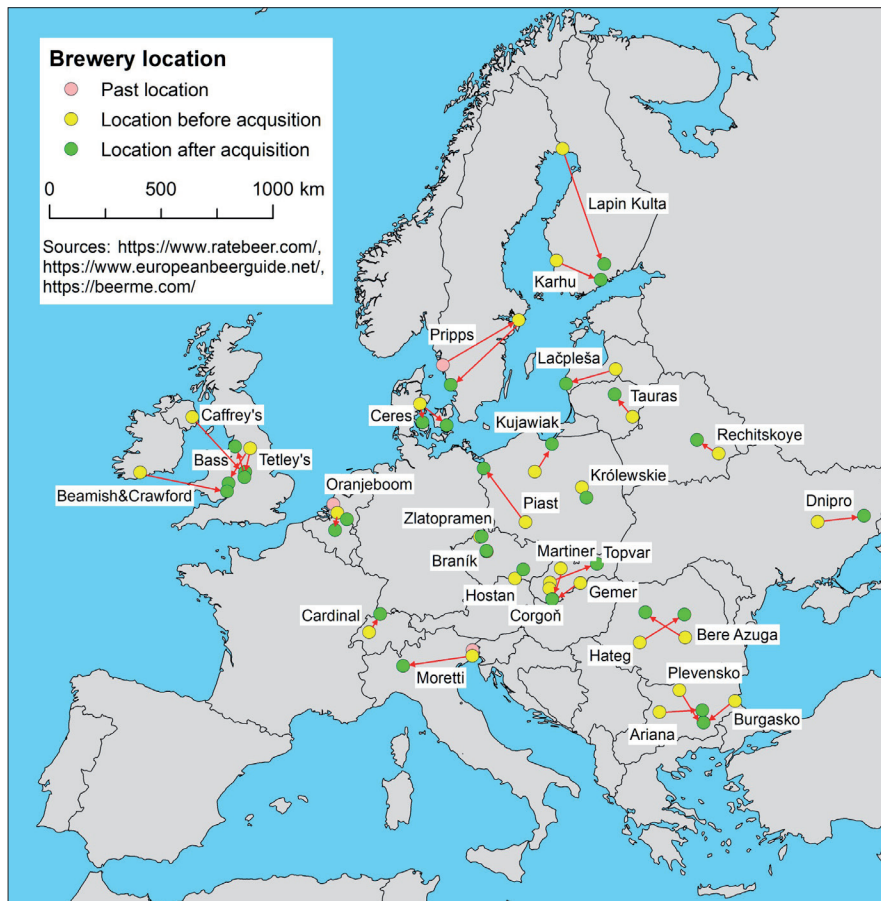


Fig. 2: Relocation of analysed brands
Source: authors' elaboration

As the sample of breweries was very heterogeneous and a wide variety of qualitative and quantitative indicators were used, we chose the following research procedure. Individual brands were categorised according to changes in the exploitation of regional and national identity for promotion purposes. Within each category, we examined: (1) how successful the brands were; and (2) how these brands' strategies and success differed, depending on geographical cultural factors. Finally, we aimed to generalise our findings in the discussion.

4. Results

4.1 A glimpse at the overall results

At first, we carried out a principal component analysis to create factors that help to quantitatively describe the national context. Based on eigenvalues greater than 1, six original variables were clustered into two factors (Tab. 3). To better interpret these factors, we named them according to the concepts they represent, though we are aware of necessary reduction. The first factor includes variables

Variable	Factor 1 (life cycle)	Factor 2 (tradition)	Source
Concentration of production	- 0.908	- 0.051	Euromonitor (2018)
Share of TNC on production	- 0.779	0.096	Euromonitor (2018)
Share of imported beer on consumption	0.704	- 0.097	Brewers of Europe (2010, 2014, 2019)
Share of dark beers on consumption	0.686	0.262	Euromonitor (2018)
Yearly beer consumption per capita [litres]	- 0.199	0.839	Brewers of Europe (2010, 2014, 2019)
Number of beer pints affordable per average income	- 0.023	0.812	http://www.pintprice.com (2019), ILO Data Explorer (2020)
Share of consumption in restaurants	0.400	0.794	Euromonitor (2018)

Tab. 3: Country level variables and factor loadings

Note: Values represent factor loadings (correlations) between extracted factors and original variables. Strong correlations (above 0.6) are in bold. Principal component analyses and oblimin rotation with Kaiser Normalisation was used; the two factors explain 66.7% of the total variability. All data correspond to the year of brewery shutdown with the exception of Number of beer pints affordable per average income variable, where only recent data (2018) were available. Concentration of production is defined as the share of the three largest brands in the national market. Number of beer pints affordable per average income shows how many average-price pints of beer a country's resident can buy if they earn an average salary.

that correspond to a country's position in the beer life cycle. A product life-cycle concept describes the level of development of a national beer market (for more, see Hána et al., 2020). Countries in the early (growth) phase of a life cycle have negative values of this factor, while positive values indicate countries in the final (decline) phase. The second factor represents variables mirroring the national beer traditions. Resulting factor scores for each brewery are displayed in Table 4. These results of the principal component analysis must be considered as indicative to some extent, since not all of its assumptions (such as independence of observations, sample size) were met. Nonetheless, robustness checks showed that the results do not change if we alter the analysis specifications.

Now let us turn our attention to the analysed brands. Through the analysis of the brand presentation, we identified a total of seven different general strategies. These strategies are not mutually exclusive. In fact, many brands applied more strategies in parallel or gradually (see Tab. 4).

4.2 Cessation of brand production

Abandoning a brand (with its specific recipe) from the closed production site is a step that would seem the most logical given the pursuit of most efficient production and marketing (see Keenan, 2020; Pike and Pollard, 2010). The fact that this strategy was chosen in only five cases (moreover, the situation is not always clear), indicates the value that the original brands had as regional products (Williams, 2009). All cases occurred in Eastern European countries in the initial phase of the beer cycle (Tab. 4). In addition, the names of these brands always directly referred to the region where the production site was located. It seems that these brands were not worth maintaining production for TNCs, as they were not attractive to consumers outside the region and were too weakly connected to regional identity.

As examples, the Bulgarian brands Burgas and Plevensko, come from breweries with a short tradition and were named after the cities where they were originally produced. This could similarly apply to the Ukrainian brand Dnipro, about which it was virtually impossible to find any information (probably due to the political situation). Compared to Bulgaria and Ukraine, Poland and Slovakia are countries with a higher degree of beer traditions. More production sites were closed there around the same time, and while some more attractive brands were retained, production of two (Kujawiak in Poland and Gemer in Slovakia) was terminated.

4.3 Abandonment of regional identification

The second option, which is again typical of countries in the initial stage of the beer life cycle (Eastern Europe, Finland), is to reduce or replace regional branding with “non-spatial” strategies (e.g. emphasis on taste or masculinity, see also Materna, Hasman and Hána, 2019). This strategy was not very successful as the market share of all these brands decreased. The only exception is the Bulgarian Ariana, whose market scope was already national before the closure and whose market share has been steadily growing. After the transfer of production from Sofia, the brand no longer refers to the region of the capital and instead recalls its Czech founders – referring to its origin from a traditional brewing country.

In total, this strategy was selected by ten brands. It is typical for Heineken, which used it in seven cases, including Hostan and Zlatopramen brands from the Czech Republic, where the beer tradition is very strong: this is probably

reflected in the particularly large slump in market share. A similar case is British Bass, which has been associated for a long time with its location in Britain's main brewing city, Burton-on-Trent (Haugland, 2014), not only in terms of marketing but also in terms of ingredients: Burton ales (including Bass) recipes were based on local very hard water (Yool and Comrie, 2014), and the name ‘burtonisation’ was introduced in the brewing industry for a specific chemical water treatment (addition of calcium sulfate and calcium chloride). After the original factory shutdown and the relocation of a large part of the production to Samlesbury, there must also have been a significant change in taste, as taste depends on the chemical composition of the water (Gatrell, Nemeth and Yeager, 2014; Yool and Comrie, 2014), which cannot be fully harmonised with the original source even by burtonisation. The world's former largest brand is now struggling with a negligible market share.

Karhu (Finland) and Topvar (Slovakia), where the Topolčany coat of arms was replaced by the simple letter “T” in the logo (Fig. 3), are other brands that completely exited regional branding. The remaining brands in this category reduced their connections with the regions but did not completely abandon it. For example, Lapin Kulta (Finland), which closed production in Lapland in 2010, kept the original slogan “Golden beer from Lapland” on cans in 2016, but not in 2019 (Fig. 3). It still retains the symbol of the north arrow, however. Logos associated with the original regions were also retained by brands from closed breweries Hateg (Romania) and Corgoň (Slovakia). Finally, Martiner (Slovakia) abandoned regional labelling on its products but continues to support local sports and cultural events, what can be important for building a relationship with consumers (Lewis and Vickerstaff, 2000).



Fig. 3: Examples of leaving regional branding by Lapin Kulta and Topvar brands. Source: <https://lenta.com>, <https://www.lapinkulta.fi>, <https://opive.sk>, <http://acp.sk>

Brand	Country	Strategy		Home country's market share [%]											Beer national context			
		Primary	Secondary	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Life cycle	Tradition			
Burgasko	Bulgaria	Production ceased	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.30	-1.11
Plevensko	Bulgaria	Production ceased	.	1.1	1.1	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.2	0.0	0.0	-0.27	-0.94
Dnipro	Ukraine	Production ceased	.	1.9	1.0	0.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.63	-1.34
Kujawiak	Poland	Production ceased	.	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-1.30	-0.21
Gemer	Slovakia	Production ceased	Return to regional	6.3	6.1	5.0	5.3	5.2	4.7	4.3	4.3	4.3	4.3	0.0	0.0	0.0	-0.70	0.51
Topvar	Slovakia	Abandons regional	.	12.6	9.9	8.8	8.2	6.4	5.6	5.5	5.5	5.5	5.5	5.6	5.6	5.6	-0.33	0.18
Hostan	Czech Rep.	Abandons regional	.	3.9	3.2	2.8	2.9	2.9	2.6	2.4	2.4	2.2	2.2	2.0	1.8	1.8	-0.38	2.09
Zlatopramen	Czech Rep.	Abandons regional	.	2.7	2.7	3.0	3.6	3.6	4.3	4.2	4.2	4.3	4.3	3.7	3.3	3.3	-0.51	1.82
Ariana	Bulgaria	Abandons regional	.	12.7	12.9	13.4	13.1	12.9	14.7	14.7	14.3	14.8	14.8	14.7	14.7	14.7	-0.28	-0.92
Corgoň	Slovakia	Abandons regional	.	6.6	6.8	6.2	6.1	5.2	4.6	4.4	4.4	5.3	5.3	5.4	5.5	5.5	-0.78	0.67
Martiner	Slovakia	Abandons regional	.	2.6	2.7	2.7	2.6	2.5	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	-0.86	0.83
Hateg	Romania	Abandons regional	.	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-0.43	-0.30
Bass	UK	Abandons regional	Return to regional	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	1.60	0.93
Karhu	Finland	Abandons regional	Regional to national	23.7	20.4	19.6	17.7	18.0	18.8	18.6	18.6	18.0	18.0	17.7	17.3	17.3	-1.18	-0.48
Lapin Kulta	Finland	Abandons regional	Regional to national	14.5	13.3	14.3	14.2	13.5	12.8	12.3	12.3	11.8	11.8	11.6	11.3	11.3	-0.97	-0.55
Bere Azuga	Romania	Regional to national	.	0.9	0.9	1.4	1.3	1.1	1.2	1.4	1.4	1.2	1.2	1.1	1.1	1.1	-0.40	-0.24
Moretti	Italy	Regional to national	Return to regional	7.2	7.2	8.0	8.2	8.6	8.7	8.7	8.7	8.8	8.8	8.9	9.0	9.0	1.07	-1.01
Pripps	Sweden	Stays national	.	13.1	14.1	14.4	12.5	12.1	12.1	11.4	11.4	11.1	11.1	11	11.7	11.7	1.62	-1.03
Beamish	Ireland	Stays national	.	2.0	2.1	2.4	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	1.86	0.51
Rechtskoye	Belarus	Stays national	.	6.1	5.3	1.9	1.5	1.3	1.5	1.2	1.2	1.1	1.1	0.9	0.7	0.7	0.76	-1.43
Tauras	Lithuania	Stays national	.	1.2	1.6	1.4	1.3	1.3	1.2	1.3	1.3	1.6	1.6	1.8	1.8	1.8	0.13	-0.81
Lačpleša	Latvia	Stays national	.	1.2	1.6	1.2	4.3	4.4	5.1	7.8	7.8	9.5	9.5	7.4	6.6	6.6	0.45	-1.34
Braník	Czech Rep.	Stays regional	.	3.6	4.0	3.9	3.8	3.9	4.1	4.4	4.4	4.4	4.4	4.6	4.5	4.5	-0.42	2.13
Caffrey's	UK	Stays regional	.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.58	1.03
Piast	Poland	Stays regional	.	1.5	1.4	1.2	1.1	1.1	1.0	1.0	0.7	0.6	0.6	0.4	0.4	0.4	-1.22	-0.26
Cardinal	Switzerland	Stays regional	.	8.0	7.9	7.9	7.7	7.8	7.9	7.8	7.8	7.7	7.7	7.6	7.6	7.6	0.86	0.44
Królewskie	Poland	Stays regional	.	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	-1.24	-0.24
Oranjeboom	Netherlands	Export	Return to regional	0.6	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.83	0.74
Ceres	Denmark	Export	Stays regional	0.8	0.8	0.8	0.9	0.9	0.9	1.1	1.1	1.0	1.0	1.0	0.9	0.9	-0.47	-0.11
Tetley's	UK	Return to regional	.	2.1	1.9	1.8	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.5	1.5	1.5	1.92	0.46

Tab. 4: Selected strategies and evolution of the market share of brands analysed (Note: The values from before the brewery shutdown are highlighted in grey. Last two columns display the factor scores computed by the principal component analysis). Source: Euromonitor (2018)

4.4 Shift in the focus from regional to national identity

A similar strategy is to shift branding from the regional to the national level. As this is the case of brands from countries with a lower degree of beer tradition (Tab. 4), however, the connection to national identity is not very strong. This applies to the brands that have in some way become the flagship of the TNC and whose market scope was extended from the regional to the national level even before their former production site's closure. In the case of Italian Moretti (Fig. 4), a steady increase in production can be observed. Romanian Bere Azuga stagnated after the closure of the original site and the share of both Finnish brands (Karhu and Lapin Kulta) has declined. Karhu and Lapin Kulta were already mentioned in the previous category – this ambiguity is due to the fact that, apart from non-geographic marketing, national identity was also utilised after abandoning regional identity (for instance, Karhu launched a campaign combining its beer with saunas in 2017).

4.5 Maintaining national identification

This category consists of brands that were profiled through national identity in the long-term, and the closure of the original production site was, thus, not a reason to change the marketing strategy. In Western Europe, these are two traditional brands that were among the major players in the national market, but their market share has been gradually declining in favour of brands that remain outside the TNCs' ownership. The first one is Swedish Pripps, which uses national identity only marginally. In comparison,

the Irish Beamish&Crawford also utilises a lower scale of identity, specifically references to the city of Cork, where production remained even after the closure of the original site. Conversely, in the case of two brands from less developed beer markets, UniBrew intensively focused on national identity and achieved success as the market share of both Latvian Lačpleša and Lithuanian Taurus is growing. Finally, the Romanian Rechitskoye was in decline for a long time and its share has been further declining after the production relocation.

4.6 Maintaining regional identification

Another strategy is closely related to the concept of false regional identity discussed above – brands are still presented through regional symbolism, even though they are no longer produced in the region. Materna, Hasman and Hána (2019) gave illustrative examples of the Polish brands Piast and Królewskie, stating that the strategy is best applied in countries with a relatively low beer tradition, where it is easier to convince consumers that the brand is still a regional product when it actually is not. Looking at the data from all of Europe, however, we have to correct this statement – all other cases can be found exclusively in countries where beer is very well embedded. An example is Caffrey's, which is still referred to as Premium Irish Ale (Fig. 5), although its production has been transferred from Northern Ireland to England; however, in terms of market share, it is a long-term marginal brand. More successful is the Danish Ceres, which even after the move, sells one of its beers under the slogan



Fig. 4: Shift of Moretti branding from regional (Birra Friulana) to national (Italia) level

Source: <https://www.beer-coasters.eu>, <https://www.baractivity.com>



Fig. 5: Piast “from Lower Silesia”, the taste of Warsaw (Królewskie), and Premium “Irish” Ale
Source: <http://piwopiast.pl>, <https://www.krolewskie.pl>, <https://www.graphis.com>

“Dortmunder is a classic from East Jutland”. East Jutland is the region where the original site (Arhus) was located, but none of the current ones (Faxe, Odense). The Swiss Cardinal had not been linked to its original region through labelling but through numerous marketing activities. This did not change since the production relocation, and even today Cardinal is involved in its original region through support of local sports and cultural activities. Although the Cardinal's share on the Swiss market was gradually declining, it was a very slight decline. The latest case of a brand from a traditional brewing country, which continues to use local motives, is the Czech Branik. This example is slightly different as its production was moved within a single city (Prague), where, however, the identity in the brewing industry is manifested at the district level. The brand's marketing still refers to the Branik district, although it is now produced in the Smíchov district. At the same time, its market share is constantly growing as it has left the production of more expensive beer and draft beers and is focusing on the segment of cheap and bottled beers. This shows the brand's focus on less demanding and probably less informed consumers, who may still be able to perceive it as a local product from Branik. Conversely, the effort to use the “premiums” for regional specialities described in the theoretical part (Harvey, 2010), is not evident here.

4.7 Export

Although many of the analysed brands had exported an important part of their production, after the closure of former production sites, their exports were usually reduced or completely stopped. For example, Bass consumption in the US fell from 665,000 hl in 2001 to 242,000 hl in 2010³ after the purchase by InBev. In contrast, the export orientation became a dominant strategy for two brands. Both also employed a national identity within their marketing strategy as they utilised the fact that they come from countries with a higher beer tradition than the importing countries. The bottles of Danish Ceres, the most imported brand in Italy, bear a highly visible slogan “Imported from Denmark” (Fig. 6). In contrast, Ceres's share of the domestic market is below one per cent. Oranjeboom even disappeared from the domestic market for a long time and operated its website only in foreign language mutations, with the main slogan being “Add some Dutch to your life” – although part of the production actually left the Netherlands and moved to Belgium. Both cases represent brands that refer to the country of their production but prefer their sales activities abroad, where they do not have to convince their customers that they are still the same brand, which is still associated with the original production site.

4.8 Return to regional brands

Most recently, a new strategy has been observed. It is an attempt to take advantage of changes in consumer preferences in the context of neolocalism, which is associated with a renewed emphasis on traditions and regional products (Overton and Murray, 2016; Schnell, 2013; Schnell and Reese, 2003). After a rather careless approach to local brands by TNCs, a major turnaround is taking place: focusing on local products and renewing previously abandoned local brands. As this strategy is completely new for TNCs (the first case was Dutch Oranjeboom in 2016), it is not possible to



Fig. 6: “Imported from Denmark”

Source: <http://maremmabevandesrl.negozy.com>

assess its success yet. Sometimes it is a return of abandoned brands, which is the example of Slovak Gemer, which had better luck than other abandoned brands (see section 4.2). That can be explained by the higher tradition of beer brewing in Slovakia than in Bulgaria or Ukraine, as well as by a larger share (and thus the embeddedness) of Gemer in the market. Oranjeboom also returned to the domestic market, using the historic brand “Princesse Beer” and numerous references to the original place of production (Rotterdam) on the label (Fig. 7). Moretti opted for a different way of utilising neolocal tendency. It launched six “regional” beers, which always use one specific regional ingredient. One of these beers refers to the Friuli region, where Moretti originally came from, while others are associated with regions that have historically nothing in common with the brand.

Renewal of two traditional brands happened in the UK in 2018. First, the return of the previously famous Bass ale was announced, with marketing emphasising the history of the brand, not its spatial identity. According to critical responses traceable on the web,⁴ however, the return failed in marketing terms, particularly being criticised for production outside Burton-on-Trent and the illogical slogan “imported pale ale” for beer produced and sold in the UK. Ironically, Bass ale was, to a lesser extent, produced under license in Burton by Marston's Brewery even before 2018. The second British example is Tetley's. Its owner, Carlsberg, launched an intensive campaign to resume production of the traditional No. 3 Pale Ale in cooperation with an independent brewery located in Leeds and to return traditional motives (including the Leeds's coats of arms) to the logo of the entire brand (Fig. 7). The fact that it is

³ Source: https://enacademic.com/dic.nsf/enwiki/498679#cite_note-Euromonitor:2C_2011-39

⁴ See, for instance, <https://www.petebrown.net/2018/11/12/bass-ale-is-back-i-wish-i-was-more-delighted/>



Fig. 7: Oranjeboom from Rotterdam, Moretti from Apulia, Bass imported from the UK to the UK, and Tetley's branding before and after a change in 2018

Source: <https://www.doranjeboom.com/home>, <https://www.birramoretti.com>, <https://global.rakuten.com>, <https://www.bmstores.co.uk>, <https://www.carlsberggroup.com>

a deliberate campaign aiming to use the connection with local production is demonstrated by the statements of the marketing department of Carlsberg⁵. Considering the non-negligible role of beer in the UK consumers' identity (which was, among others, reflected by high public criticism of the earlier production relocation from Burton and Yorkshire, respectively), the connection to the traditional production site may be the reason why Tetley's return can be more successful than that of Bass, although data on the success of both brands are not yet available.

5. Discussion

5.1 Changes in the main marketing strategies

The main conclusion of our analysis is that the individual brands differed considerably, and it was not possible to determine any dominant chosen strategy. The most common was a resignation on regional branding, which could be inefficient and non-perspective for TNCs (Keenan, 2020; Pike and Pollard, 2010). We also observed a recent breakthrough, however, which brought greater emphasis of consumers on local products in the spirit of neolocalism (Naylor, 2000; Schnell, 2013; Schnell and Reese, 2003). Traditional brands and the relationship to regions or localities of original production are being renewed. These are not always the places where the brands are actually produced, and the relationship is frequently fictional for marketing purposes (Bowen, 2010, 2011; Overton and Murray, 2016). Producers

thus take advantage of consumers' false regional identities, assuming consumers are not interested in the real origin of products (Materna, Hasman and Hána, 2019). It seems that producers have not sufficiently appreciated the role of identity in brand-consumer relations before, and they now reflect it with the rise of neolocalism in contemporary marketing strategies. This illustrates that in sectors where consumers' attitudes to the product play a crucial role, acquisitions and plant closures cannot be viewed only from an economic perspective, but the spatial identity factor must also be considered (Marks and Mirvis, 2011; Materna, Hasman and Hána, 2019).

5.2 Evolution of market shares

Regarding the second research question, a decrease in market share clearly prevailed (21 cases), while only six brands were growing and the remaining three were stagnating. That does not necessarily mean the decreased demand was directly caused by production relocation, however – many brands had been losing their market share even before brewery closing. Moreover, the current global trends do not favour medium-sized brands (which are the cases for most of the analysed ones). On the one hand, the concentration of production occurs (Cabras and Higgins, 2016), and on the other hand, the interest in small local producers is growing (Schnell, 2013; Schnell and Reese, 2003). The analysed brands would probably have declined even if their breweries had not been closed.

⁵ For more see <https://www.morningadvertiser.co.uk/Article/2018/05/11/Tetley-s-to-be-brewed-in-Leeds-again>

5.3 The role of geographical factors

Several geographical cultural factors were identified that affected the chosen strategies and subsequent results. Contextual level factors, especially the embeddedness of brewing in the country's traditions and consumers' identity, seemed to be more fundamental. The country's location was also relevant, as TNCs seemed to approach Eastern European countries differently than Western European ones. In Eastern European countries in the initial stage of the beer life cycle, brands or utilisation of regional identity in marketing were abandoned much more often than in Western European countries, where keeping regional branding or focusing on export was more favoured. At the same time, brands that abandoned regional branding usually experienced a higher market share decline. It is not clear however to what extent this was a consequence of the unsuccessful marketing strategy and to what extent it was caused by possible TNC's strategy to gradually suppress the brand. It was further confirmed that in countries with a higher degree of beer traditions, breweries were more strongly connected to their regions. The relocation of production was more often criticised by consumers (see Bass or Tetley's in the UK, or Hostan and Zlatopramen in the Czech Republic) and brands that abandoned regional branding were unsuccessful. TNCs thus more often tended to continue to bet on regional identity, even though the brand was no longer produced in the region. This included a recent return to traditions and localism leading to more frequently utilised false regional identity, and in one case (Tetley's) even the return of physical production to the original region. In this sense, the assumption of Materna, Hasman and Hána (2019) that false regional identities occurred more in countries with a low beer tradition was not confirmed, and their example of Poland proved to be rather an exception. In fact, Poland has a medium rather than a low beer tradition within the European context (see Tab. 4). Brands in countries with a low beer tradition do not have much to build on and there is no motivation to keep such brands alive due to their weak embeddedness in regions. Finally, it is not surprising that a steady increase in market share was observed only within the countries with a relatively low beer tradition (the only exception being Czech Braník, see section 4.6).

Conversely, individual-level variables seem to have played a minor role. Some of them did not matter, while some regularities can be noted for others. The least successful were those brands that were named after the region where they were produced, so they were closely connected to the original place of production. Their production was terminated (Burgansko, Plevensko, Dnipro, and temporarily also Gemer), or profoundly decreased (Rechitskoye, Topvar, Lapin Kulta). The abandonment of brands was always the case of newly established ones (from 1965 and later)⁶, as they did not even have time to embed in their regions. Conversely, all brands that remained in production were established before 1965 (the only exception is Hateg). Finally, the results show that the chosen strategies were not related to which TNC acquired the brewery as the individual TNCs chose different strategies for their breweries depending on other circumstances. The only exception is Heineken's strong tendency to abandon regional branding. This may be related, however, primarily to the fact that Heineken focussed more on Eastern Europe than other TNCs.

6. Conclusion

Although the results cannot be generalised beyond the scope of the brands examined in this project, our research documents the important role of geographic factors in understanding the evolution of acquisitions. We have shown that external geographic factors need to be considered in every assessment of acquisition outcomes. Research has so far been limited to economic internal factors in the field of economic studies. It is relevant for companies to see these geographical factors when setting their strategies. Therefore, we believe that our research will contribute to a shift in knowledge about trends of the current globalised economy, local responses to the global shift, and the impact of actors from both TNC and local contexts.

Acknowledgements

This work was supported by the Czech Science Foundation; under Grant P404/18-13381S; and Charles University under Grant UNCE/HUM 018.

References:

- AL-LAHAM, A., SCHWEIZER, L., AMBURGEY, T. L. (2010): Dating before marriage? Analyzing the influence of pre-acquisition experience and target familiarity on acquisition success in the 'M&A as R&D' type of acquisition. *Scandinavian Journal of Management*, 26(1): 25–37.
- ALASHBAN, A. A., HAYES, L. A., ZINKHAN, G. M., BALAZS, A. L. (2002): International brand-name standardization/adaptation: Antecedents and consequences. *Journal of International Marketing*, 10(3): 22–48.
- AMIN, A. (2002): Spatialities of Globalisation. *Environment and Planning A: Economy and Space*, 34(3): 385–399.
- BARNETT, C., CLOKE, P., CLARKE, N., MALPASS, A. (2005): Consuming ethics: Articulating the subjects and spaces of ethical consumption. *Antipode*, 37(1): 23–45.
- BENSON-ARMER, R., LEIBOWITZ, J., RAMACHANDRAN, D. (1999): Global beer: What's on tap? *The McKinsey Quarterly*, 1: 111–121.
- BERTONCELJ, A., KOVAC, D. (2007): An integrated approach for a higher success rate in mergers and acquisitions. *Zbornik radova ekonomskog fakulteta u Rijeci-Proceedings of Rijeka Faculty of Economics*, 25(1): 167–188.
- BOWEN, S. (2010): Embedding local places in global spaces: Geographical indications as a territorial development strategy. *Rural Sociology*, 75(2): 209–243.
- BOWEN, S. (2011): The importance of place: Re-territorialising embeddedness. *Sociologia Ruralis*, 51(4): 325–348.
- CABRAS, I. (2011): Industrial and Provident Societies and Village Pubs: Exploring Community Cohesion in Rural Britain. *Environment and Planning A: Economy and Space*, 43(10): 2419–2434.
- CABRAS, I., HIGGINS, D. (2016): Beer, brewing, and business history. *Business History*, 58(5): 609–624.

⁶ Although the Kujawiak was produced in a brewery with a longer tradition, the brand itself was not launched on the market until 1975.

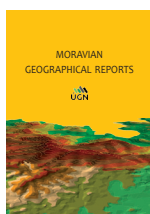
- DATTA, D., GRANT, J. H. (1990): Relationships Between Type of Acquisition, The Autonomy Given to the Acquired Firm, and Acquisition Success: An Empirical Analysis. *Journal of Management*, 16(1): 29–44.
- DAVIDS, K. (2015): Brewery, Brand, and Family: 150 Years of Heineken. *Business History Review*, 89(4): 805–808.
- DICKEN, P. (2015): *Global Shift. Mapping the Changing Contours of the World Economy*. London, SAGE Publications.
- GAMMELGAARD, J., DÖRRENBÄCHER, C. (2013): Introduction. In: Gammelgaard, J., Dörrenbacher, C. [eds.]: *The Global Brewery Industry* (pp. 1–18). Cheltenham, Edward Elgar.
- GAMMELGAARD, J., HOBDARI, B. (2013): Subsidiary strategic responsibilities and autonomy in Carlsberg. In: Gammelgaard, J., Dörrenbacher, C. [eds.]: *The Global Brewery Industry* (pp. 199–222). Cheltenham, Edward Elgar.
- GARAVAGLIA, C., SWINNEN, J. (2020): Industry Concentration and the Entry of Craft Producers into the Global Beer Market. In: Madsen, E. S., Gammelgaard, J., Hobdari, B. [eds.]: *New Developments in the Brewing Industry: The Role of Institutions and Ownership* (pp. 216–234). Oxford, Oxford University Press.
- GATRELL, J. D., NEMETH, J. D., YEAGER, C. D. (2014): Sweetwater, Mountain Springs, and Great Lakes: A Hydro-Geography of Beer Brands. In: Patterson, M., Hoalst-Pullen, N. [eds.]: *The Geography of Beer: Regions, Environment and Societies* (pp. 89–98). Dordrecht, Springer.
- GEPPERT, M., DORRENBACHER, C., GAMMELGAARD, J., TAPLIN, I. (2013): Managerial Risk-taking in International Acquisitions in the Brewery Industry: Institutional and Ownership Influences Compared. *British Journal of Management*, 24(3): 316–332.
- HAMPL, M. (1998): *Realita, společnost a geografická organizace: hledání integrálního řádu*. Praha, DemoArt.
- HÁNA, D., MATERNA, K., HASMAN, J. (2020): Winners and losers of global beer market: European competition in the view of product life-cycle. *Cambridge Journal of Economics*, 44(6): 1245–1270.
- HARVEY, D. (2010): *The Enigma of Capital and the Crises of Capitalism*. New York, Oxford University Press.
- HASMAN, J., HÁNA, D., MATERNA, K. (2016): Geografie pivovarnictví: vývoj prostorového rozdělení českého pivního trhu po roce 1989. *Geografie*, 121(3): 437–462.
- HAUGLAND, J. E. (2014): The Origins and Diaspora of the India Pale Ale. In: Patterson, M., Hoalst-Pullen, N. [eds.]: *The Geography of Beer: Regions, Environment and Societies* (pp. 119–130). Dordrecht, Springer.
- HOALST-PULLEN, N., PATTERSON, M., MATTORD, R., VEST, M. (2014): Sustainability trends in the regional craft beer industry. In: Patterson, M., Hoalst-Pullen, N. [eds.]: *The Geography of Beer: Regions, Environment and Societies* (pp. 109–116). Dordrecht, Springer.
- HOLT, D. B., QUELCH, J. A., TAYLOR, E. L. (2004): How global brands compete. *Harvard Business Review*, 82(9): 68–75.
- HOLTKAMP, C., SHELTON, T., DALY, G., HINER, C. C., HAGELMAN, R. R. III. (2016): Assessing neolocalism in microbreweries. *Papers in Applied Geography*, 2(1): 66–78.
- HOMBURK, C., BUCERIUS, M. (2006): Is speed of integration really a success factor of mergers and acquisitions? An analysis of the role of internal and external relatedness. *Strategic Management Journal*, 27(4): 347–367.
- HOWARD, P. H. (2014): Too Big to Ale? Globalization and Consolidation in the Beer Industry. In: Patterson, M., Hoalst-Pullen, N. [eds.]: *The Geography of Beer: Regions, Environment and Societies* (pp. 155–165). Dordrecht, Springer.
- HOWARD, P. H. (2018): Craftwashing in the U.S. beer industry. *Beverages*, 4(1): 1–13.
- ILBERY, B., KNEAFSEY, M. (1999): Niche markets and regional speciality food products in Europe: towards a research agenda. *Environment and Planning A: Economy and Space*, 31(12): 2207–2222.
- KAPLAN, S. N., WEISBACH, M. S. (1992): The Success of Acquisitions: Evidence from Divestitures. *Journal of Finance*, 47(1): 107–138.
- KEENAN, L. (2020): The geographies of the institutional and industrial constraints on the financialization of German brewing. *Environment and Planning A: Economy and Space*, 52(8): 1662–1680.
- LE HERON, K., HAYWARD, D. (2002): The Moral Commodity: Production, Consumption, and Governance in the Australasian Breakfast Cereal Industry. *Environment and Planning A: Economy and Space*, 34(12): 2231–2251.
- LEPIČ, M. (2017): Limits to territorial nationalization in election support for an independence-aimed regional nationalism in Catalonia. *Political Geography*, 60: 190–202.
- LEWIS, C., VICKERSTAFF, A. (2000): Positioned for success: Branding in the Czech brewing industry. *Journal of Brand Management*, 7: 341–352.
- LIMBERGER, S. C., TULLA, A. F. (2017): The emergence of microbreweries in the face of the oligopolization of the brewing sector (Brazil and Spain). *Finisterra-revista portuguesa de geografia*, 52(105): 93–110.
- LOY, J.-P., GLAUBEN, T., MONGROWIUS, A. (2020): Price Promotions in Space and Time. Some Evidence for the German Beer Market. In: Madsen, E. S., Gammelgaard, J., Hobdari, B. [eds.]: *New Developments in the Brewing Industry: The Role of Institutions and Ownership* (pp. 118–137). Oxford, Oxford University Press.
- MADSEN, E. S. (2020): Branding and Consolidation in the Global Beer Market. In: Madsen, E. S., Gammelgaard, J., Hobdari, B. [eds.]: *New Developments in the Brewing Industry: The Role of Institutions and Ownership* (pp. 192–215). Oxford, Oxford University Press.
- MADSEN, E. S., GAMMELGAARD, J., HOBDARI, B. (2020): Introduction. *Interactions between Institutions and Governance Management in the Brewing Industry*.

- In: Madsen, E. S., Gammelgaard, J., Hobdari, B. [eds.]: *New Developments in the Brewing Industry: The Role of Institutions and Ownership* (pp. 1–21). Oxford, Oxford University Press.
- MARKS, M. L., MIRVIS, P. H. (2011): Merge Ahead: A Research Agenda to Increase Merger and Acquisition Success. *Journal of Business and Psychology*, 26(2): 161–168.
- MARTIN, R. (2011): The local geographies of the financial crisis: From the housing bubble to economic recession and beyond. *Journal of Economic Geography*, 11(4): 587–618.
- MATERNA, K., HASMAN, J., HÁNA, D. (2014): *Obraz regionální identity v pivovarnictví severozápadních Čech* [online]. [cit. 16.09.2020]. Available at: <https://regpol.natur.cuni.cz/REGPOL-53.html>
- MATERNA, K., HASMAN, J., HÁNA, D. (2019): Acquisition of industrial enterprises and the role of regional identity: the case of beer industry in Central Europe. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, 73(4): 197–214.
- MUEHLFELD, K., WEITZEL, U., VAN WITTELOOSTUIJN, A. (2011): Mergers and acquisitions in the global food processing industry in 1986–2006. *Food Policy*, 36(4): 466–479.
- NAYLOR, S. (2000): Spacing the Can: Empire, Modernity, and the Globalisation of Food. *Environment and Planning A: Economy and Space*, 32(9): 1625–1639.
- OVERTON, J., MURRAY, W. E., BANKS, G. (2012): The Race to the Bottom of the Glass? Wine, Geography, and Globalization. *Globalizations*, 9(2): 273–287.
- OVERTON, J., MURRAY, W. E. (2016): Fictive place. *Progress in Human Geography*, 40(6): 794–809.
- OZSOMER, A. (2012): The interplay between global and local brands: A closer look at perceived brand globalness and local iconness. *Journal of International Marketing*, 20(2): 72–95.
- PAASI, A. (2002): Bounded spaces in the mobile world: Deconstructing ‘regional identity’. *Tijdschrift voor Economische en Sociale Geografie*, 93(2): 137–148.
- PAVLÍNEK, P. (2015): Škoda Auto: the transformation from a domestic to a Tier Two lead firm. In: Bryson, J. R., Clark, J., Vanchan, V. [eds.]: *Handbook of Manufacturing Industries in the World Economy* (pp. 345–361). Cheltenham, Northampton, Edward Elgar.
- PIKE, A., POLLARD, J. (2010): Economic geographies of financialization. *Economic Geography*, 86(1): 29–51.
- RANGNEKAR, D. (2011): Remaking Place: The Social Construction of a Geographical Indication for Feni. *Environment and Planning A: Economy and Space*, 43(9): 2043–2059.
- REID, N., GATRELL, J. (2015): Brewing growth: Regional craft breweries and emerging economic development opportunities. *Economic Development Journal*, 14: 4–12.
- REID, N., GATRELL, J. (2017): Craft Breweries and Economic Development. *Polymath: an Interdisciplinary Arts & Sciences Journal*, 7(2): 90–110.
- RENNEBOOG, L., VANSTEENKISTE, C. (2019): Failure and success in mergers and acquisitions. *Journal of Corporate Finance*, 58: 650–699.
- ROBERTSON, R. (1995): Glocalization: Time-space and homogeneity-heterogeneity. In: Featherstone, M., Lash, S., Robertson R. [eds.]: *Global Modernities* (pp. 25–44). London, SAGE.
- RUSTEN, G., BRYSON, J. R., AARFLOT, U. (2007): Places through products and products through places: Industrial design and spatial symbols as sources of competitiveness. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, 61(3): 133–144.
- SCHMITT, E., DOMINIQUE, B., SIX, J. (2017): Assessing the degree of localness of food value chains. *Agroecology and Sustainable Food Systems*, 42(5): 573–598.
- SCHNELL, S. M. (2013): Deliberate identities: Becoming local in America in a global age. *Journal of Cultural Geography*, 30(1): 55–89.
- SCHNELL, S. M., REESE, J. F. (2003): Microbreweries as tools of local identity. *Journal of Cultural Geography*, 21(1): 45–69.
- ŠIFTA, M., CHROMÝ, P. (2017): The importance of symbols in the region formation process. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, 71(2): 98–113.
- SPENCER, D. A. (2020): Economics and ‘bad’ management: the limits to performativity. *Cambridge Journal of Economics*, 44(1): 17–32.
- STILWELL, F. (2018): *Political Economy. The Contest of Economic Ideas*. South Melbourne, Oxford University Press.
- SWINNEN, J. (2017): Beer consumption and trade in an era of economic growth and globalization. *Choices*, 32(3): 1–6.
- SWYNGEDOUW, E. (2004): Globalisation or ‘glocalisation’? Networks, territories and rescaling. *Cambridge Review of International Affairs*, 17(1): 25–48.
- TSELIOS, V., TOMANEY, J. (2019): Decentralisation and European identity. *Environment and Planning A: Economy and Space*, 51(1): 133–155.
- VALLBÉ, J. J., MAGRE, J., TOMÀS, M. (2018): Being metropolitan: The effects of individual and contextual factors on shaping metropolitan identity. *Journal of Urban Affairs*, 40(1): 13–30.
- VAN KERCKHOVEN, S., VAN MEERTEN, M., WELLMAN, C. (2020): Contract Brewing and Its Implications for the Beer Industry. In: Madsen, E. S., Gammelgaard, J., Hobdari, B. [eds.]: *New Developments in the Brewing Industry: The Role of Institutions and Ownership* (pp. 235–255). Oxford, Oxford University Press.
- VINOPAL, J. (2006): Pivo a hospody v české společnosti. Český pivní patriotismus. *Výběr piva českými konzumenty. Kvasný průmysl* 52(1): 26–27.
- WILKINSON, J., CERDAN, C., DORIGON, C. (2017): Geographical indications and ‘origin’ products in Brazil – the interplay of institutions and networks. *World Development*, 98: 82–92.
- WILLIAMS, S. (2009): *Tourism Geography: A New Synthesis*. London, Routledge.
- WINTER, M. (2003): Embeddedness, the new food economy and defensive localism. *Journal of Rural Studies*, 19(1): 23–32.

- WOJTYRA, B. (2020): How and why did craft breweries 'revolutionise' the beer market? The case of Poland. *Moravian Geographical Reports*, 28(2): 81–97.
- YOOL, S., COMRIE, A. (2014): A Taste of Place: Environmental Geographies of the Classic Beer Styles. In: Patterson, M., Hoalst-Pullen, N. [eds.]: *The Geography of Beer: Regions, Environment and Societies* (pp. 99–108). Dordrecht, Springer.
- ZENG, Y. P., DOUGLAS, T. J., WU, C. Q. (2013): "The Seller's Perspective on Determinants of Acquisition Likelihood: Insights from China's Beer Industry." *Journal of Management Studies*, 50(4): 673–698.
- ZENG, Y. P., SCHOENECKER, T. S. (2015): Strategic similarity and acquisition outcomes at the target: Evidence from China's beer industry. *Asian Business & Management*, 14(5): 413–438.

Please cite this article as:

HASMAN, J., HÁNA, D., MATERNA, K. (2021): Regional brands produced beyond the region: An analysis of beer brands from recently closed breweries in Europe. *Moravian Geographical Reports*, 29(3): 168–183. doi: <https://doi.org/10.2478/mgr-2021-0013>



The importance of historical maps for man-made pond research: From the past extent of ponds to issues of the present landscape. A case study from the Czech Republic

Jindřich FRAJER^{a*}, Jana KREMLOVÁ^a, David FIEDOR^a,
Renata PAVELKOVÁ^a, Miroslav TRNKA^{b,c}

Abstract

Historical maps are a valuable resource in landscape research. The information gathered from them facilitates the cognisance of landscapes and may assist current landscape planning. This study focuses on the historical occurrence and spatial extent of man-made ponds in the Czech Republic. Based on the 1st Military Survey maps (1764–1783) of the Habsburg Monarchy, we use Historical GIS to identify 7,676 man-made ponds in the historical landscape. Compared to the 2nd Military Survey maps (1836–1852), 56% of these man-made ponds had been drained. Such disappearances mostly affected large ponds in fertile agricultural areas, but also affected small reservoirs in less fertile areas at higher altitudes. As the current maps and spatial datasets (Water reservoirs, Landscape water regime, Farming areas) show, a number of these agricultural regions have been affected by climate changes and face water shortages. The historical map information of former ponds has the potential to contribute to their restoration in areas where water retention in the landscape needs to be increased.

Keywords: ponds; water regime; historical GIS; historical maps; Czech Republic

Article history: Received 25 February 2021, Accepted 29 July 2021, Published 30 September 2021

1. Introduction

Historical maps are an important source of information on the historical landscape (Podobnikar, 2010; Pindozi et al., 2016). Their popularity is growing, and they are used more commonly in the academic sphere, which is reflected in the number of published studies that utilise them (Chiang et al., 2020, p. 5). Historical maps are more beneficial in comparison with other sources, mainly in providing rapid spatial information on a given phenomenon without the need to study the auxiliary science of history (Trpáková, 2009). They are more widely available online to both experts and the public with increased digital access (Southdall and Přidal, 2012). Historical map processing in geographical information systems (GIS) has proven beneficial in many disciplines. The information acquired in this manner can be combined with other sources of spatial data. Processing historical materials in GIS is often

referred to as Historical GIS (HGIS) (Knowles, 2002). It allows researchers to gain new insights about the past as well as to expand its application throughout various fields (Gregory and Geddes, 2014). HGIS traces the long-term spatial development of certain phenomena in the landscape, thus providing valuable information to other sciences dealing with current landscapes. The methods of HGIS are applied in geographic research (among others) in the study of land use development (Demek et al., 2012; Pindozi et al., 2016), landscape diversity (Yeh and Huang, 2009), changes in natural or anthropogenic landforms (Faccini et al., 2020), and specific landscape features (Kaim et al., 2020; Brykała and Podgórski, 2020). The outcomes of such studies facilitate the understanding of the present landscape development and its functions (Skaloš, Richter and Keken, 2017; Bateman et al., 2020), allow the discovery of locations suitable for conservation (Canessa et al., 2017), or

^a Department of Geography, Faculty of Science, Palacký University Olomouc (*corresponding author: J. Frajer, e-mail: jindrich.frajer@upol.cz)

^b Institute of Agriculture Systems and Bioclimatology, Mendel University of Agriculture and Forestry, Brno, Czech Republic

^c Global Change Research Centre, Czech Academy of Sciences, Brno, Czech Republic

serve as a basis for modelling future landscape development (Tortora et al., 2015) and a source of inspiration for solving environmental issues in the current landscape (Antrop, 2004; Haase et al., 2007; Marignani et al., 2008).

The above-mentioned research can be documented with the example of ponds in the landscape. Ponds (natural and anthropogenic) are an integral part of the rural landscape. As such, their existence as an everyday feature of the landscape has ‘prevented’ expert discovery of their original role and history (Upex, 2004), and they have escaped the mainstream attention of scientists for a considerable amount of time (Jeffries, 2016; Ruggiero et al., 2008). This view has changed, together with the result of dynamic changes of European landscapes during the last two centuries (Antrop, 2004; Jeffries, 2012). A number of ponds were turned into agricultural land in the 19th and 20th centuries due to the intensification of agriculture (Boothby and Hull, 1997; Curado et al., 2011; Havlíček et al., 2014), cleared for advancing urbanisation (Burgin et al., 2016), and other anthropogenic activities such as mining and transport infrastructure construction (Kopp et al., 2015). Many other ponds face growing anthropogenic pressure including agricultural drainage, pollution and landfilling (Juszczak and Kedziora, 2003), as well as the impacts of climate extremes (Jeffries, 2016).

Landscapes lack other important hydrological and ecological features with the loss of ponds (Céréghino et al., 2008; Chen et al., 2019; Juszczak et al., 2007). In England, with respect to the important conservation values of ponds, historical maps began to be used to follow the long-term development of the number and density of ponds in the landscape in the mid-1980s (Jeffries, 2012; Langton, 1985). Simultaneously, the causes of their disappearance were uncovered (Boothby and Hull, 1997). Studies from the end of the last century emphasised the exceptional role of ponds as wildlife habitats; thus ponds became an important scientific as well as political topic with respect to landscape planning and landscape management (Jeffries, 2016). Historical maps allow us to uncover the extent of the loss of ponds in the landscape. Thus, official historical state surveys (Chabudziński et al., 2017; Jankowski, 2006; Jeffries, 2016), special historical atlases (Fairchild et al., 2013), as well as personal hand-drawn maps (Johnstone, 2015) and plans (Mactaggart et al., 2007), have been used and combined in the GIS environment with current maps and aerial photographs (Fairchild et al., 2013) or with Lidar data (Walter and Merritts, 2008).

Ponds have become a topic for discussion in Central Europe with respect to adaptation measures to climate change and their impact on the landscape. This concerns mostly the impact of higher frequency and duration of the period of drought in the landscape (Trnka et al., 2016). This trend has had an impact on most of Europe, which has been repeatedly affected by drought during the last decades (Barros et al., 2014), along with the recent European summer droughts starting from 2015, which are without precedence over the last two millennia (Büntgen et al., 2021). Thus, the availability of water in the landscape, whether for plants and animals or human society and its activities and needs – agriculture, aquaculture, industrial production, recreation, supplying local aquifers, water accumulation in case of fire – becomes a major problem, especially during the summer months. Ponds might play a significant role in this issue. They provide many hydrological functions such as intercepting surface run-off, reducing and postponing flood

peaks, recharging and discharging groundwater, intercepting sediment in surface run-off, increasing humidity in their neighbourhoods and storing water for different human needs (Chen et al., 2019). Overall, they increase water retention in the landscape (Juszczak et al., 2007).

Building man-made ponds can also be seen as a significant anthropogenic impact on the landscape (Hoffmann, 2002), which dramatically affects natural hydrological and geomorphological processes (Walter and Merritts, 2008). Their contribution to groundwater recharging is sometimes disputed (Kale, 2017), as well as their ecological functions when they can disturb the natural migration trajectories of certain fish species (DeFries et al., 2019), change the quality of water in the watercourses (Igantius and Rasmussen, 2016), store the environmental pollutants from anthropogenic activity (Bábek et al., 2021), or create eutrophic or hypertrophic conditions due to the increased nutrient loading from agriculture and settlement (Potužák, 2016). The lack of maintenance or unsuitable management of man-made ponds may lead to the loss of some hydrological functions (Výleta, 2020), which may also cause the threat of dam burst or overflowing of man-made ponds during flood events (Lhotský, 2010).

The tradition of man-made ponds in Central European countries goes back to the Middle Ages, but most of these ponds ceased to exist at the beginning of the 19th century (Jankowski, 2006; Pavelková et al., 2016). For the above-stated hydrological and ecological functions of man-made ponds, a gradual revitalisation and renewal of ponds with the support of the state or European subsidy programs is presently underway (Chabudziński et al., 2017; Rozkošný et al., 2020). Historical maps can play an important role in preparing the ground for pond restoration (David and Davidová, 2015).

The aims of this paper, using the example of the Czech Republic and the methods of HGIS, historical maps, and current geodata are:

- i. to identify the historical man-made ponds, discover their spatial distribution in the historical landscape, and to determine the extent of their disappearance at the beginning of the 19th century; and
- ii. to determine the potential applicability of historical pond data in connection with the issues of water shortages in the current landscape.

2. Theoretical background

2.1 Ponds – terminology

The definitions of ponds vary according to the viewpoints used to evaluate them and the purposes of the study. Ponds are most commonly defined based on their size – that is what distinguishes them from lakes (Moss, 2017). Chabudziński et al. (2017, p. 2) saw ponds as small man-made or natural shallow water bodies in the landscape that hold water permanently or temporarily. This corresponds to the definition presented by De Meester et al. (2005), who stated that it is complicated to distinguish between a pond and a lake, which can, similar to a pond, be of a natural or anthropogenic origin (Jánský and Šobr, 1995). While some authors perceived ponds only as “small” water bodies expanding up to 2 hectares maximum (Biggs et al., 2005; De Bie, 2008; Wood et al., 2003), others recommended extending the limit to 5 hectares (De Meester et al., 2005) or up to 100 hectares, mainly in regions without natural lakes (Renwick

et al., 2005). Moss (2017) noted that the size limit between lakes and ponds is artificial and that ponds can be historically seen as small lakes and small lakes as large ponds. The term pond however is more commonly used in connection with human activities (fishpond, farm pond, hammer pond, etc.) (Löfler, 2001). This also holds for the Czech Republic, where the historically largest man-made ponds reached sizes from several tens of square metres up to several hundreds of hectares (Pokorný and Hauser, 2002).

The distinction between man-made ponds (sometimes called artificial ponds, e.g. Oertli, 2002; or constructed ponds, e.g. Fairchild et al., 2013) and natural ponds are often blurred as well. A number of these water bodies are up to several centuries old (Hurst et al., 2016), and their integration in the landscape makes the distinction between natural and anthropogenic origin nearly impossible (Muir, 2004). This occurs mainly because the newly created pond is soon colonised by neighbouring macrophytes (Francová et al., 2019). Some types of man-made ponds are well recognisable because of specific earthworks (e.g. dams, dykes, or feeding channels), but others were created from natural ponds located in shallow depressions, which were only deepened and expanded by digging (Rugiero et al., 2008), or they are flooded relics of past mining activities (Prince, 1962).

In this study, a distinction between man-made and natural ponds is used following Fairchild et al. (2013), who applied historical maps and aerial photographs and reduced the category of natural ponds to oxbow ponds and temporary ponds in a study about the changes in the distribution of constructed ponds in the Brandywine watershed. This category can be detected in historical maps within floodplains with elongated and typically sinuous shapes, as well as by orientations paralleling larger streams. All other ponds which are typical for their regular shape, bank conditions, dams, or outfall structures, as well as their specific land use, are then constructed (man-made) ponds. Fairchild et al. (2013) followed the conditions of their study area with a few natural lakes. The situation in the Czech Republic is similar: there are very few natural ponds and lakes and the majority of ponds are of anthropogenic origin (Björk, Pokorný and Hauser, 2010; Pavelková et al., 2016). Thus, our research considers all water bodies in historical maps to be man-made ponds (except oxbow ponds), regardless of their size.

2.2 History of man-made ponds in the Czech Republic

The history of the construction of artificial ponds in the Czech Republic goes back to the 10th century, with evidence of their existence in the form of archaeological findings. The first written accounts date to documentation of the 12th century. The records about fishponds were part of the list of properties gifted by the monarch to newly established monasteries. These records also demonstrate an interesting fact – the history of creating man-made ponds in the Czech Republic is closely linked to the term fishpond. It refers to small water reservoirs primarily serving as fish farms but was also used for all other types of ponds, whether it was sources of water for mills, watering places for cattle, or decorative ponds in the gardens of noble houses. For example, millpond in Czech (mlýnský rybník) is directly translated as mill fishpond. The preference for the term fishpond is connected with the massive construction of ponds in the 15th and 16th centuries due to the beneficial activity of fish farming (especially carp). Powerful noble families, royal cities, and monasteries built extensive systems of ponds that were supplied by watercourses as well as by artificial channels (Lochamn, 1970).

Originally, smaller ponds were built on small watercourses as they were less demanding technologically. As builders gained experience, however, large ponds were built in flat areas and on larger watercourses. The largest ones, including Rožmberk (South Bohemia), Velká Čepka, and Blato (Eastern Bohemia) covered an area of up to 1,000 hectares. And it is the largest ponds and pond systems that have attracted the greatest attention of research so far in the fields of history (Teplý, 1925), geography (Skaloš et al., 2011), and hydrobiology (Francová et al., 2019). It is estimated that in the period of the greatest boom of man-made pond building (16th century), there were approximately 75,000 fishponds on the territory of the current Czech Republic (Broža et al., 2005) covering a total of 180,000 ha (Teplý, 1925). The actual number of constructed ponds is unclear, however, given the lack and fragmentation of historical resources, as well as the fact that many small fishponds were not in the interest area of the period officials and chroniclers.

As Figure 1 shows, the number of ponds currently in the Czech Republic has been declining since the Middle Ages, especially during the 18th and 19th centuries, when the

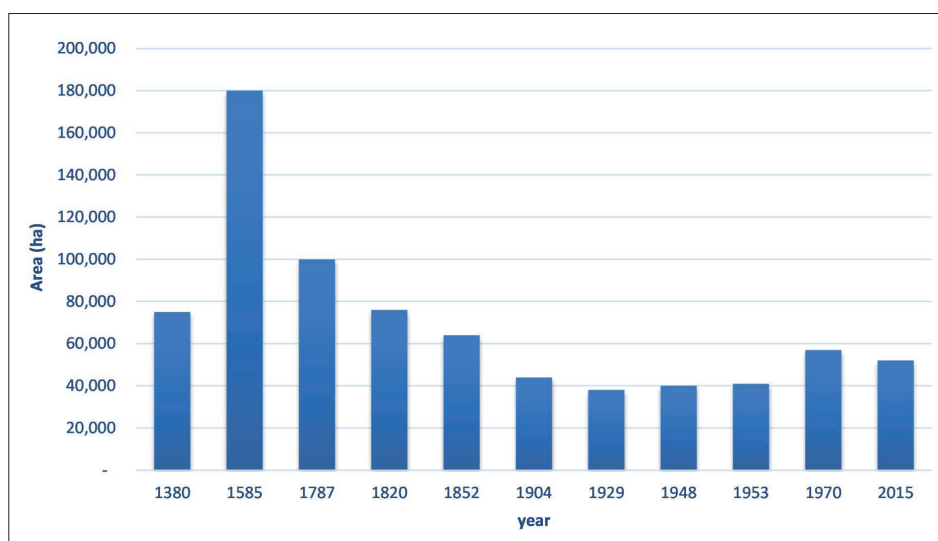


Fig. 1: Development of fishpond areas in the Czech Republic

Sources: Adapted from Teplý (1925), Růžička (1954), Jůva (1980), Pavelková et al. (2014), and Lusk (2015)

majority of fishponds were drained. Such changes were connected to several factors, including the Enlightenment reforms (abolition of monasteries, slavery, land reforms), the poor technical condition of the fishponds, natural processes (filling with sediments or destroyed by flood), a decline in the economic yield of fish farming, as well as accelerated urbanisation – but mainly due to intensified agriculture. Regarding pond draining, two main “waves” can be identified. The first one occurred at the turn of the 18th and 19th centuries and the second one in the second half of the 19th century. The “second wave” of pond destruction in the Czech Republic was surveyed in detail in the study of Pavelková et al. (2016). They identified nearly 34,000 man-made ponds of an area of 64,000 ha based on historical maps from the mid-19th century (2nd Military survey of the Habsburg Empire). Focusing on ponds larger than 0.5 ha, more than 31% of them (over 15,000 ha) disappeared from the landscape. The “first wave” of pond destruction, which appears to be more significant based on regional studies (David and Černochová, 2020; Frajer, 2019; Skaloš et al., 2011; Šimůnek et al., 2014), however, has not yet been studied on a larger scale.

Interest in the restoration of ponds was already registered at the end of the 19th century in connection with rediscovering carp pond management practices (Francová et al., 2019). Since the mid-20th century, some ponds have also been restored for agricultural purposes (irrigation). State and European subsidies to support the restoration of ponds for ecological and hydrological purposes began to be granted in the 1990s. Some 342 projects for the construction of new ponds and restoration of former ones were subsidised between 2008–2014 (Rozkošný et al., 2020). At present, ponds are among the topics of public and political dispute in connection with

climatic change and its impact on the landscape (Ministry of Agriculture of the Czech Republic, 2019), especially the potential for their restoration.

2.3 Study area

The area of interest was determined with respect to the use of historical maps based on the borders of historical regions which were identifiable in the historical maps. Four historical administrative regions were included: Čáslav, Chrudim, Hradec and Bydžov (see Fig. 2a). The study area covers some 12,478 km² and is diverse in terms of its relief, climate and soil conditions. These aspects may have influenced the disappearance of ponds. The central part of the study area contains fertile flatlands along the river Elbe and its tributaries, where historically large pond areas (Poděbrady and Pardubice regions) were located. This part of the study area is mostly affected by drought and negative water regimes (e.g. higher evapotranspiration rate than precipitation: Fig. 2b). There are mountainous areas in the north and north-east and the south and south-east are characterised by highlands. Regarding the official distribution of areas suitable for farming in the Czech Republic, three farming areas are located: a fertile beet-growing area (mostly with chernozems and fluvisols up to 300 m a. s. l., annual mean temperature between 8 and 9 °C and mean annual precipitation between 500–650 mm); a potato-growing area (luvisols, cambisols, up to 600 m a. s. l., 6–8 °C; 600–800 mm); and a mountain area (cambisols, > 600 m a. s. l., < 6°C, > 800 mm). The results of climatic models based on the data acquired between 1981–2010 show that nearly 27% of the area of interest has a negative balance of water regime in the landscape, and that this share is expected to increase to 39% by 2040 (Czech Globe, 2021).

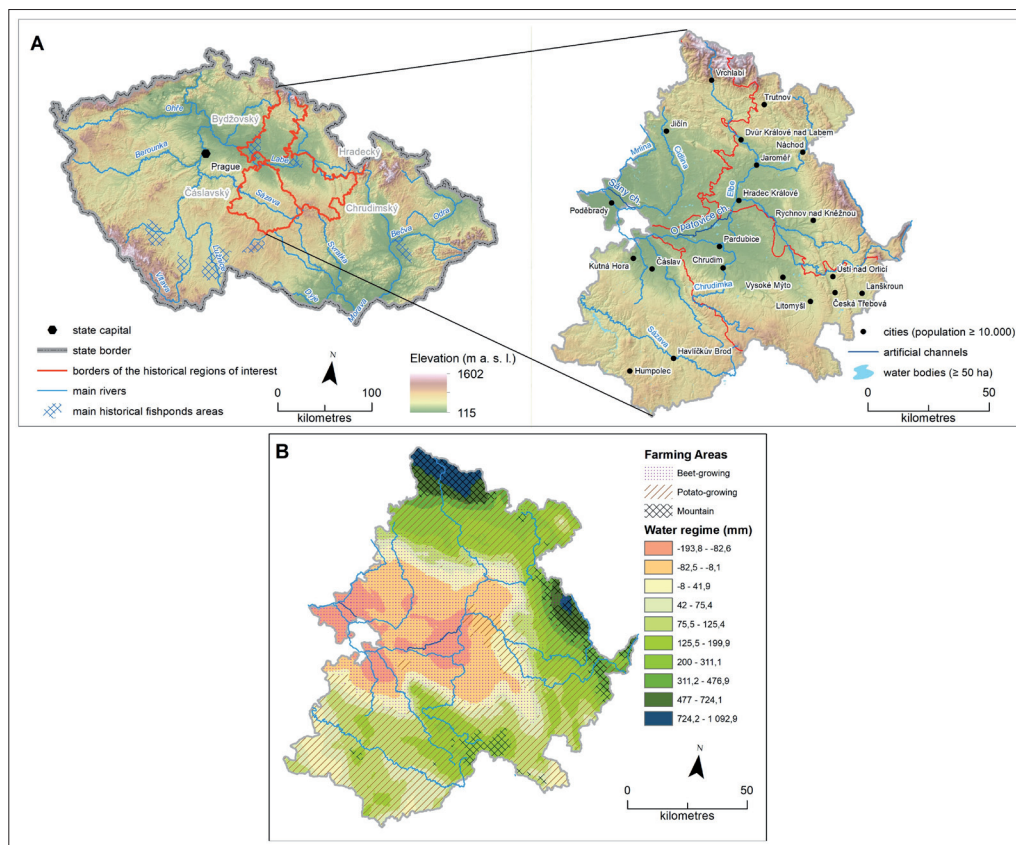


Fig. 2: Study area: A) Location of the study area within the Czech Republic (note: borders of the historical regions are based on the maps from the 1MS); B) Water regime (1981–2010); and Farming areas
Sources (for data): ArcCR 500; Semotanová and Synek, 2007; CzechGlobe, 2021; ČÚZK, 2021

3. Data and methods

3.1 Historical maps

The 1st Military Survey (IMS) of the Habsburg Empire is the basic historical map source for our study. It was undertaken for military-strategic reasons and was completed during the reign of Joseph II (it is also known as the Josephian Survey). The Habsburg Monarchy was surveyed between the years 1764–1783. The Czech Lands, which belonged to the Monarchy, were surveyed in 1764–1768 on the scale of 1:28,800, and some map sheets were rectified between 1780–1783 (Zimová et al., 2006a). The survey utilised older enlarged Müller's maps of Bohemia and Moravia with astronomically determined geodetic points (Janata and Cajthaml, 2021), although the plotting itself was accomplished using the *à la vue* method through military engineers who rode horses on the landscape and took notes (Krejčí et al., 2009). Together with the maps, military engineers made a written description of the depicted areas (Vávrová and Šantrůčková, 2009). These written sources were not used for our study.

The absence of adequate cartographic procedures and the lack of a geodetic network had an impact on the positional deviation of the resulting maps (Zimová et al., 2006b). It is then rather problematic to follow the sequence of individual map sheets when processing a larger area and to maintain a uniform procedure in georeferencing. The entire area of the Habsburg Monarchy was newly georeferenced within the Arcanum Mapire project using the mathematical model Cassini-Soldner map projection for an unknown map grid of the original maps (Molnár and Timár, 2015). It results in a seamless layer of IMS which is available in the map portal Mapire.eu and access can be bought for a fee via the Web Map Tiled Service (WMTS) for GIS software in the Web Mercator projection. The positional accuracy of this georeferenced

layer varies. For the fifty selected ground control points, Janata and Cajthaml (2021) showed that the median of the positional deviation of this layer is about 250 m, but the maximum deviations can reach 2,000 m in a few cases.

The second source of spatial information of the historical landscape is the 2nd Military Survey (2MS) of the Habsburg Empire, which was created in the years 1836–1852 on an identical scale (1:28,800). This survey was based on more precise geodetic field methods and used a network of trigonometric points (Timár, 2009). The positional accuracy of this survey is very high, and the positional deviations are less than 50 m (Zimová, 2006b). We accessed the seamless georeferenced layer of the 2MS on the Mapire.eu portal.

3.2 Spatial datasets

Publicly available spatial data are used in this study: the GIS layer of water reservoirs (WR) from the Digital bases of water management data (DIBAVOD); the Digital Elevation Model (DEM); and the official regionalisation of farming areas (FA) of the Czech Republic (reflecting physical geographic conditions for agriculture production). The detailed attributes of each source are presented in Table 1. In addition to these sources, we have also used the outputs of two scientific projects: (i) Assessment of agricultural land in the areas of former fishpond systems with the aim of supporting the sustainable management of water and soil resources in the Czech Republic; and (ii) CzechAdapt – System for Exchange of Information on Climate Change Impacts, Vulnerability and Adaptation Measures on the Territory of the Czech Republic. We acquired the GIS layer of Historical fishponds of the Czech Republic (HFGR) in the first one (i). This polygon layer contains vectorised man-made ponds from the 2MS, for the complete area of the Czech Republic. Ponds larger than 0.5 ha have an attribute about their existence or non-existence to present. This

Spatial dataset	Description	Administrator/Source	Access
Water reservoirs (WR) (<i>A05 Vodní nádrže*</i>)	Polygon layer; part of the DIBAVOD; based on the Fundamental Base of Geographic Data of the Czech Republic (ZABAGED®), from the year 2010 on the scale of 1:10,000	T. G. Masaryk Water Research Institute, Public Research Institution (VÚV T.G.M.)	www.dibavod.cz (public source)
Digital Elevation Model of the Czech Republic (DEM)	Derived from Lidar data. Distributed in the raster format (cell size 50 × 50 m); part of the spatial data package ArcCR500 (version 3.3; 2016)	ArcDATA Prague Ltd. State Administration of Land Surveying and Cadastre (ČÚZK)	https://www.arcdata.cz/ (public source)
Farming areas (FA) (<i>Výrobní oblasti a podoblasti katastrálních území*</i>)	The official regionalisation of the territory of the Czech Republic reflects the agro-ecological conditions of the territory for agricultural production; distributed as an attribute table for all cadastral municipalities (last updated 2021)	State Administration of Land Surveying and Cadastre (ČÚZK)	https://www.cuzk.cz/ (public source)
Historical Fishponds of the Czech Republic (HFGR)	Polygon layer of the historical fishponds; based on the 2 nd Military Survey (1836–1852); (last updated 2016)	Ministry of Agriculture Palacký University Olomouc T. G. Masaryk Water Research Institute, Public Research Institution (VÚV T.G.M.)	https://heis.vuv.cz/ (data on demand)
Changes in landscape water regime 1981–2010 (WReg)	Based on the AgriClim tool developed by CzechGlobe; raster dataset (cell size = 500 × 500 m)	Global Change Research Institute, CAS (CzechGlobe)	https://www.klimatickazmena.cz/en/?l=33 (data on demand)

Tab. 1: Spatial datasets (Note: *official name in the Czech language)
Sources: As indicated in Table

layer was finished in 2016 on the base of the georeferenced 2MS, which is accessible by the Czech National Geoportal via WMS.

From the CzechAdapt project (ii), we use the data for landscape water regimes from 1981 to 2010. The resulting raster layers expressed the mean difference between annual sums of precipitation and reference evapotranspiration during the years. It is based on the calculation from AgriClim software, which was developed for calculating agroclimatic indicators (see Trnka et al., 2011). This software works with a database of meteorological elements in a daily step (maximum and minimum air temperatures, a sum of global solar radiation, precipitation totals, wind speed, and air humidity) for the current climate, which is based on measurements at individual stations throughout the Czech Republic. These values are interpolated to grids (500 × 500 m) covering the Czech Republic, to which AgriClim is then applied. Its key components include the SoilClim model for calculating reference and actual evapotranspiration, moisture and soil temperature, and a description of the soil climate (Czech Globe, 2021).

3.3 Data preparation and processing

A layer of all water bodies found in the area of interest in the four historical regions was created as the first step using the software ArcMap 10.3 based on the 1MS (from WMTS provided by Mpire portal). The regions were recorded in the 1MS. There were 7,796 objects in total. Three attributes were recorded for each object (pond): type (man-made or natural: following the Fairchild et al., 2013 methodology); area (hectares); and disappearance (dichotomous: yes: pond occurs only on the 1MS; no: pond occurs on the 1MS and 2MS). The last attribute was studied using the visual comparison of the 1MS and 2MS in the portal Mpire (tool Synchronized view). Only man-made ponds were entered into further analyses: they were saved in the 1MS_mp layer. Another 536 ponds were vectorised in the buffer zone of 2 km along the border of the area of interest for the needs of spatial analyses (see below). Furthermore, a point layer was created with the localities of the dams of former ponds, which were displayed in the 1MS within the area of interest.

For the basic statistical evaluation, the polygon layer of man-made ponds (1MS_mp) was converted to the point layer (centroid for each pond; layer: 1MS_mpp), to which was consequently assigned the attributes of altitude from DEM and affiliation with Farming Areas (FA) (Tab. 2). The 1MS_mp layer through the ArcMap tool Kernel density layer (with this setting: cell size = 550; search radius = 6,500) was used to assess the spatial concentration of ponds. The same process was applied to the HFRCR layer for further comparison. Man-made ponds from the buffer zone also entered this analysis in order to avoid distortion of spatial analyses at the boundaries of the study area.

A grid of hexagons (area of one hexagon = 5 km²) was created for the entire territory to evaluate the development of man-made ponds in the landscape and its current water regime. For each hexagon, the areas (square metres) of man-made ponds from each source (1MS_mpp; HFRCR; WR) were calculated using Hawth's Analysis Tools (Beyer, 2004) in ArcMap. Furthermore, for each hexagon, the mean value of water balance and altitude was calculated from the raster data WReg and DEM using the Zonal Statistics tool. This created a HEX layer with all the above attributes.

Data from the 1MS_mpp and HEX layer were then entered into statistical processing. The Mann-Whitney U test was used for ponds within the 1MS_mpp layer. The null hypothesis that all samples come from the same population (i.e. have the same median) was tested at a significance level of $\alpha = 0.05$.

Concerning the second objective of the article, it is necessary to focus on identifying areas where data on the location of defunct historic ponds could serve to restore them. For this purpose, cluster analysis is primarily used to create different types of areas, depending on altitude and water balance, but also depending on the representation of water areas and their change over time. Cluster analysis was applied to the data from the HEX layer (with the hierarchical method and Euclidean distance setting). Ward's method was chosen as a criterion for clustering. The variables that entered the cluster analysis for each hexagon were the following: altitude, a sum of pond area from the 1MS_mp layer, a sum of the area from the WR layer, and mean water balance from the Wreg layer. For individual clusters, the hypothesis of concordance of medians of water balance in each hexagon was tested at a significance level $\alpha = 0.05$. If this hypothesis was rejected, the methods of multiple comparisons were used to determine the differences between the individual pairs of clusters (again at the level of significance $\alpha = 0.05$). The authors used nonparametric methods of hypothesis testing since conditions of data normality were not met.

4. Results

4.1 The number of man-made ponds and their spatial distribution

Some 7,796 ponds were identified in the studied area in the 1MS. Of those, 7,676 objects were identified as man-made ponds (98.5%). The man-made ponds covered 22,828.72 ha (i.e. 99.6% of the total area of all ponds). As can be seen in Figure 3, the largest proportion is for ponds with an area of up to 2 ha, of which there were nearly 85%. The most significant coverage in the total area, however, was for 32 ponds with an area exceeding 100 ha. This number is only indicative with respect to the positional deviation of the 1MS. It is evident from the spatial distribution of ponds that the highest number of man-made ponds were concentrated in the south part of the study area (Fig. 4a). Its terrain is

Farming Area (FA)	Sum of ponds		Disappeared ponds*		Non-disappeared ponds	
	Abs.	Rel. (%)	Abs.	Rel. (%)	Abs.	Rel. (%)
Beet-growing	2,682	34.9	1,640	61.1	1,042	38.9
Potato-growing	4,889	63.7	2,618	53.5	2,271	46.5
Mountain	105	1.4	71	67.6	34	32.4

Tab. 2: Disappeared man-made ponds from the 1MS according to Farming Areas (FA) (Note: * ponds from the 1MS that do not occur on the 2MS). Source: authors' processing

more rugged, hence allowing the construction of a higher number of ponds on smaller watercourses, commonly in the form of cascades where one pond followed from another. The sets of ponds covering the largest areas were located in the flatlands in the lower part of the Elbe tributaries

(Fig. 4c). Due to their location in the vicinity of large rivers, they were often built on artificial channels (Opatovice and Sány) which supplied them with water. This is also the case of the largest pond Blato, which covered nearly 910 ha in the 1MS_mp layer.

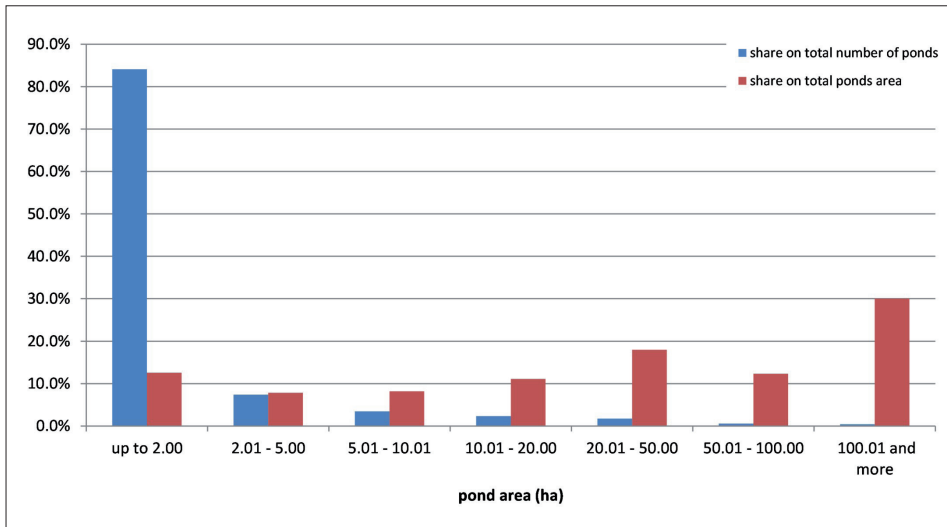


Fig. 3: Distribution of man-made ponds on the 1MS by size categories
Source: authors' processing

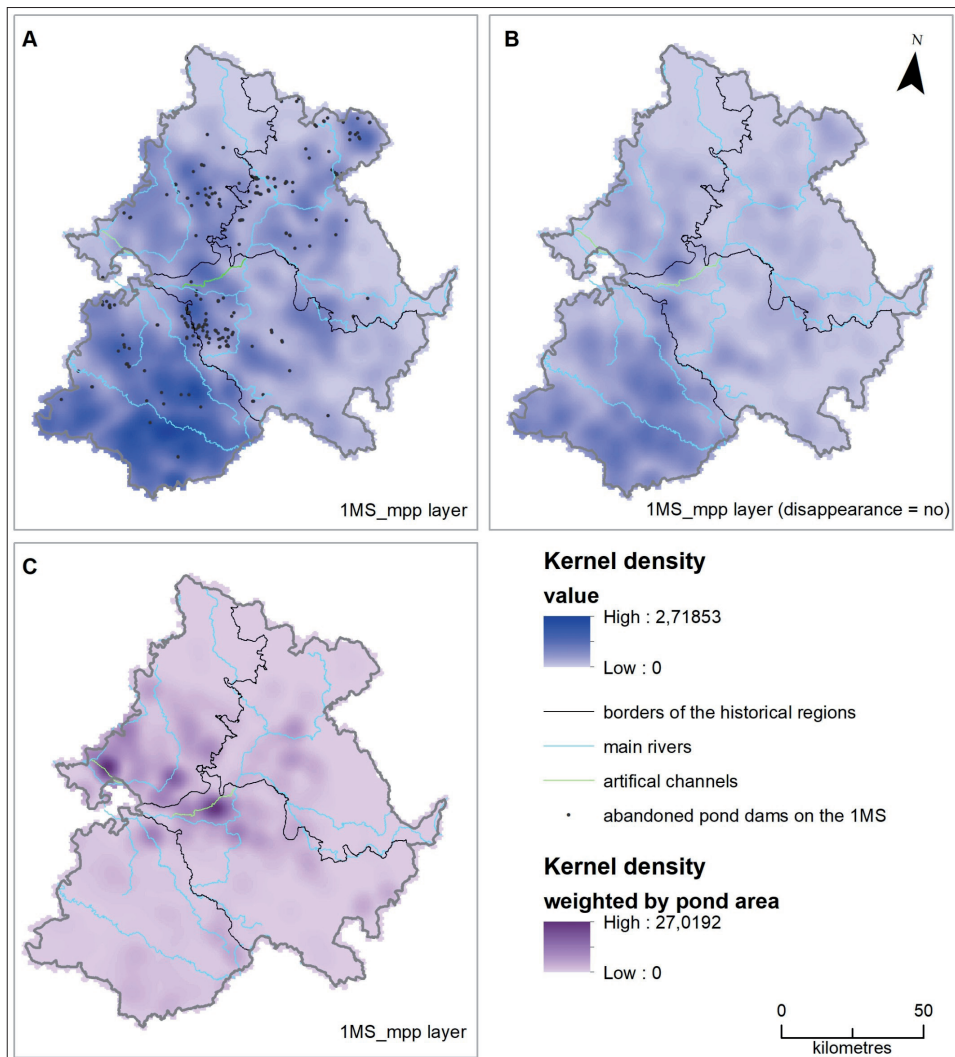


Fig. 4: Spatial distribution of man-made ponds based on the 1MS
Source: authors' processing

4.2 Disappearance rate and changes in the spatial distribution of man-made ponds

Out of the total number of man-made ponds from the 1MS, only 3,347 (43.6%) were identified in the 2MS. Thus, a significant number of them had disappeared during the wave of pond draining at the turn of the 18th and 19th centuries. Further, 265 relics of dams or fishponds were located in the 1MS maps, which had already been defunct in the period of the 1MS. Based on the Mann-Whitney test, the null hypothesis of equality of median values of the altitude of the former ponds and existing ponds (p -value = 0.00) is rejected. This means that those ponds located in lower altitudes ceased to exist more frequently. If only large ponds (> 5 ha) were taken into account, then all those within 200 m were drained (Fig. 5). As shown in Table 2, the most fertile beet-growing area accounts for the largest proportion of lost ponds, but a significant proportion of ponds were also lost in the less fertile mountain farming area.

The number of man-made ponds recorded in the 1MS_{mp} layer, the layer of the historical fishponds (HFCR), and the current data for water reservoirs (WR) provides an interesting comparison. The current landscape register (12,163 objects in the study area) records the most water areas of all monitored periods, although this result is distorted by the character of the current data (see Discussion, below). Man-made ponds in the HFCR layer (4,639 objects in the study area) cover 60.5% of the number registered in the 1MS_{mp} layer. This number contains almost 1,300 more ponds than identified as not disappeared by comparing the 1MS and 2MS maps. This result means that fewer ponds were recorded in the 1MS map sheets in some areas than in the later 2MS.

The spatial impact of pond drainage in the “first wave” is obvious in Figure 4b, it shows that many smaller ponds in the south and south-east part of the study area (former the Čáslav region) disappeared, as well as the drainage of large ponds in the fertile areas along the river Elbe.

The area of the ponds in the individual period from different spatial datasets (1MS_{mp} layer; HFCR layer; WR layer) was compared using a hexagon grid (Fig. 6). The comparison of the periods demonstrates that the ratio of water areas of ponds plummeted between the end of the 18th century and the middle of the 19th century. On the other hand, there are a higher number of water areas in the landscape at present. Hexagons with a more dominant share of water area, however, are found in the places of modern large water dams and the relics of the original pond systems in the vicinity of the Opatovice channel.

4.3 Cluster analysis

The cluster analysis of the HEX layer ($n = 2,604$ hexagons) was stopped at 5 clusters (A–E) (Tab. 3). A Kruskal-Wallis test ($p = 0.00$) with the null hypothesis that all samples come from the same population (i.e. have the same median) was carried out. Multiple comparisons have shown that there are significant statistical differences between the clusters except for the “C” cluster compared to the “B” and “E” clusters. The most frequent clusters “A” (50.3% of the total number of hexagons) and “B” (34.7%) are characterised by the highest median values of the average annual water regime and altitude. A smaller representation of pond areas in the 1MS was also identified in the “A” cluster, with a larger representation of the area of current ponds. On the other hand, the clusters “D” (2.2%) and “E” (7.2%) are characterised by negative median values of the average water regime, lower altitude, and a significant decrease in pond area (between 1MS and the present time – Tab. 3). If the results of the cluster analysis are projected in space (see Fig. 7a), it is evident that especially the lower areas with a negative water balance in the landscape are located in the most agriculturally fertile areas, where historically more areas of man-made ponds were concentrated than at present (Figs. 7b, 7c).

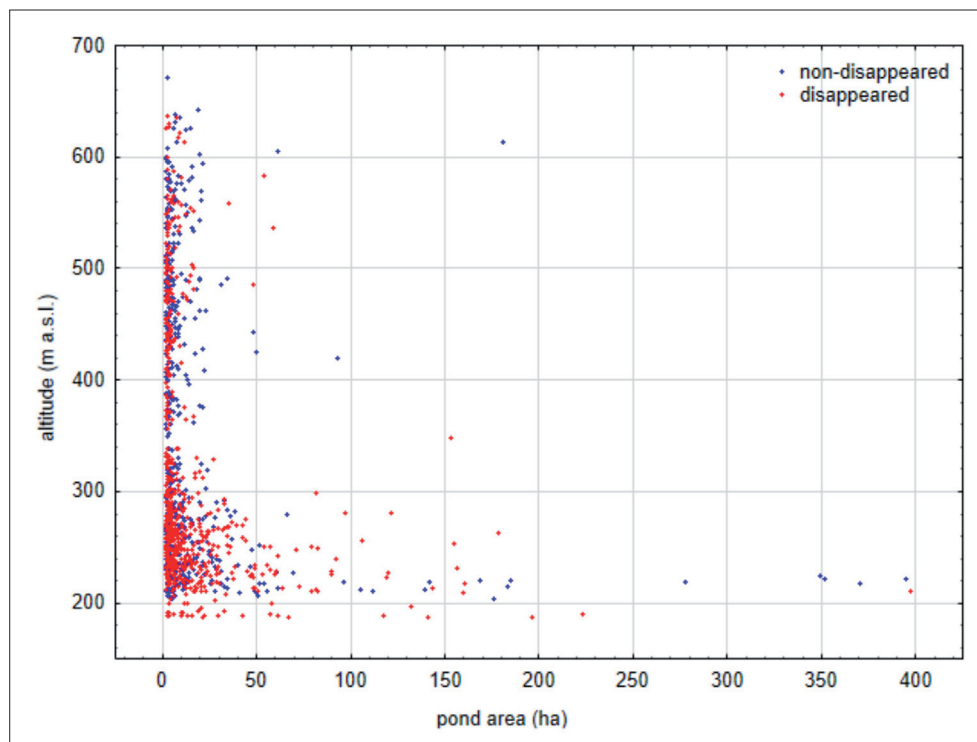


Fig. 5: Disappearance of man-made ponds (> 2 ha) according to altitude (Based on the data from a comparison of 1MS and 2MS) (Note: For the clarity of the graph, the largest pond with an area of 910 ha was omitted)
Source: authors' processing

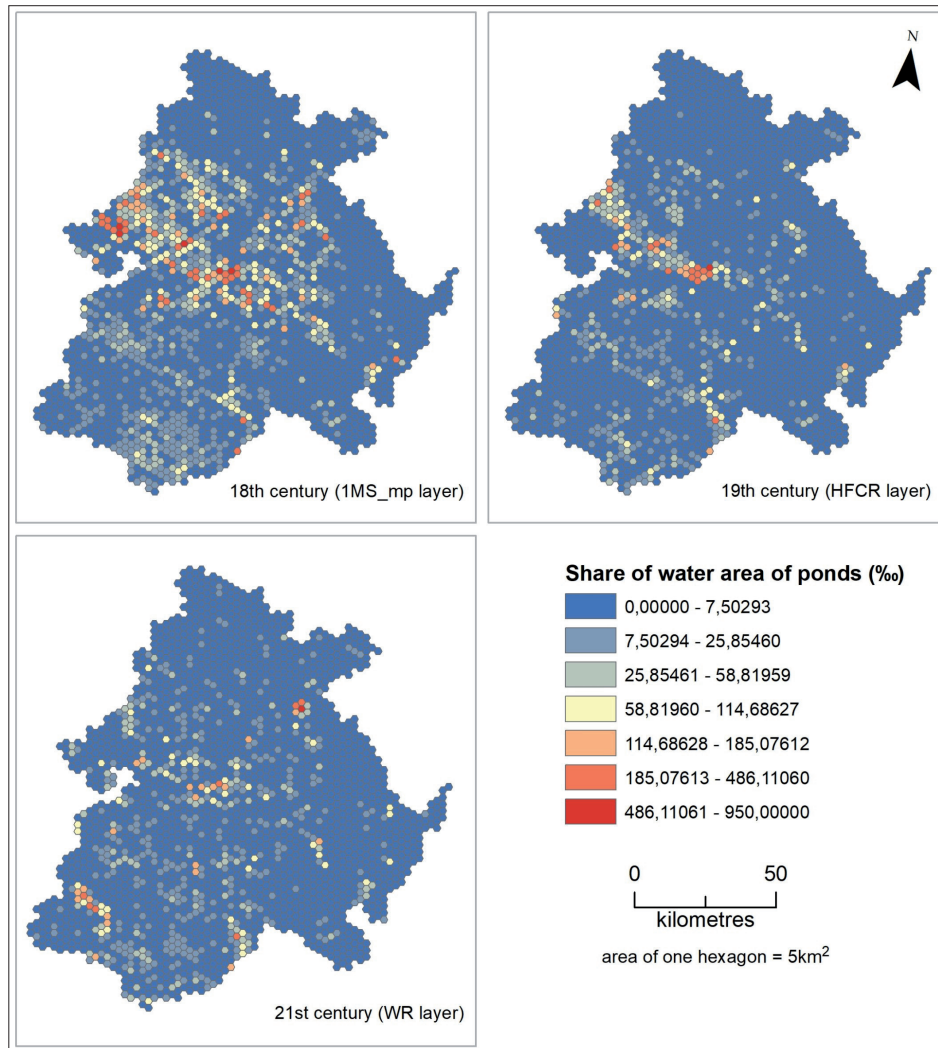


Fig. 6: Time-space comparison of the pond water areas. Sources: authors' processing based on the data from DIBAVOD (2010) and results from the project "Assessment of agricultural land in the areas of former fishpond systems with the aim of supporting the sustainable management of water and soil resources in the Czech Republic" (2016).

5. Discussion

5.1 The disappearance of man-made ponds and changes in their spatial distribution

The results show that the "first wave" of pond draining from the turn of the 18th and 19th centuries signified the end of 56% of man-made ponds recorded within our survey of the 1MS. The research of Pavelková et al. (2016) ascertained that more than 31% of historical ponds were drained from the middle of the 19th century to the present day. Observing the results of both surveys, it follows that the first draining "wave" was more intensive. It is necessary, however, to consider the fact that our study only dealt with the area of four historical regions, while the study of Pavelková et al. (2016) covered the entire area of the Czech Republic, albeit only for ponds exceeding 0.5 ha. The gradual disappearance of ponds from the landscape was registered elsewhere in Europe as well. Boothby and Hull (1997) determined that 61% of ponds were drained in Cheshire County (UK) between 1870–1993. Jeffries (2012) reported nearly 40% of drained ponds in Northumberland (UK) in the 19th century. Similar to this situation, only 53% of the surfaces of the original medieval fishponds in the region of Dombes in France remain (Williams et al., 2006), and 59% in the region of Rudy Wielkie in Poland (Jankowski, 2006).

These results confirm that the massive "wave" of draining man-made ponds at the turn of the 18th century was concerned mostly with the lowland and fertile areas. It was caused by the character and size of the ponds, as well as the environment in which they were located. Johannes Dubravius (1486–1553) mentions in his classic manual about freshwater aquaculture *De Piscis* (About Fishponds), that ponds located in flat areas need only a moderate-size dam, which will then create a shallow pond of considerable size. Such ponds ceased to be economically profitable at the beginning of the 19th century, however, and occupied significant areas of fertile soil in the fluvial plains. The massive draining of these ponds was aided by social reforms which abolished traditional serfdom in the Habsburg Monarchy in 1781, and which led to further interest of serfs in agricultural land. The ponds were drained, dewatered, and gradually turned mostly into fields and meadows, or less commonly into forests and built-up areas (Leglerová, 2019).

Another factor that aided this process was the boom of beetroot production (Daněk et al., 2015). It is significant that the current farming area, which stretches along the Elbe, is named after the sugar beet. It had been grown in the Czech Lands since 1770 with its boom connected with the expanding sugar production industry between 1810–1816

Variables	Cluster	N (ponds)	Median	Mean	Min.	Max.	Standard Deviation
Water regime (mm)	A	1310	127	167	– 156	1,032	206
1MS_mp layer (area [m ²])			0	3,196	0	20,528	4,820
WR layer (area [m ²])			2,005	5,053	0	39,696	7,567
Altitude (m a.s.l.)			461	472	180	1,409	176
Water regime (mm)	B	903	64	53	– 169	798	94
1MS_mp layer (area [m ²])			41,526	51,330	0	161,004	36,661
WR layer (area [m ²])			21,107	37,107	0	274,829	42,056
Altitude (m a.s.l.)			411	401	182	886	129
Water regime (mm)	C	129	39	29	– 115	313	92
1MS_mp layer (area [m ²])			256,353	281,112	0	1,212,080	249,611
WR layer (area [m ²])			310,843	452,759	82,485	4,673,799	519,846
Altitude (m a.s.l.)			334	367	188	639	132
Water regime (mm)	D	56	– 87	– 76	– 130	74	45
1MS_mp layer (area [m ²])			1,313,535	1,437,115	738,973	3,717,478	675,088
WR layer (area [m ²])			9,002	73,109	0	762,529	162,747
Altitude (m a.s.l.)			220	225	187	360	31
Water regime (mm)	E	206	– 32	– 8	– 156	314	86
1MS_mp layer (area [m ²])			264,874	324,032	151,529	763,799	159,154
WR layer (area [m ²])			13,527	26,620	0	271,039	38,749
Altitude (m a.s.l.)			256	303	188	657	118

Tab. 3: Cluster characteristics. Source: authors' calculations

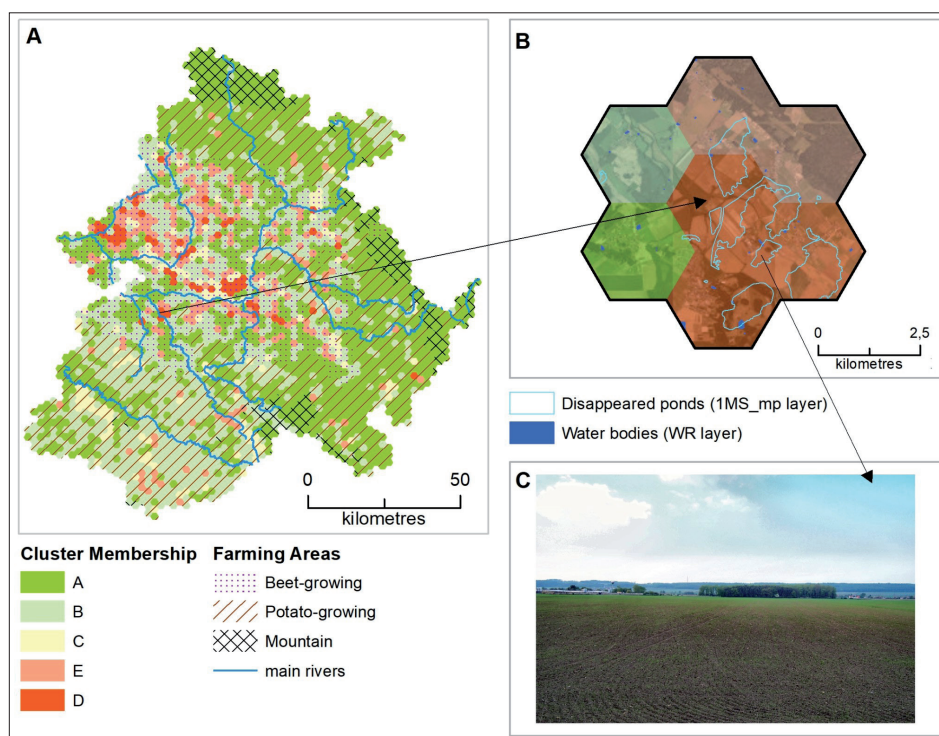


Fig. 7: Cluster Analysis results

Sources: DIBAVOD, 2010; CzechGlobe, 2021; ČÚZK, 2021; Photo by the authors

initiated by Napoleon's continental blockade (Dudek, 1979). This "sugar beet rush" caused a massive expansion of agricultural land along the Elbe, at the expense of ponds and floodplain meadows (Hellich, 1923). As a study by Šarapatka and Pavelková (2020) showed, the drainage of other ponds

on the fertile soils of this area continued into the second half of the 19th century. As can be seen from the recorded abandoned dams of the ponds in Figure 4a, however, the ponds were selectively drained before the middle of the 18th century, that is, before agricultural intensification as well

as the Enlightenment reforms. The reasons are as yet unknown, although these may have been ponds in a poor technical condition or those filled with sediments (Walter and Merritt, 2008), or those that were destroyed by flash floods (Elleder et al., 2020a; Jankowski, 2006).

On the other hand, the number of ponds which were drained in the areas at higher altitudes is interesting (the potato-growing and mountain-farming areas). There was seemingly no reason for draining these ponds. First of all, they covered a small area and were found in cooler areas with less fertile wet soils which did not provide a quality base for arable crop farming. This was the reason many ponds (e.g. in the South Bohemia region) remain until the present day where they constitute a specific pond scape (Pokorný and Květ, 2018). The cause of the disappearance of small ponds in these highland regions can be found in their interconnection. This did not occur only in the framework of hydrology (same pond water supply), but also in the framework of the aquaculture itself. As early as 1547, following the instructions of Bishop Dubravius, the system of carp culture based on transferring fish to a different type of pond, according to their size, was established (Svanberg and Cios, 2014). The highland regions were typical for their great presence of breeding and fry ponds, which resisted fish fry and young fish to the chamber, and fattening ponds, which were placed in the lower-altitude areas. This disrupted the demand system. The ponds continued to be drained despite the growing price of fish fry. The maintenance of ponds was also very difficult, due to their location in deep hollows they faced sediment clogging during torrential rains (Hurt, 1960). This can also be demonstrated by studies of millponds which emphasise that a number of historical millponds faced rapid sediment accumulation and ceased to exist at the end of the 19th century (Fairchild et al., 2013). Some man-made ponds thus disappeared naturally due to in-filling with sediments, the succession of vegetation and lack of maintenance. This may have happened to ponds that were used for logging needs in mountainous regions. Following the completion of logging or a change in log transport to lower-lying regions, these ponds were abandoned (Šádková and Jánský, 2020).

It is evident from the perspective of long-term development that the extent of pond areas was at its maximum at the end of the 18th century, compared with the mid-19th century and the present. Currently, the number of ponds is higher, which may be due to several factors. Thus, in absolute numbers, we paradoxically register more bodies of water in the current landscape than at the end of the 18th century. This phenomenon reflects two factors. The first is the refinement and improvement of cartographic work, where more man-made ponds appear in more recent maps, since especially smaller ponds were omitted in some historical surveys by mistake or intentionally (e.g. they were not a subject of the survey) (Jeffries, 2016). And secondly, the restoration and creation of new ponds were occurring simultaneously. Thus, as early as the end of the 19th century, some ponds were restored for aquaculture (Francová et al., 2019), and others were created during the 20th century for the needs of agriculture or later during the 21st century, to support biodiversity in the landscape (Chabudziński et al., 2017; Fairchild et al. 2013; Jeffries, 2016;).

5.2 Methodological issues

Working with historical maps, it is always necessary to consider several uncertainties that may influence the interpretation of the results. According to Leyk et al. (2005),

these uncertainties can be divided into three groups: a) production-oriented; b) transformation-oriented; and c) application-oriented. Therefore, we also have to consider the limitations of the 1MS.

In the case of ‘production-oriented’, it is mainly how the 1MS was elaborated. The lack of geodetically adequate procedures led to misinterpretations and inaccuracies in locations, where a positional error in comparison to current maps may be as large as several hundreds of metres (Zimová et al., 2006b). This problem does not manifest itself in spatial analyses at smaller scales, as much as in the case of detailed case studies where other methods are necessary to determine the exact position of a pond (David and Černochová, 2020). It can also be assumed that plotting the water areas was probably complicated (especially with the larger ones) for surveying officers who plotted the individual landscape elements manually. Therefore, the acquired data on the size of ponds need to be understood only as indicative.

Another question is how carefully a specific area was plotted by individual surveyors (i.e. if perhaps some ponds might not have been omitted). As Prince (1959) states, despite uniform instructions, the course of historical surveying might have differed depending on their interpretations of individual surveyors. Approximately 30 surveyors worked in the Czech Lands (Šimůnek et al., 2014). It can be assumed that regarding the military purpose of surveying, ponds presented an important strategic element in the landscape, as evidenced in the written descriptions for the 1MS (Vávrová and Šantrůčková, 2009). Thus, the number of surveyed ponds should be quite accurate.

As Figure 8 suggests, however, if our layer of remaining ponds from the 1MS (1MS_mpp) is compared with the HFCR layer created based on the 2MS, we find several areas where more ponds were surveyed in the 2MS than in the 1MS. Leaving aside the possibility that some ponds may have been restored, it was probably an omission by the surveyors. This may be due to the terrain (deep valleys) creating difficulties to move on horseback, the concentration of a large number of ponds in a small area, and miscalculations.

From a current point of view, however, the somewhat trivial way of processing the 1MS also brings positives to the research issues. Above all, it is the symbolism of plotting the ponds, which were colored with a distinctive blue colour, and, in most cases, their dams were recorded using a line mark. Thus, artificial ponds can be distinguished from other ponds. All in all, the identification of ponds in the 1MS is easier than in the 2MS (see Fig. 9a), which struggles with faded colours, and the identification of ponds is commonly accomplished using indirect marks (Pavelková et al., 2016). Forejt et al. (2020) claimed that another limiting feature of maps may also be the lack of diachronic depth – they depict the dynamically evolving landscape only in a certain moment. In our case, some ponds were captured, which were in the process of draining and it was possible to identify them as a body of water, but at the same time, they had other uses (Fig. 9c).

The manner of processing the 1MS in GIS (mainly via georeferencing) introduces another possible distortion. We partially managed to deal with this problem using the seamless layer of the Mapire project, which was processed identically in the entire area. This aided in eliminating the issues with the possible connection of individual map sheets (Šimůnek et al., 2014) or the selection of different transformation methods while georeferencing (Baiocchi

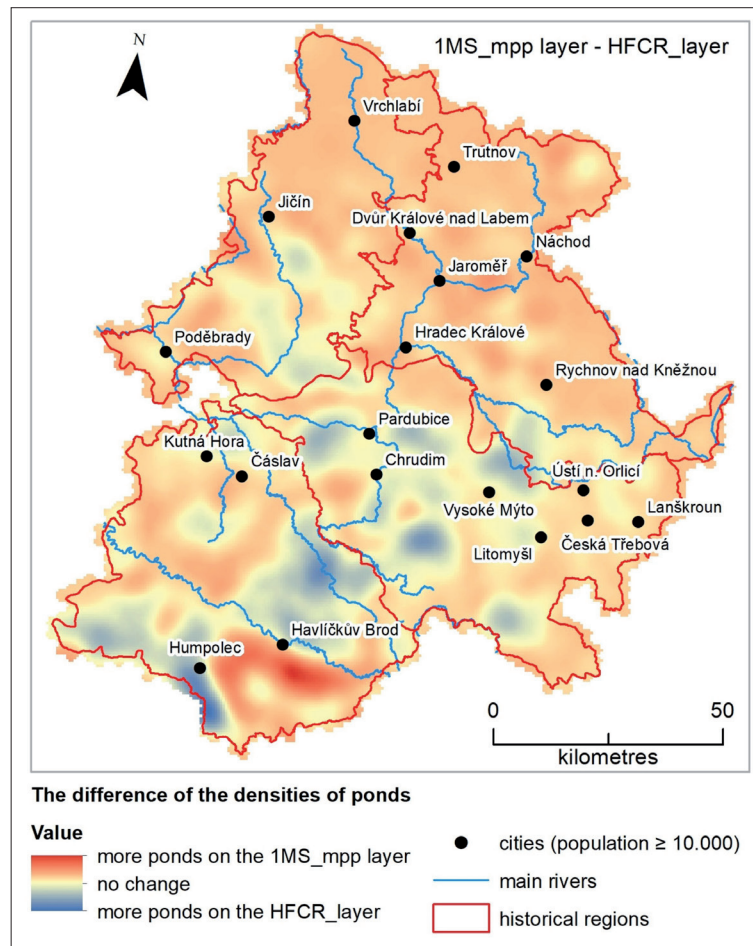


Fig. 8: Changes in pond density between different (cartographic) sources
Source: authors' processing



Fig. 9: Importance of the 1st Military Survey for studying man-made ponds. (A) Comparison of map symbols for man-made ponds between 1st and 2nd Military Surveys and Stabile Cadastre; (B) Artificial pond feeder channel; (C) Man-made ponds on the 1st Military Survey maps during the process of draining – marked with the white crosses; (D) Relics of the former ponds in the current landscape – former dams
Sources: © ČÚZK; © Austrian State Archives [Österreichisches Staatsarchiv] – all rights reserved (survey, z.B. Josephinische Landesaufnahme/First Military Survey), Mapire.eu; © Czech National Geoportal (CENIA); Photo by the authors

et al., 2013). Despite that, the choice of an adequate transformation method at the local level should provide smaller positional deviations concerning the distribution and number of identical points. The issue of sheet connections and a greater degree of distortion was recorded, especially in the borders of historical regions of Bohemia and Moravia. Janata and Cajthaml (2021) proposed a new method of georeferencing of the 1MS map mosaic, with positional accuracy corresponding to Mapire.eu results, but with the minimum occurrence of substantial deformations of the map sheets. At present, however, their georeferenced maps are not yet available to other researchers.

This study is also limited by its manual processing in GIS, which may be susceptible to errors on the part of the researchers – whether be it due to a misinterpretation or an omission of the draft during vectorisation. Spatial analysis results can also be influenced by the Kernel Density tool's settings, where the cell size is only reflected in the visual quality of the resulting maps (Chainey, 2013), but the larger search radius can make the results smoother (Fotheringham et al., 2000, p. 45). We based our analysis on the recommended search radius by the ArcGIS Kernel Density tool.

5.3 Implications for the applied use of the research results

We have to deal with several problems concerning the possibility of using the data of the spatial distribution of ponds achieved from the 1MS – as combined with current data. Most of all, it is the earlier mentioned problem of positional accuracy, which can only be solved by a manual correction of the position of the ponds. Such a process is a very time-consuming with respect to the number of ponds (see Pavelková et al., 2016). Another issue is data consistency, which causes surprising problems, especially for the present. While it is possible to distinguish the natural and man-made ponds in the 1MS, the current data (WR layer) lacks such distinguishing attributes (although the layer is called “Water reservoirs”), and we register all types of stagnant water bodies regardless of origin or size. Another issue is scale, where the current data layers are detailed and elaborated on a scale of 1:10,000. Such issues impact the datasets. Compared to more recent and more accurate cartographic sources, e.g. the 2MS, they capture a larger number of ponds before the first wave of their draining. This provides the considerable potential to ‘guess’ the suitable location where it would be possible to renew ponds or other man-made reservoirs (David and Davidová, 2014; 2015; Šádková and Jánský, 2020), which is, in reality, occurring with the support of state subsidy programs (Rozkošný et al., 2020).

Pond restoration, a possible adaptation measure, can be expected to be in the interest of landscape management, especially with respect to the changing climate and its impact on the European landscape (the increased number of hot days, more frequent episodes of heavy rainfall, interspersed with longer periods of drought). Moreover, ponds and the history of their construction are known to the general public in the context of the Czech Republic, therefore they are often mentioned by political representatives as a tool to mitigate the future effects of drought (Ministry of Agriculture of the Czech Republic, 2019; Ministry of the Environment of the Czech Republic, 2020). Trantinová (2015) surveyed the local authorities of 134 small and medium-sized municipalities, which showed that 86% of municipal representatives consider ponds to be important landscape features in the municipality, and 77% would support the renewal of ponds

in the municipality with sufficient funding. At the same time, 26% of the representatives of municipalities responded that they use old maps to obtain information about former ponds, and 47% are aware of former ponds within the municipality due to local knowledge. This could be promoted by many relics of former ponds in the rural as well as the urban landscape – abandoned dams (Fig. 9d), bank lines, terrain depressions, and former embankments (David and Černochová, 2020; Frajer et al., 2020; Rippon, 2004) or by local toponymy (Frajer and Fiedor, 2018).

Ponds will become an important topic, especially in fertile agricultural areas that face a future threat in the form of droughts. This does not mostly concern the restoration of large ponds in fertile areas (Fig. 7c), where it would be spatially impossible and where there are not sufficient water sources at present, but mostly small ponds whose restoration does not require extensive water management studies or expensive technologies. The results of our study show that it was these small ponds with areas up to two hectares that were represented most in the historical landscape. The restoration of ponds represents merely one of several measures for water retention in the landscape (Dzuráková et al., 2018), and must be accomplished with appropriate sensitivity and concern for local water management and ecological conditions.

Following the example of the government's program to build farm ponds in India, Kale (2017) stated that unrestrained construction of man-made ponds or their expansion can ultimately accelerate drought problems in the landscape – increase evapotranspiration and increase groundwater extraction in an effort to store as much water as possible. Looking at old maps, we obtain a picture of the landscape with a large number of man-made ponds, although we do not know how they coexisted in the landscape. Elleder et al. (2020b) stated that some large ponds may have been drained due to water shortages in drought episodes at the turn of the 18th and 19th centuries. Not only were they not economically viable without water, but they drained the necessary water from streams and rivers, which then disappeared due to intensive evapotranspiration. Some ponds may have had issues with an insufficient amount of water in the past and had to be fed by channels from other watersheds as historical maps show (Fig. 9b). Continuous maintenance and conservation of man-made ponds are also very important. As research by Juszak and Kędziora (2003) showed, many man-made ponds may be subject to severe anthropogenic pressure (landfilling, pollution from waste, sewage water, and agricultural activity) which degrades their ecological role.

6. Conclusions

In this study, we attempted to contribute to the debate on historical maps and their use in connection with GIS (Historical GIS) for solving questions related to historical and current landscapes. The first question was related to the extent of man-made ponds in the historical landscape. As was ascertained in the examples of four historical Bohemian regions, the 1st Military Survey of the Habsburg Empire (1764–1783) shows that there were some 7,700 man-made ponds at the end of the 18th century. The turn at the 18th and 19th centuries brought a significant reduction through the influence of political and economic changes (agricultural intensification, industrialisation), which had an impact on large ponds in fertile areas, as well as small ponds at higher altitudes. Thus, approximately one-half of man-made

ponds disappeared. The landscape lost important elements regarding water retention and biodiversity. The pieces of information about disappeared ponds from the historical maps can be relevant even after several centuries and important for the present time (Canessa et al., 2017). In our case, the potential of the 1st Military Survey for research of the historical extent of man-made ponds has proved worthy, and the information thus obtained can contribute as a basis, for example, to the debates on the restoration of water elements in the landscape, mainly in the agricultural areas with negative water balance. Our research pointed out the significance of historical maps in the study of the historical landscape where they may play an irreplaceable role (Fuchs et al., 2015). Although we deal with several methodological and interpretation limits in their processing, including problems of compatibility with current data, these historical sources cannot be understood only as contemporary works of art due to these shortcomings.

Acknowledgments

This study was supported by the grant of Palacky University Olomouc IGA_PrF_2021_027 “Landscape as a palimpsest of space and places”. Miroslav Trnka contribution has been supported by “SustES – Adaptation strategies for sustainable ecosystem services and food security under adverse environmental conditions” (CZ.02.1.01/0.0/0.0/16_019/000_0797). The authors would like to express their thanks to all reviewers for their valuable remarks and recommendations.

References:

- ANTROP, M. (2004): Landscape change and the urbanization process in Europe. *Landscape and Urban Planning*, 67: 9–26.
- ARCČR (2016): Digital geographical database 1:500,000 ArcČR 500 Version 3.3 [cit. 29.09.2020]. ArcDATA Prague. Available at: http://download.arcdata.cz/data/ArcCR_500-3.3-Popis-dat.pdf
- BÁBEK, O., SEDLÁČEK, J., LENDÁKOVÁ, Z., ELZNICOVÁ, J., TOLASZOVÁ, J., PACINA, J. (2021): Historical pond systems as long-term composite archives of anthropogenic contamination in the Vrchlice River, Czechia. *Anthropocene*, 33: 100283.
- BAIOCCHI, V., LELO, K., MILONE, M. V., MORMILE, M. (2013): Accuracy of different georeferencing strategies on historical maps of Rome. *Geographia Technica*, 1(1): 0–16.
- BARROS, V. R. et al. [eds.] (2014): Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Working Group II Contribution of to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, Cambridge University Press.
- BATEMAN, M. D., McHALE, K., BYNTUN, H. J., WILLIAMS, N. (2020): Understanding historical coastal spit evolution: A case study from Spurn, East Yorkshire, UK. *Earth surface processes and landforms*, 45: 3670–3686.
- BEYER, H. L. (2004): Hawth’s analysis tools for ArcGIS [online]. Available at: www.spatialecology.com/htools
- BIGGS, J., WILLIAMS, P., WHITFIELD, M., NICOLET, P., WEATHERBY, A. (2005): 15 years of pond assessment in Britain: results and lessons learned from the work of Pond Conservation. *Aquatic conservation: Marine and freshwater ecosystems*, 15: 693–714.
- BJÖRK, S., POKORNÝ, J., HAUSER, V. (2010): Restoration of Lakes through Sediment Removal, with Case Studies from Lakes Trummen, Sweden and Vajgar, Czech Republic. In: Eiseltoová, M. [ed.]: *Restoration of Lakes, Streams, Floodplains, and Bogs in Europe: Principles and Case Studies* (pp. 101–122). Springer, Dordrecht.
- BOOTHBY, J., HULL, A. P. (1997): A census of ponds in Cheshire, North West England. *Aquatic conservation: Marine and freshwater ecosystems*, 7: 75–79.
- BROŽA, V. et al. (2005): *Přehradý Čech, Moravy a Slezska*. Liberec, Knihy 555.
- BRYKAŁA, D., PODGÓRSKI, Z. (2020): Evolution of landscapes influenced by watermills, based on examples from Northern Poland. *Landscape and Urban Planning*, 198: 1–15.
- BÜNTGEN U., URBAN, O., KRUSIC, P. J., RYBNÍČEK, M., KOLÁŘ, T., KYNCL, T., AČ, T., KOŇASOVÁ, E., ČÁSLAVSKÝ, J., ESPER, J., WAGNER, S., SARER, M., TEGEL, W., DOBROVOLNÝ, P., CHERUBINI, P., REINIG, F., TRNKA, M. (2021): Recent European drought extremes beyond Common Era background variability. *Nature Geoscience*, 14(4): 190–196.
- BURGIN, S., FRANKLIN, M. J., HULL, L. (2016): Wetland loss in the transition to urbanisation: a case study from Western Sydney, Australia. *Wetlands*, 36(6): 985–994.
- CANESSA, M., MONTEFALCONE, M., BAVESTRELLO, G., POVERO, P., COPPO, S., MORRI, C., BIANCHI, C. N. (2017): Fishery maps contain approximate but useful information for inferring the distribution of marine habitats of conservation interest. *Estuarine, Coastal and Shelf Science*, 187(5): 74–83.
- CÉRÉGHINO, R., BIGGS, J., OERTLI, B., DECLERCK, S. (2008): The ecology of European ponds: defining the characteristics of a neglected freshwater habitat. *Hydrobiologia*, 597: 1–6.
- CHABUDZIŃSKI, Ł., SZULC, D., BRZEZIŃSKA-WÓJCİK, T., MICHALCZYK, Z. (2017): Changes in the location and function of small water bodies in the upper Sanna River catchment—case study (SE Poland). *Landscape Research*, 43(1): 112–123.
- CHAINEDY, S. P. (2013): Examining the influence of cell size and bandwidth size on kernel density estimation crime hotspot maps for predicting spatial patterns of crime. *Bulletin of the Geographical Society of Liege*, 60: 7–19.
- CHEN, W., HE, B., NOVER, D., LU, H., LIU, J., CHEN, W. (2019): Farm ponds in southern China: Challenges and solutions for conserving a neglected wetland ecosystem. *Science of the Total Environment*, 659: 1322–1334.
- CHIANG, Y. Y., DUAN, W., LEYK, S., UHL, J. H., KNOBLOCK, C. A. (2020). Using historical maps in scientific studies: Applications, challenges, and best practices. Berlin, Springer.
- CURADO, N. HARTEL, T., ARNTZEN, J. W. (2011): Amphibian pond loss as a function of landscape change – A case study over three decades in an agricultural area of northern France. *Biological Conservation*, 144(5): 1610–1618.
- CZECH GLOBE (2021): Changes in a landscape water regime_Norway_CZE [online]. Available at: <https://www.klimatickazmena.cz/cs/?l=33>

- ČÚZK (2021): Výrobní oblasti a podoblasti katastrálních území [online]. Available at: <https://www.cuzk.cz/Katastr-nemovitosti/Poskytovani-udaju-z-KN/Ciselniky-ISKN/Ciselniky-k-mape/Vyrobni-oblasti-a-podoblasti-katastralnich-uzemi.aspx>
- DANĚK T., KILÍANOVÁ H., BRUS J., PECHANEC V., OPRŠAL, Z. (2015): Development of Sugar Industry in Haná Region in 19th Century and its Impact on Landscape Character. *Listy Cukrovarnické a Reparské*, 131(4): 146–149.
- DAVID, V., ČERNOCHOVÁ, K. (2020): Identification of ponds in the Blanice catchment area on maps of 1st Austrian Military Survey. *Vodohospodářské technicko-ekonomické informace*, 62(1): 32–37.
- DAVID, V., DAVIDOVÁ, T. (2015): Analysis of Available Retention Volume in Extinct Ponds – Case Study for Blanice River Catchment. *Agriculture and Agricultural Science Procedia*, 4: 79–87.
- DE BIE, T., DECLERCK, S., MARTENS, K., DE MEESTER, L., BRENDONCK, L. (2008): A comparative analysis of cladoceran communities from different water body types: patterns in community composition and diversity. *Hydrobiologia*, 597(1): 19–27.
- DE MEESTER, L., DECLERCK, S., STOKS, R., LOUETTE, G., VAN DE MEUTTER, F., DE BIE, T., MICHELS, E., BRENDONCK, L. (2005): Ponds and pools as model systems in conservation biology, ecology and evolutionary biology. *Aquatic Conservation: Marine and freshwater ecosystems*, 15(6): 715–25.
- DEMEK, J., MACKOVČIN, P., SLAVÍK, P. (2012): Spatial and temporal trends in land-use changes of Central European landscapes in the past 170 years: A case study from the south-eastern part of the Czech Republic. *Moravian Geographical Reports*, 20(3): 2–21.
- Digital Base of Water Management Data (DIBAVOD) (2010): Layer A_05 Water reservoirs [online]. Available at: <https://www.dibavod.cz/index.php?id=27>
- DUDEK, F. (1979): Vývoj cukrovarnického průmyslu v českých zemích do roku 1872. Praha, Academia.
- DZURÁKOVÁ, M., ŠTĚPÁNKOVÁ, P., LEVITUS, V. (2018): Katalog přírodě blízkých opatření pro zadržení vody v krajině a jeho uplatnění ve webové mapové aplikaci pro veřejnost. *Vodohospodářské technicko-ekonomické informace*, 60(5): 6–11.
- ELLEDER, L., KREJČÍ, J., ŠÍROVÁ, J. (2020a): The 1714 flash flood in the Bohemian-Moravian Highlands – Reconstructing a Catastrophe. *Quaternary International*, 538: 14–28.
- ELLEDER, L., ŠÍROVÁ, J., DAVID, V., KAŠPÁREK, L., KLETETSCHKA, G., DRAGON, Z. (2020b): Growth and decline of fishery in Poděbrady and Nymburk estates from the point of view of historical hydrology. *Vodohospodářské technicko-ekonomické informace*, 1: 18–31.
- FACCINI, F., GIARDINO, M., PALIAGA, G., BRANDOLINI, P. (2020): Urban geomorphology of Genoa old city (Italy). *Journal of Maps*, 1–14.
- FAIRCHILD, G. W., ROBINSON, C., BRAINARD, A. S., COUTU, G. W. (2013): Historical changes in the distribution and abundance of constructed ponds in response to changing population density and land use. *Landscape Research*, 38(5): 593–606.
- FOREJT, M., DOLEJŠ, M., ZACHAROVÁ, J., RAŠKA, P. (2020): Quantifying inconsistencies in old cadastral maps and their impact on land-use reconstructions. *Journal of Land Use Science*, 15(4): 570–584.
- FOTHERINGHAM, S., BRUNSDON, C., CHARLTON, M. (2000): Quantitative geography. Perspectives on Spatial Data analysis. London, Sage.
- FRAJER, J. (2019): Josephian cadastre as a source of geographic information on historical landscapes. *Geografie*, 124(3): 315–339.
- FRAJER, J., FIEDOR, D. (2018): Discovering extinct water bodies in the landscape of Central Europe using toponymic GIS. *Moravian Geographical Reports*, 26(2): 121–134.
- FRAJER, J., PAVELKOVÁ, R., LÉTAL, A., KOPP, J. (2020): Relics and transformation of former ponds in the urban environment of the historical region of Bohemia (Czech Republic). *Journal of Maps*, 1–11.
- FRANCOVÁ, K., ŠUMBEROVÁ, K., JANAUER, G. A., ADÁMEK, Z. (2019): Effects of fish farming on macrophytes in temperate carp ponds. *Aquaculture International*, 27: 413–436.
- FUCHS, R., VERBURG, P. H., CLEVERS, J. G. P. W., HEROLD, M. (2015): The potential of old maps and encyclopaedias for reconstructing historic European land cover/use change. *Applied Geography*, 59: 43–55.
- GREGORY, I. N., GEDDES, A. (2014): From historical GIS to spatial humanities: Deepening scholarship and broadening technology. In: Gregory, I. N., Geddes, A. [eds.]: *Toward Spatial Humanities* (pp. 9–19). Indiana University Press.
- HAASE, D., WALZ, U., NEUBERT, M., ROSENBERG, M. (2007): Changes to Central European landscapes – Analysing historical maps to approach current environmental issues, examples from Saxony, Central Germany. *Land Use Policy*, 24: 248–263.
- HAVLÍČEK, M., PAVELKOVÁ, R., FRAJER, J., SKOKANOVÁ, H. (2014): The Long-Term Development of Water Bodies in the Context of Land Use: The Case of the Kyjovka and Trkmanka River Basins (Czech Republic). *Moravian Geographical Reports*, 22(4): 39–50.
- HELLICH, J. (1923): Příspěvek k podobě zaniklých osad na Poděbradsku. Praha, Rodinné tiskárny v Praze.
- HOFFMANN, R. (2002): Carp, cods and connections: new fisheries in the medieval European economy and environment. In: Henninger-Voss, M. J. [ed.]: *Animals in human histories: the mirror of nature and culture* (pp. 3–55). Rochester, NY, University of Rochester Press.
- HURST, D., DAFFERN, N., GRIFFIN, L., HEAD, K., MANN, A., PEARSON, E., WARMAN, S. (2016): A Roman Pond at Wyre Piddle, Worcestershire, with a Brief Survey of Ponds in Roman Britain. *Britannia*, 47: 169–191.
- HURT, R. (1960): Dějiny rybníkářství na Moravě a ve Slezsku I. a II. díl. Opava, Krajské nakladatelství v Opavě.
- IGNATIUS, A., RASMUSSEN, T. C. (2016): Small reservoir effects on headwater water quality in the rural-urban fringe, Georgie Piedmont, USA. *Journal of Hydrology: Regional Studies*, 8: 145–161.

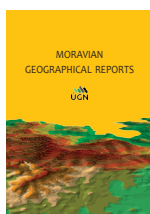
- JANATA, T., CAJTHAML, J. (2021): Georeferencing of Multi-Sheet Maps Based on Least Squares with Constraints—First Military Mapping Survey Maps in the Area of Czechia. *Applied Sciences*, 11(1): 299.
- JANSKÝ, B., ŠOBR, M. a kol. (2003): *Jezera České republiky*. Praha, Katedra fyzické geografie a geoekologie na PřFUK v Praze.
- JANKOWSKI, G. (2006): Changes in time and space of pond farming in the area of Rudy Wielkie (Poland). *Moravian Geographical Reports*, 14(3): 19–25.
- JEFFRIES, M. J. (2012): Ponds and the importance of their history: an audit of pond numbers, turnover and the relationship between the origins of ponds and their contemporary plant communities in south-east Northumberland, UK. *Hydrobiologia*, 689: 11–21.
- JEFFRIES, M. J. (2016): Flood, drought and the inter-annual variation to the number and size of ponds and small wetlands in an English lowland landscape over three years of weather extremes. *Hydrobiologia*, 768(1): 255–272.
- JOHNSTON, C. A. (2015): Fate of 150 Year Old Beaver Ponds in the Laurentian Great Lakes Region. *Wetlands*, 35: 1013–1019.
- JUSZCZAK, R., KĘDZIORA, A., LEŚNY, J., OLEJNIK, J. (2007): Assessment of Water Retention Capacity of Small Ponds in Wysoc Agricultural-Forest Catchment in Western Poland. *Polish Journal of Environmental Studies*, 16(5): 685–695.
- JUSZCZAK, R., KĘDZIORA, A. (2003): Threats to and deterioration of small water reservoirs located within Wysoc catchment. *Polish Journal of Environmental Studies*, 12(5): 567–573.
- JŮVA, K., HRABAL, A., PUSTĚJOVSKÝ, R. (1980): *Malé vodní nádrže*. Praha, SZN.
- KAIM, D., TACZANOWSKI, J., SZWAGRZYK, M., OSTAFIN, K. (2020): Railway network of Galicia and Austrian Silesia (1847–1914). *Journal of Maps*, 16(1): 132–137.
- KALE, E. (2017): Problematic uses and practices of farm ponds in Maharashtra. *Economic & Political Weekly*, 52(3): 20–22.
- KNOWLES, A. K. (2002): *Past time, past place: GIS for history*. Redlands, California, ESRI Press.
- KOPP, J., FRAJER, J., PAVELKOVÁ, R. (2015): Driving Forces of the Development of Suburban Landscape – A Case Study of the Sulkov Site West of Pilsen. *Quaestiones Geographicae*, 34(3): 51–64.
- KREJČÍ, J., MIKŠOVSKÝ, M., ZIMOVÁ, R. (2009): Possible relation between the Müllers Map of Bohemia and the First Military Survey – A case study of the Kladno region. *Acta geodaetica et geophysica Hungarica*, 44(1): 39–48.
- LANGTON, T. (1985): The London pond survey. *Oryx*, 19(3): 163–166.
- LEGLEROVÁ, A. (2019): History and present state of the landscape of the former fish pond system in the drainage basin of the Opatovický kanál channel (Central and Eastern Bohemia). Master Thesis, Prague, Charles University.
- LEYK, S., BOESCH, R., WEIBEL, R. (2005): A Conceptual Framework for Uncertainty Investigation in Map-based Land Cover Change Modelling. *Transactions in GIS*, 9(3): 291–322.
- LHOTSKÝ, R. (2010): The role of historical fishpond systems during recent flood events. *Journal of Water and Land Development*. 14: 49–65.
- LOCHMAN, Z. (1970): The Opatovice channel and its historico-geographical development. *Sborník Československé společnosti zeměpisné*, 75(3): 219–233.
- LÖFFLER, H. (2003): The Origin of Lake Basins. In: O'Sullivan, P. E., Reynolds, C. S. [eds.]: *The Lakes Handbook: Limnology and Limnetic Ecology* (pp. 8–60). Wiley: London.
- LUSK, S. (2015): Rybníky a ostatní malé vodní nádrže v krajině – význam a funkce. In: Pokorný, J., Zykmond, A., Mareš, J. ... [eds.]: *České rybníky a rybářství ve 20. století* (pp. 15–35). České Budějovice, Rybářské sdružení České republiky.
- MACTAGGART, B., BAUER, J., GOLDNEY, D. (2007): When History May Lead us Astray: using historical documents to reconstruct swampy meadows/chains of ponds in the New South Wales Central Tablelands, Australia. *Australian Geographer*, 38 (2): 233–252.
- MARIGNANI, M., ROCCHINI, D., TORRI, D., CHIARUCCI, A., MACCHERINI, S. (2008): Planning restoration in a cultural landscape in Italy using an object-based approach and historical analysis. *Landscape and urban planning*, 84(1): 28–37.
- MOLNÁR, G., TIMÁR, G. (2015): Inversion application in cartography: Estimation of the parameters of the best fitting Cassini-projections of the First Habsburg Military Survey. *Geosciences and Engineering*, 4(6): 36–44.
- MOSS, B. (2017): *Ponds and small lakes: Microorganisms and freshwater ecology*. Exeter, Pelagic Publishing Ltd.
- MUIR, R. (2004): *Landscape Encyclopaedia: A reference guide to the Historic Landscape*. Windgather Press.
- OERTLI, B., AUDERSET JOYE, D., CASTELLA, E., JUGE, R., CAMBIN, D., LACHAVANNE, J. (2002): Does size matter? The relationship between pond area and biodiversity. *Biological Conservation*, 104(1): 59–70.
- PAVELKOVÁ, R., FRAJER, J., NETOPIL, P. a kol. (2014): *Historické rybníky České republiky: Srovnání současnosti se stavem v 2. polovině 19. století*. Praha, Výzkumný ústav vodohospodářský T. G. M.
- PAVELKOVÁ, R., FRAJER, J., HAVLÍČEK, M., NETOPIL, P., ROZKOŠNÝ, M., DAVID, V., DZURÁKOVÁ, M., ŠARAPATKA, B. (2016): Historical ponds of the Czech Republic: an example of the interpretation of historic maps. *Journal of Maps*, 12(sup1): 551–559.
- PINDOZZI, S., CERVELLI, E., CAPOLUPO, A., OKELLO, C., BOCCIA, L. (2016): Using historical maps to analyze two hundred years of land cover changes: case study of Sorrento peninsula (south Italy), *Cartography and Geographic Information Science*, 43(3): 250–265.
- PODOBNIKAR, T. (2010). Historical maps of Ljubljana for GIS applications. *Acta geodaetica et geophysica Hungarica*, 45(1): 80–88.
- POKORNÝ, J., HAUSER, V. (2002): The restoration of fish ponds in agricultural landscapes. *Ecological engineering*, 18: 555–574.
- POKORNÝ, J., KVĚT, J. (2018): Fishponds of the Czech Republic. In: Finlayson, C. M., Milton, G. R.,

- Prentice, R. C., Davidson, N. C. [eds.]: *The Wetland Book II: Distribution, description, and conservation* (pp. 469–485). Dordrecht, Springer.
- POTUŽÁK, J., DURAS, J., DROZD, B. (2016): Mass balance of fishponds: Are they source or sinks of phosphorus? *Aquaculture International*, 24(6): 1725–1745.
- PRINCE, H. C. (1959): The Tithe Surveys of the Mid-Nineteenth Century. *The Agricultural History Review*, 7(1): 14–26.
- PRINCE, H. C. (1962): Pits and ponds in Norfolk. *Erdkunde*, 16(1): 10–31.
- REES, S. E. (1997): The historical and cultural importance of ponds and small lakes in Wales, UK. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 7(2): 133–139.
- RENWICK, W. H., SMITH, S. V., BARTLEY, J. D., BUDDEMEIER, R. W. (2005): The role of impoundments in the sediment budget of the conterminous United States United States. *Geomorphology*, 71(1–2): 99–111.
- RIPPON, S. (2004): *Historic Landscape Analysis: Deciphering the Countryside*. London, Council for British Archaeology.
- ROZKOŠNÝ, M., DZURÁKOVÁ, M., PAVELKOVÁ, R., DAVID, V., HUDCOVÁ, H., NETOPIL, P. (2020): Small Water Reservoirs, Ponds and Wetlands Restoration at the Abandoned Pond Areas. In: Zelenakova, M., Fialova, J., Negm, A. M. [eds.]: *Assessment and Protection of Water Resources in the Czech Republic* (pp. 127–146). Cham, Springer.
- RUGGIERO, A., CÉRÉGHINO, R., FIGUEROLA, J., MARTY, P., ANGÉLIBERT, S. (2008): Farm ponds make a contribution to the biodiversity of aquatic insects in a French agricultural landscape. *Comptes Rendus Biologies*, 331(4): 298–308.
- RŮŽIČKA, K. (1954): Z historie rybníkářství. *Vodní hospodářství*, 12: 365–367.
- SEMOTANOVÁ, E., SYNEK, J. [eds.] (2007): *Ottův historický Atlas Česko*. Praha, Ottovo nakladatelství
- SKALOŠ, J., WEBER, M., LIPSKÝ, Z., TRPÁKOVÁ, I., ŠANTRŮČKOVÁ, M., UHLÍŘOVÁ, L., KUKLA, P. (2011): Using old military survey maps and orthophotograph maps to analyse long-term land cover changes – Case study (Czech Republic). *Applied Geography*, 31: 426–438.
- SKALOŠ, J., RICHTER, P., KEKEN Z. (2017): Changes and trajectories of wetlands in the lowland landscape of the Czech Republic. *Ecological Engineering*, 108: 435–445.
- SMITH, S. V., RENWICK, W. H., BARTLEY, J. D., BUDDEMEIER, R. W. (2002): Distribution and significance of small, artificial water bodies across the United States landscape. *The Science of the Total Environment*, 299(1–3): 21–36.
- SOUTHALL, H., PŘIDAL, P. (2012): Old Maps Online: Enabling global access to historical mapping. *e-Perimtron*, 7(2): 73–81.
- SVANBERG, I., CIOS, S. (2014): Petrus Magni and the history of fresh-water aquaculture in the later Middle Ages. *Archives of natural history*, 41(1): 124–130.
- ŠÁDKOVÁ, E., JÁNSKÝ, B. (2020): Splash dams in the Krkonoše Mts: from the history to their possible use. *Geografie*, 125(3): 291–317.
- ŠARAPATKA, B., PAVELKOVÁ, R. (2020): Small bodies of Water which have Disappeared from the Czech Landscape and the Possibility of Restoring them. In: Zelenakova, M., Fialová, J., Negm, A. M. [eds.]: *Assessment and Protection of Water Resources in the Czech Republic* (pp. 127–143). Cham, Springer.
- ŠIMŮNEK, R., ANTOŠ, F., HAVRLANT, J. (2014): Třeboň region in the First Military Survey. *Historická geografie (Historical geography)*, 40(2): 153–204.
- TEPLÝ, F. (1925): *Dějiny rybníků na Hradecku*. Vodňany, Rybář.
- THE MINISTRY OF AGRICULTURE OF THE CZECH REPUBLIC (2019): Ministerstvo pomůže s budováním dalších rybníků [online]. [cit. 30.07.2019]. Available at: http://eagri.cz/public/web/mze/tiskovy-servis/tiskove-zpravy/x2019_ministerstvo-zemedelstvi-pomuze-s.html
- THE MINISTRY OF THE AGRICULTURE OF THE CZECH REPUBLIC (2019): Ministerstvo zemědělství pomůže s budováním dalších rybníků, vodovodů a také opatření proti povodním. Získalo na ně půl miliardy korun navíc [online]. Available at: http://eagri.cz/public/web/mze/tiskovy-servis/tiskove-zpravy/x2019_ministerstvo-zemedelstvi-pomuze-s.html
- THE MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2020): Odborníci i politici stvrdili nová opatření pro boj se suchem, klíčové je zadržovat vodu – v nádržích, půdě i v urbanizovaném prostředí [online]. Available at: https://www.mzp.cz/cz/news_20200512-odbornici-i-politici-stvrdili-nova-opatreni-pro-boj-se-suchem-klicove-je-zadrzovat-vodu
- TIMÁR, G. (2009): System of the 1:28,800 scale sheets of the second military survey in Tyrol and Salzburg. *Acta Geodaetica et Geophysica Hungarica*, 44: 95–104.
- TORTORA, A., STATUTO, D., PICUNO, P. (2015): Rural landscape planning through spatial modelling and image processing of historical maps. *Land Use Policy*, 42: 71–82.
- TRNKA, M., OLESEN, J. E., KERSEBAUM, K. C., SKJELVAG, A. O., EITZINGER, J., SEGUIN, B., et al. (2011): Agroclimatic conditions in Europe under climate change. *Global Change Biology*, 17: 2298–2318.
- TRNKA, M., SEMERÁDOVÁ, D., NOVOTNÝ, I., DUMBROVSKÝ, M., DRBAL, K., PAVLÍK, F., VOPRAVIL, J., ŠTĚPÁNKOVÁ, P., VIZINA, A., BALEK, J., HLAVINKA, P., BARTOŠOVÁ, L., ŽALUD, Z. (2016): Assessing the combined hazards of drought, soil erosion and local flooding on agricultural land: a Czech case study. *Climate Research*, 70: 231–249.
- TRANTINOVÁ, M. (2015): Udržitelné hospodaření s půdními a vodními zdroji. In: Rozkošný, M., Pavelková, R., David, V., Trantinová, M. [eds.]: *Zaniklé rybníky v České republice: případové studie potenciálního využití území* (pp. 25–42). Praha, Výzkumný ústav vodohospodářský T. G. M.
- TRPÁKOVÁ, I. (2009). The use of historical sources and their ecological interpretation in the course of almost two centuries-a literature review. *Journal of Landscape Studies*, 2: 97–119.
- UPEX, S. G. (2004): The Uses and Functions of Ponds within Early Landscapes in the East Midlands. *The Agricultural History Review*, 52(2): 125–140.

- YEH, C. T., HUANG, S. L. (2009): Investigating spatiotemporal patterns of landscape diversity in response to urbanization. *Landscape and Urban Planning*, 93: 151–162.
- VÁVROVÁ, V., ŠANTRŮČKOVÁ, M. (2009): The landscape around Nové Dvory and Žehušice in the descriptions for the 1st Military Mapping. *Historická geografie*, 35(1): 213–228.
- VÝLETA, R., VALENT, P., DANÁČOVÁ, Z. (2020): Monitoring changes in the morphology and storage of a small water reservoir. A case study from Vrbovce, Slovakia. *Slovak Journal of Civil Engineering*, 28(2): 20–35.
- WALTER, R. C., MERRITTS, D. J. (2008): Natural streams and the legacy of water-powered mills. *Science*, 319(5861): 299–304.
- WILLIAMS, P., BIGGS, J., FOX, G., NICOLET, P., WHITFIELD, M. (2006): History, origins and importance of temporary ponds. *Freshwater Forum*, 17: 7–15.
- WOOD, P. J., GREENWOOD, M. T., AGNEW, M. D. (2003): Pond biodiversity and habitat loss in the UK. *Area*, 35(2): 206–216.
- ZIMOVÁ, R., PEŠŤÁK, J., VEVERKA, B. (2006a): Historical Military Mapping of Czech Lands-Positional Accuracy of Old Maps. *GIM International*, 20(10): 21–23.
- ZIMOVÁ, R., PEŠŤÁK, J., VEVERKA, B. (2006b): Historical military mapping of the Czech lands–Cartographic Analysis. In: *International Conference on Cartography and GIS*, Borovets, Bulgaria (pp. 1–7).

Please cite this article as:

FRAJER, J., KREMLOVÁ, J., FIEDOR, D., PAVELKOVÁ, R., TRNKA, M. (2021): The importance of historical maps for man-made pond research: From the past extent of ponds to issues of the present landscape. A case study from the Czech Republic. *Moravian Geographical Reports*, 29(3): 184–201. doi: <https://doi.org/10.2478/mgr-2021-0014>



From the agricultural station to a luxury village? Changing and ambiguous everyday practices in the suburb of Vinnytsia (Ukraine)

Oleksiy GNATIUK^{a*}, Kostyantyn MEZENTSEV^a, Nataliia PROVOTAR^a

Abstract

The study of everyday practices, self-identities and perceptions seems to be a promising approach to understand the suburban spaces as not only static containers but socially constructed, dynamic and ambiguous entities. Our case study is represented by the suburban village of Ahronomichne, located in the peri-urban area of the second-order Ukrainian city of Vinnytsia. The research methods included survey of residents (67 long-term residents and 59 newcomers), observations of the everyday activities of the residents and appearance of the build environment at seven observation points within the village, and four semi-structured in-depth interviews. We found that everyday practices of the long-term residents and newcomers significantly differ in terms of their set, spatial configuration and actual exercitation. The other important factors contributing to the variety of everyday practices and lifestyles are type of housing, age and family status. Simultaneously, we observed not just a combination but rather intertwining, mixing and hybridisation of urban, suburban and rural everyday practices and lifestyles. Another finding of the research was the western-type suburban growth of the second-order Ukrainian city in contrast to the largest cities of the country where centrifugal migrations of rich people to peri-urban area combines with the centripetal stream of less affluent migrant from peripheral settlements, keeping transitory residential strategy.

Keywords: suburbanisation, everyday practices, lifestyles, Vinnytsia, Ukraine

Article history: Received 25 February 2021, Accepted 29 July 2021, Published 30 September 2021

1. Introduction

We live in the (questioned) “age of urbanisation”, under conditions of dramatic wave of urban restructuring (Brenner and Schmid, 2014, 2015), and this is an indisputable argument why urban processes and phenomena deserve special attention, especially from geographers. However, in the context of planetary urbanisation (Brenner and Schmid, 2015), the “urban question” can well be described as a “suburban question” (Phelps, Tarazona Vento and Roitman, 2015; Phelps, 2017; Keil, 2018), and the current epoch – as the suburban century (Schneider, 1992). The point is that cities in different parts of the world are largely growing by their suburbs: both urban and suburban populations are growing in the global scale.

Since the second half of the 1990s, suburbanisation has been one of the most important processes that influenced the transformation of the settlement patterns in the post-socialist countries of the Central and Eastern Europe (hereinafter CEE)

(Borén and Gentile, 2007). At the same time, post-socialist cities hold a specific place in conceptualising the suburban development given the unique trajectory of peri-urban areas in post-socialism (Ouředníček, 2007; Stanilov and Sýkora, 2014) comparing to the “western-type” suburbanisation.

The main aspects of the western-type suburbanisation are widely discussed regarding their possible manifestation in the post-socialist space (e.g. Hirt, 2007; Tammaru, 2001; Slaev and Kovachev, 2014; Krisjane and Berzins, 2012). We share Hirt’s vision that some aspects are most pronounced, namely locational, motivational, functional and demographical:

- Locational: new inhabitants of the classical western-type suburbia come mainly from the urban core or from other urban areas;
- Motivational: migrants are driven by environmental considerations – to escape urban life disadvantages,

^a Department of Economic and Social Geography, Faculty of Geography, Taras Shevchenko National University of Kyiv, Kyiv, Ukraine (*corresponding author: O. Gnatiuk, e-mail: alexgnat22@ukr.net)

and find a higher-quality and more “family-oriented” lifestyle in greener, more private, and socially exclusive settings (including the desire to own a detached house).

- **Functional:** suburbs are typically residential zones that substantially depend on the central city in terms of jobs, which results in increased commuting; borders between urban and rural areas are blurred due to the spread of low-density detached housing.
- **Demographic:** suburban development is related to the people’s life-cycle stages and is initially led by upper- and upper-middle-income actors that are typically affluent and well educated.

Suburbanisation in the CEE large cities has aspects of western type suburbanisation, e.g. in Estonia (Tammaru, 2001; Tammaru and Leetmaa, 2007), Latvia (Krisjane and Berzins, 2012), Bulgaria (Hirt, 2007; Slaev and Kovachev, 2014). At the same time, local contribution to classical model is emphasised, in particular: new suburbs of large post-socialist cities are more compact, with higher densities and higher levels of social mix and mix of uses (Slaev and Kovachev, 2014). Moreover, western type suburbanisation is hindered by an insufficient number of jobs in the suburbs, poor road and social infrastructure, and low living standards (Nefedova, 2018). Thus, simplified model of the “western-type suburbanisation” cannot adequately explain the post-socialist changes in housing suburbanisation (Leetmaa, Tammaru and Anniste, 2009, p. 437).

Similar to the other post-socialist countries, peri-urban development in Ukraine does not correspond to the classical model of western-type suburbanisation, when affluent city dwellers move to the peri-urban area to live in environmentally and socially safer conditions. On the other hand, it cannot be aligned with the reversed western-type suburban development, when the low-income population moves to the suburban area in order to implement a survival strategy (Mezentsev, 2017). Also, there are discussions on the feasibility of the classic indicators of suburbanisation, e.g. higher population growth rate in the peri-urban area compared to the big city (Mezentsev, 2017). Speaking more broadly, there are debates about the correspondence of the urban development in Ukraine to the stages of urban development model (van den Berg et al., 1982; Cheshire and Hay, 1989; van den Berg, 1999) and differential urbanisation model (Geyer and Kontuly, 1993). In particular, it was shown that despite some common trends and apparent similarity to the urban development in the western world, stages of urban evolution and migration patterns in Ukraine are rather debatable and may essentially differ from the provisions of the mainstream theory (Mezentsev and Havryliuk, 2015; Malchykova and Pylypenko, 2017; Gnatiuk, 2018; Havryliuk et al., 2021). In fact, post-socialist peri-urban development may include a combination of several typical scenarios or processes depending on the social profile, place of origin and work of migrants, their motivation (Ford, 1999; Fisher, 2003; Hirt, 2007; Ouředníček, 2007).

The regional and national diversities of suburban development (including specific post-socialist trajectories) are supplemented with the growing diversity of suburbia itself. Since the 1970s, the researchers have emphasised its increasing diversity and erosion of hallmarks, so called “maturing” of suburbia, diversification of land use patterns and functions (McManus and Ethington, 2007; Harris, 2010), the emergence of its own centres and forms of economic activity, and, as a consequence, the growing independence

of the suburban area from the central city (Massotti, 1973; Garreau, 1991; Golubchikov, Phelps and Makhrova, 2010; Manshylina, 2015). As a result, suburbia loses its homogeneity: although individual regions and cities tend to produce specific types of suburban areas, different types of suburbia often coexist in the same area, mixing different land uses, building types, social strata and social practices (Shen and Wu, 2013; Drummond and Labbé, 2013; Phelps, 2017; Keil, 2018). Moreover, the traditional understanding of the city-countryside dichotomy is replaced by the concept of urban-rural continuum, so called post-suburbia, with attractive residential areas, new infrastructure in trade and services, employment opportunities mainly in the tertiary sector and industry, high personal mobility and, the most important, a new lifestyle that cannot be described via the “old” categories of urban and rural (Borsdorf, 2004; Mezentsev, 2017). In particular, post-socialist transitions have led to the exposure of the countryside to global flows and hence to the blurring and partial collapse of spatial categories such as “centre-periphery” and “urban-rural” (Duijzings, 2013).

Suburbia can be studied from different points of view: migration, relocation and redistribution of population; population and housing growth; change in the population structure (by incomes, education, age, etc.); decentralisation of economic activity and employment. The main alternative approaches for the typology of suburban spaces and settlements are statistical, morphological and genetic (Mantey and Sudra, 2018). However, these methods are not always able to fully characterise the substantial aspects of peri-urban development in the conditions of diversifying and “maturing” suburbia. In order to fully understand the suburban spaces, it is necessary to study them via the lens of everyday life of local inhabitants. At the same time, suburban spaces are not just “containers” where the everyday life of residents takes place, but the living environments that influence the behaviour of people and provide senses (Eyles, 1989; Mezentsev et al., 2019).

Combining the given perspectives, we have posed the following research goals: (1) to conceptualise the scenario of suburban development for the second-order post-socialist city in terms of the origin and motivation of residents, within the existing theoretical framework on the urban evolution in general (e.g. van den Berg, 1982; Cheshire and Hay, 1989) and overall peri-urban development patterns in particular (e.g. Ford, 1999; Fisher, 2003; Hirt, 2007; Ouředníček, 2007; etc.), and (2) to describe the suburban development with respect to changing everyday practices and respective lifestyles in the context of social differentiation of residents (Walker and Li, 2007; Provotar et al., 2019; Mezentsev et al., 2019, 2020).

2. Changing suburban spaces through the lens of everyday practices

The study of the routine, mundane aspects of traditional human geography subjects may reveal some of their essential but still hidden details (Denysyk et al., 2020). From this point of view, the study of lifestyle in terms of various everyday practices of suburban residents is an important aspect of studying suburban spaces and understanding their transformation. Moreover, in order to better understand and conceptualise the suburban way of life, it is necessary to explore how local residents themselves understand, perceive and interpret the suburbia, what they think and say

about it (Harris, 2010). The specificity of everyday practices in the suburban spaces stems from their social nature (Bourne, 1996), they begin with physical characteristics but are not limited to them (Harris, 2010). Suburbia is socially “developed” to achieve certain collective and individual goals (Bourne, 1996). The main social characteristics are usually related to the level of income, ethnic structure, migration behaviour, and lifestyle.

The meaning of the term “lifestyle” is rather ambiguous, as there are a range of definitions, depending on the academic field (Pisman, Allaert and Lombaerde, 2011). The term is used with regard to behaviour (e.g. choice, acquisition, use, and consumption), behavioural domains (e.g. dwelling, work, transport) and factors that influence behaviour (e.g. intentions, preferences, values or structural variables) (Heijs et al., 2009; Pisman, Allaert and Lombaerde, 2011). As people often make their residential choices basing on keeping their habitual everyday practices, the spatial division of lifestyle groups in different neighbourhoods is considered to be one of the most important spatial impacts of lifestyles (Aero, 2006; Feijten et al. 2008; Mokhtarian and Cao, 2008; van Acker, 2010; Jansen, 2020).

The differences and, simultaneously, ambiguous relationships between urban, suburban and rural lifestyles have been pointed out since the middle of the XX century (e.g. Amato, 1993; Le Gates and Stout, 1996; den Hartog, 2006; Aero, 2006; Kaneff, 2013; Matz, Stieb and Brion, 2015; Jansen, 2020). The term “suburbanism” was first proposed in the 1950s as a “third way” between the concepts of urbanism and ruralism, as a specific socio-psychological state and pattern – a suburban way of life (Fava, 1956). Specific patterns of everyday practices of suburban residents are determined mainly by the high level of their everyday mobility, which affects, first of all, the practices of working, consumption, recreation and leisure (Mezentsev et al., 2019). However, although it is widely accepted that urban and suburban lifestyles differ from each other (Pisman, Allaert and Lombaerde, 2011), nowadays it is almost impossible to talk about typical lifestyle and everyday practices in the suburbs as it was at the global start of suburban growth. Suburban spaces are

characterised by double diversity: on the one hand, in terms of development type and composition of residents, and on the other, in terms of a set of everyday practices (Mezentsev et al., 2020). Suburbia is becoming a place where different forms and practices mix, where low-rise detached houses and multi-storey residential complexes are located next to each other, where rich, middle class and poorer inhabitants often live in spatial proximity, where ideas about “feminised suburbia” and “masculinised” city are blurred (Drummond and Labbé, 2013). Suburban residents may have different lifestyles referring to their economic and socio-cultural capital, housing history and their functional, social and emotional relationship with residential environment (Reijndorp et al., 1998; Reijndorp, 2004) and residential strategies, i.e. long-term inhabitants and transit riders (Walker and Li, 2007; Mezentsev et al., 2020).

In today’s globalised world, urban lifestyles are perceived as modern and attractive, they are mostly sought to be adopted and copied, and thus their elements are gradually becoming part of the mundane life for residents of other areas. As Davidson and Lees (2005, p. 1167) put it, “the urban-rural dichotomy has broken down, as a significant part of the world has become increasingly urbanised and desirous of an urban lifestyle”. The everyday practices of the inhabitants of the suburban zone are “urbanising” and become much less dependent (or completely independent) from the central city (Anderson, 2006; McManus and Ethington, 2007). In such circumstances, the boundary between the city and the suburban area looks quite formal; often it is even difficult to delineate the margin between the urban and suburban space (Dymitrow and Stenseke, 2016). Each of the suburban evolution options (decline of cities in favour of suburbia; transformation of suburbia into post-suburbia; transformation of post-suburbia into cities; decline of suburbia and its transformation into “something less than suburbia”) (Phelps, Tarazona Vento and Roitman, 2015) is accompanied by specific changes in everyday practices. However, despite the long-term intense influence of large cities on their suburban areas, some “old” suburban and even rural practices can still be identified. The general trend of recent years is the overlapping and hybridisation



Fig. 1: Location of Vinnytsia

of typically urban, suburban and rural everyday practices in suburbia (Mezentsev and Provotar, 2020; Mezentsev et al., 2020). Different spaces are thus filled with different levels and forms of suburbanism (Walks, 2013).

3. Case study area

This study is focused on the second-order Ukrainian city of Vinnytsia with current population ca. 370,000 (Fig. 1). The overwhelming share of literature on suburban development in the post-socialist countries is devoted to the large metropolises, and only a few publications reveal the peculiarities of second-order cities (e.g. Matlovič and Sedláková, 2007; Gnatiuk, 2016; Zakutynska and Slyvka, 2016; Kubeš and Nováček, 2019). During the last decades, Vinnytsia demonstrates a pronounced outpacing population growth of the peri-urban area alongside the stagnating or even declining population of the city itself (Gnatiuk, 2017). The average radius of the area affected by suburban processes is approximately 25 km; however, its shape is characterised by spatial asymmetry due to the factors like different aesthetic appeal of landscapes, differences in the functional profile of the individual parts of the central city, configuration of main transport arteries and allocation of the neighbouring small cities. Especially high rates of suburban growth are observed in the south-western and western sectors (Gnatiuk, 2016).

The village of Ahronomichne, selected for our case study, is located on the south-western outskirts of Vinnytsia (Fig. 2). Comparing to the typical villages in the region, it is very young settlement founded in 1965 for the agricultural research station that moved from the other village to the outskirts of the city. The specific function of the settlement was imprinted in the visual appearance and the nature of residential development, namely the presence of apartment houses and dormitories constructed for the research station

employees in the 1960–1980s. Since the 1990s, the research station is experiencing a period of decline and has ceased to be a major employer for residents although officially it continues to operate as a unit of the National Academy of Agrarian Sciences of Ukraine.

Considering the proximity to the city and favourable landscapes, Ahronomichne became a subject to suburban growth starting from the 2000s. The village demonstrates one of the fastest rates of population growth among the peri-urban settlements. In 2018, the registered population was 3,852 inhabitants, and it is projected that in 2030 the population will reach 15,000. Recent residential development of the village demonstrates significant morphological heterogeneity: detached houses neighbour upon multi-storey apartment houses, as well as cottage towns and townhouses, some of the latter being gated or semi-gated communities (Fig. 3).

According to the urban planning and strategic documents of the 2010s, the spatial development of Vinnytsia should have been implemented in accordance with the concept of a compact city. Therefore, the expansion of the city limits via absorption of the adjacent rural settlements was not planned. However, in 2015, under extremely favourable political situation (the former city mayor Volodymyr Groisman acted as a Ukrainian Prime Minister), the limits of the city were expanded, including absorption of a proximate part of Ahronomichne built-up with detached houses of local new rich, so called Tsarske Selo (literally “Tsar Village”). In 2019, in course of the administrative-territorial reform in Ukraine, the village community decided between joining the Vinnytsia urban community and creating a separate rural community. Despite the close ties with the city, the discussions and rallies were finally won by the opponents of absorption; their key arguments were higher land taxes and utility fees in the city, as well as

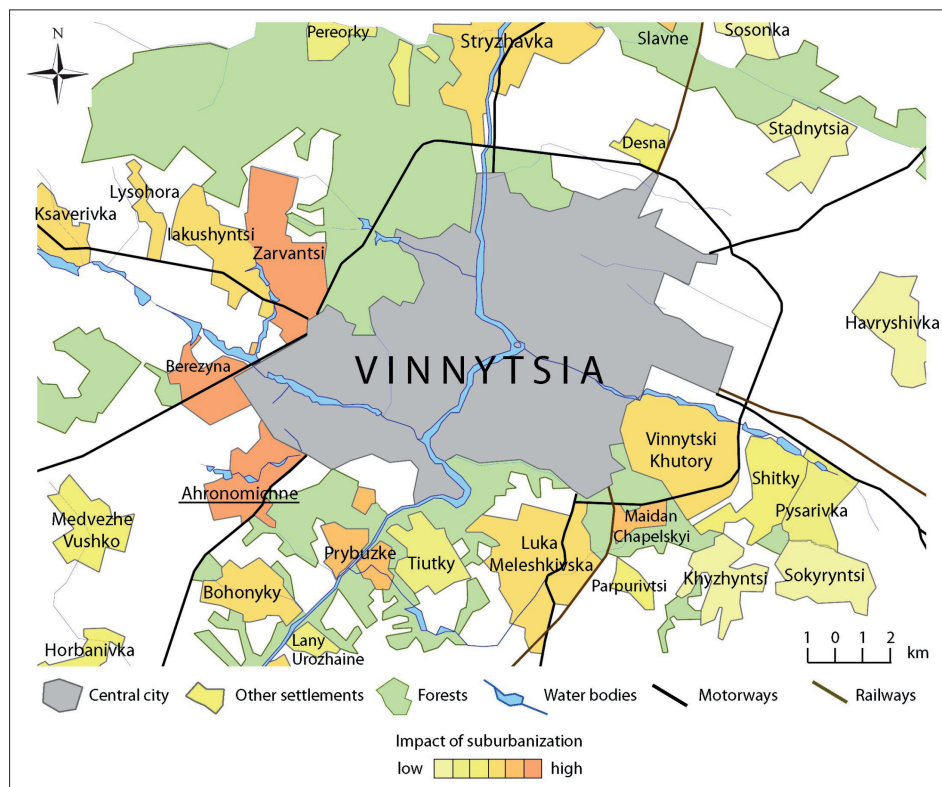


Fig. 2: Position of Ahronomichne in the suburban area of Vinnytsia
Source: authors' elaboration. The assessment of the suburbanisation impact according to Gnatiuk (2016)

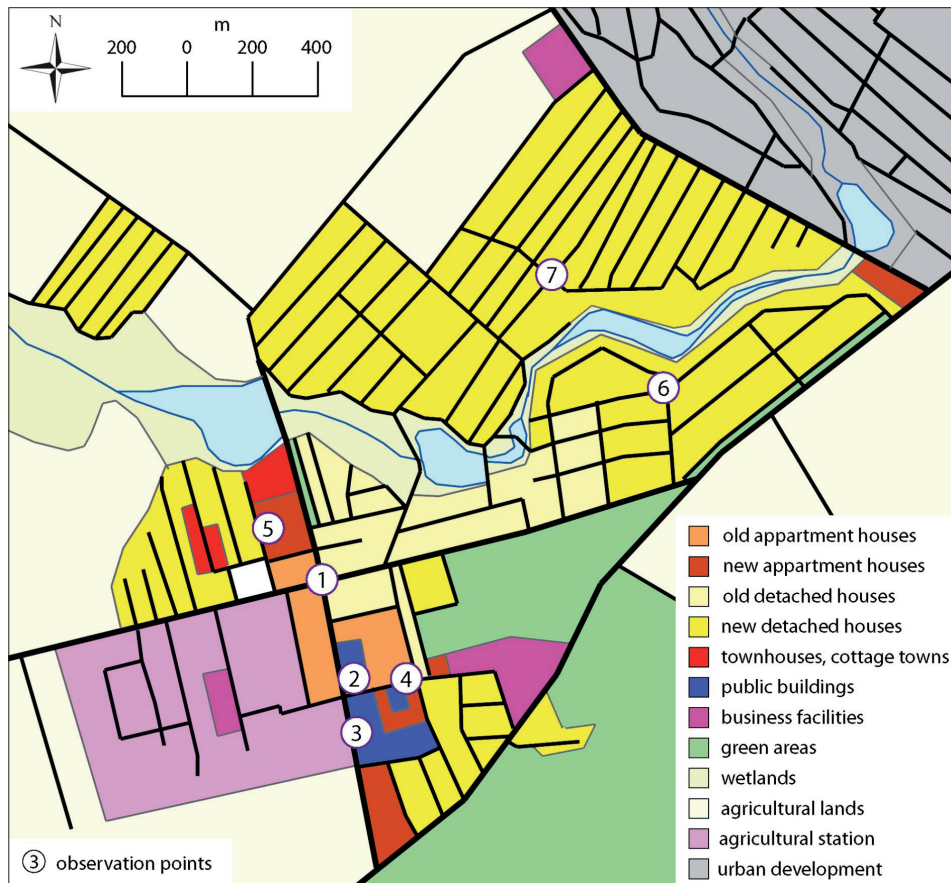


Fig. 3: Morphological and functional zoning of Ahronomichne and position of observation points
Source: authors' elaboration

fears that the village may not have own representative in the City Council. Consequently, since 2020, Ahronomichne became a centre of a village community that includes also several other suburban villages (Bokhonyky, Medvezhe Vushko, Horbanivka, Ilkivka, Rivets – see Fig. 2), and joining the city in the short term is not being discussed. However, recent heated debates about the future of the village could exacerbate the contradictions between the long-term residents and newcomers.

4. Data and methods

Suburbanisation processes in Ukraine are quite uneven: they depend on the region and the suburbanisation potential of the city (Mezentsev and Mezentseva, 2017; Gnatiuk, 2017). In particular, five main types of suburban spaces with specific types of housing and lifestyles can be distinguished: suburban-absorbed rural settlements, new “cottage” villages, residentialised summer houses settlements, amplified Soviet-era satellite towns and “internally” suburbanised neighbourhoods within the cities (Mezentsev et al., 2019). The internal diversity of Ukrainian suburban areas is shaped by the overlapping lifestyles of urban and rural residents (Zakutynska and Slyvka, 2016), migrants from different regions, “temporary” residents who implement a conscious or forced transitional or long-term strategy (Mezentsev et al., 2019). Differences in everyday practices and lifestyles of long-term residents and newcomers are caused by differences in their origin, as well as social and property status (Mezentsev et al., 2020). Typical urban residents in Ukraine, especially in big cities, are living in high-rise apartment houses, have no personal homesteading and thus depend on jobs in services or industry. In the

recent decades, they benefit from the intense development of catering, entertainment and leisure industry, and are used to spend free time visiting public spaces like shopping malls or street cafes. On the contrary, rural residents in Ukraine typically live in detached houses, are employed in agricultural sector and usually have homesteading both as a part of rural tradition and a matter of survival. The services available are typically limited to the old-fashioned food store, second-rate cafe and beat-up community club, and thus their lives are more monotonous and tied to the own homesteading (Hukalova, 2009). At the same time, rural residents are used to keep closer social ties comparing to their urban counterparts. In Ukraine, the urban lifestyle is seen as more attractive, as it is characterised by the dynamism of socio-economic transformations, a more diverse cultural environment, a variety of lifestyles, a high level of social mobility. However, this does not apply to the way of life in small towns, where it is mainly similar to the rural one.

Thus, the employed research methodology should be able to show the similarities and differences of the everyday practices, identities and perceptions (1) in the dichotomy of old-term residents and the recent newcomers, (2) in the dichotomy of the residents of apartment houses and detached houses (as well as townhouses and cottage settlements). Given the actual start of residential suburbanisation in Ukraine in the late 2000s (Mezentsev and Mezentseva, 2017), the time of living in suburbia may be considered as a main criterion to distinguish between the long-term rural residents and newcomers. In view of the foregoing, the research methodology employed three methods, each focused on the specific aspect of the investigated issue although partly overlapping and complementing each other (Fig. 4).

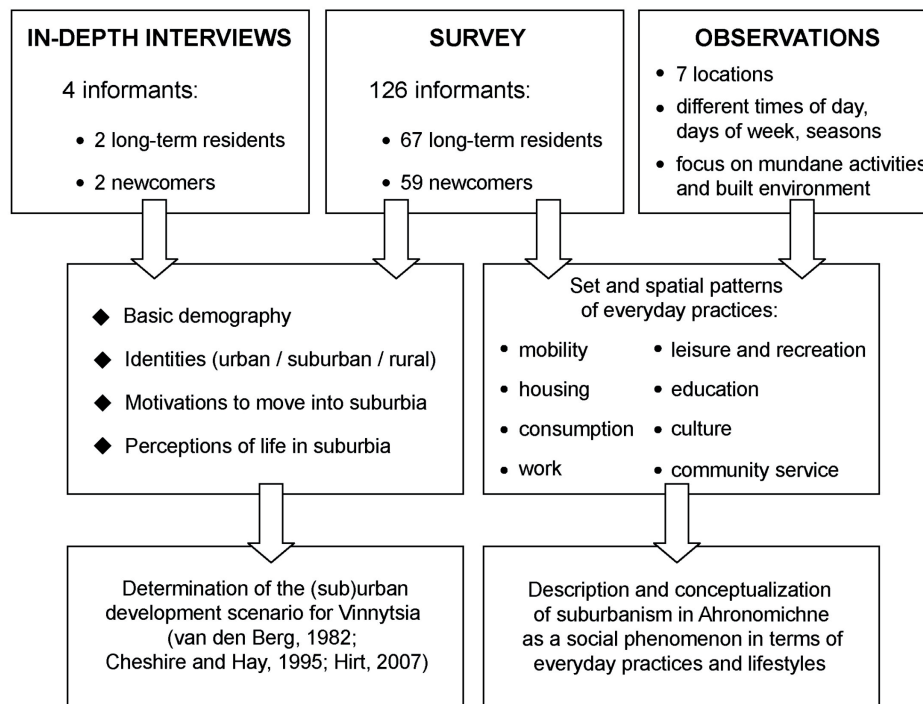


Fig. 4: Scheme of the research methods and goals
Source: authors' elaboration

The main research method was a survey of residents carried out in July–August 2020 and December 2020–January 2021. The survey was conducted among a random sample of Ahronomichne residents caught by the interviewer in the public spaces of the village and near their homes. The informants ($n = 126$) were divided into two groups: long-term residents (those living in Ahronomichne for 10 years or more; 67 informants) and newcomers (those living in Ahronomichne for less than 10 years; 59 informants). The key subject of the analysis were the most common forms of everyday practices such as mobility, housing, consumption, work, leisure and recreation, education and cultural development, community service, including self-organisation at the suburban community level (Mezentsev et al., 2019). Despite the relatively small number of survey subjects, the sample size was sufficient to show some statistical significance and there is no theoretical reason to expect that a larger sample would lead to very different results. Moreover, similar sample sizes are not uncommon (e.g. Ghose, 2004; Hirt, 2007). We used Pearson's Chi-Square test to evaluate cross-tabulations, and in the most cases null hypothesis of insignificant difference between the behaviour of long-term residence and newcomers were rejected.

Additional source of information about the everyday practices (as well as about the built environment of the village) were visual observations of the mundane activity of the residents, performed in October–November 2019, April–May 2020 and January 2021 at seven basic locations (Fig. 3):

- 1 – intersection of the two main streets;
- 2 – square and playground in the village centre;
- 3 – square near a school and a village hall;
- 4 and 5 – new residential complexes (apartment houses);
- 6 and 7 – crossroads in the areas of new detached housing.

Locations were selected in order to (a) cover both old and new parts of the village and (b) observe everyday practices of housing, mobility, leisure, recreation, shopping, etc.

Observations were carried out on weekends and weekdays, as well as in the morning, afternoon and evening hours. Also, in-depth semi-structured interviews with two newcomers and two long-term residents were taken in order to clarify the perception of living in transforming suburbia by suburban residents. In the following section, questionnaires and interviews of the long-term residents are marked as “LTR”, of the newcomers – as “NC”, respectively.

There are several circumstances that may influence the integrity of the study. The first is already mentioned relatively small sample size: the use of the larger sample for the survey and a larger set of in-depth interviews would allow drawing more confident conclusions about the similarities and/or differences between the subgroups of informants. The second is a lack of accurate and detailed information on the demographic structure of the sampled population, in particular, the exact age and sex structure, as well as proportion between the long-term residents and newcomers, which may influence the overall conclusions of the balances of lifestyles in Ahronomichne. The third is probable selection bias due to the difficulty of reaching informants from the gated communities/households. However, these limitations seem to be not crucial for the key findings and their interpretation.

5. Results and discussion

The basic characteristics of the survey informants, including their origin, mobility, motivation for migration, occupation and economic activity, self-identification, perceptions, social communication and composition of the homesteading are presented in Table 1, while Table 2 shows spatial configuration of the studied everyday practices.

Three findings are made based on the results of the survey, interviews and observations. The first one is the dominance of western-type pattern of peri-urban growth of Vinnytsia's suburbia. The second one claims that nowadays the suburbia is divided in terms of everyday practices, self-identifications and perceptions of the long-term residents and newcomers.

Answer options	LTR (%)	NC (%)	Chi-square	Answer options	LTR (%)	NC (%)	Chi-square
<i>Geography of origin (From where have you moved to Abromonichne?)</i>							
Original residents	50.7	0.0	41.0052*	Not familiar at all	0.0	1.7	1.14468
City of Vinnytsia	22.4	84.7	48.8466*	Greeting at meeting only	6.0	13.6	2.09701
Vinnytsia region (rural areas)	25.4	8.5	6.21642**	Greeting and exchange of few remarks	7.5	20.3	4.45660**
Kyiv region (rural areas)	1.5	0.0	0.887642	Keep personal friendship	74.6	54.2	6.68235*
Donetsk region	0.0	5.1	3.48987***	Family friendship	11.9	5.1	1.85051
Other country (Syria)	0.0	1.7	1.14468	<i>Perceived inconveniences</i>			
Self-identification-1 (Who are you?)				Insufficient development of social infrastructure	56.7	47.5	1.07823
Urban resident	7.5	11.9	0.705434	Lack of places for recreation and leisure	41.8	50.8	1.03579
Suburban resident	19.4	61.0	22.8607*	Lack of employment opportunities	67.2	16.9	32.1620*
Rural resident	73.1	27.1	26.5990*	Difficulties with transport communication with the city	28.4	62.7	14.9954*
<i>Self-identification-2 (How will you answer the question 'Where are you from?')</i>							
From Abromonichne	56.7	39.0	3.95036**	Lack of benefits of urban civilization	31.3	35.6	0.254996
From Vinnytsia	43.3	61.0	3.95036**	High rates of new housing construction	37.3	10.2	12.4611*
<i>Motivation (Why have you moved to Abromonichne?)</i>							
Quieter living conditions	45.5	72.9	6.83278*	Low quality of utilities (water supply)	20.9	15.3	0.669096
Healthy living environment	45.5	54.2	0.653287	<i>Composition of homesteading (Do you have?)</i>	AH	DH	AH
Cheaper housing prices	48.5	35.6	1.46287	Flowerbed	44.4	95.0	50.0
Family circumstances	39.4	5.1	17.3397*	Cellar	59.3	87.5	23.1
Employment opportunities	36.4	3.4	17.8348*	Vegetable plot	14.8	100.0	15.6
Quality of life	6.1	6.8	0.017949	Barn	55.6	82.5	57.6
<i>Occupation / economic activity</i>							
Hired workers	59.7	52.5	0.653726	Poultry	14.8	77.5	15.6
Businessmen	3.0	20.3	9.56634*	Classic garden	14.8	70.0	15.6
Housekeepers	9.0	6.8	0.203228	Cattle	0.0	32.5	0.0
Retirees	26.9	5.1	10.7162*	Wall or dwarf garden	0.0	12.5	3.1
Students	1.5	15.3	8.13174*	Bee-house	0.0	10.0	0.0
<i>Mobility (How do you commute to Vinnytsia?)</i>							
Public transport	71.6	44.1	9.84151*				
Own car	23.9	39.0	2.68194				
Bicycle / motorcycle	4.4	10.2	1.53243				
By foot	0.0	6.7	4.69130**				

Tab. 1: Characteristics, practices, perceptions and identities of suburban residents (Legend: LTR – long-term residents, NC – newcomers, AH – apartment houses, DH – detached houses, cottages and townhouses; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$)

Source: authors' survey and calculations

Everyday practices	Long-term residents				Newcomers			
	Suburbs only	Suburbs and city	City only	No activity	Suburbs only	Suburbs and city	City only	No activity
Work or education	28.4	6.0	29.9	35.8	10.2	5.1	72.9	11.9
Purchase of food products	23.9	59.7	16.4	0.0	16.9	39.0	44.1	.0
Purchase of non-food products	16.4	35.8	47.8	0.0	5.1	22.0	67.8	5.1
Leisure, entertainment	40.3	28.4	17.9	13.4	5.1	25.4	55.9	13.6
Time with friends	49.3	35.8	7.5	7.5	49.2	27.1	11.9	11.9
Doing sports	19.4	16.4	7.5	56.7	44.1	5.1	16.9	33.9
Visiting catering facilities	7.5	23.9	19.4	49.3	0.0	6.8	62.7	30.5
Visiting cultural institutions	19.4	16.4	31.3	32.8	0.0	5.1	76.3	18.6
Visiting beauty industry	28.4	28.4	23.9	19.4	5.1	5.1	71.2	18.6
Medical care	11.9	5.1	73.1	10.4	0.0	0.0	94.9	5.1
Education of children	28.4	7.5	22.4	41.8	27.1	11.9	39.0	22.0
Leisure with children	35.8	28.4	5.1	31.3	39.0	11.9	27.1	22.0
Civic activity	35.8	9.0	10.4	44.8	20.3	11.9	6.8	61.0

Tab. 2: Spatial configuration of everyday practices for long-term residents and newcomers
Source: Survey and calculations by the authors

The third one is about mixing and hybridisation (rather than replacement) of urban, suburban and rural everyday practices and lifestyles. The following subsections are discussing these aspects in more detail.

5.1 Western-type pattern of peri-urban growth

The results show that the western-type pattern of suburban growth prevail in Ahronomichne. First, the majority of newcomers are former urban residents, and most part of them moved from Vinnytsia, the central city. Thus, we observe centrifugal migration pattern, which is classical for western-type suburban growth. Furthermore, upon the average, the newcomers are more affluent comparing to the long-term residents and have higher social status (significantly higher shares of businessmen and lower share of retirees among the newcomers), and their main motivations for moving to suburbia were quieter living conditions and healthier living environment, which fits the broader idea of urban escape (Hirt, 2007). On the contrast, factors like cheaper housing prices, family circumstances and employment opportunities were much more often mentioned by the long-term residents. The other hallmarks of the western-type suburban growth are high dependence on personal car for commuting and strong dependence on the city in everyday life, which is evident from the Table 2. The idea of urban escape was articulated by the interviewed newcomers as well:

“The quality of life here is completely different. There is silence, peace; there is no city bustle to which you get used, but which kills all the joy of life ... the opportunity to have your own piece of land. Look here – a flowerbed, strawberries, bushes... You live in four walls [in the city], and you want to have a piece of nature. Here you want to go to the field – here is a field. If you want to go to the forest – here is a forest. No gray walls covering the sky. And what is the sky like here... Did you see the sky here at night? You will never see this in the city. I’m willing to pay extra for this.” (Informant NC-01)

Therefore, in terms of peri-urban development concepts, the peri-urban growth of Vinnytsia could be classified as suburbanisation (migration from the central city to the

nearest peri-urban belt) (Ford, 1999; Fisher, 2003), western-type suburbanisation (relocation of wealthy households from the central city to the countryside) (Hirt, 2007), centrifugal migration from the central city to the peri-urban area, predominantly to the newly-built housing (Ouředníček, 2007). However, cheaper housing prices in suburbia were important for 35.6% of newcomers, and 27.1% of them declared mixed motivation: ecological (urban escape) together with economical (cheaper housing). This indicates that the stream of migrants to suburbia is not homogenous: wealthy migrants are accompanied by people with relatively low incomes, although this can hardly be called a genuine desurbanisation (Hirt, 2007).

Interestingly, in terms of peri-urban growth pattern, the suburbs of Vinnytsia are qualitatively different from the suburban area of a big Ukrainian city like Kyiv, where centrifugal migrations of rich people to peri-urban area combines with the centripetal stream of less affluent migrant from peripheral settlements, keeping transitory residential strategy (Mezentsev et al., 2019, 2020).

5.2 Divided suburbia in terms of everyday practices, self-identification and perception

Long-term residents and newcomers demonstrate essentially different patterns of their everyday practices in terms of (1) set of practices, (2) their spatial configuration and (3) mode of their performance. Also, the differences are observed in (4) self-identification and perception of life in suburbia.

Differences in the set of practices are due to different geography of origin of the long-term residents (who often indicated the absence of practices related to sports, catering, leisure and entertainment) and newcomers. The former are predominantly descendants from rural areas, who spent in villages all their lives and firmly mastered the rural way of life. They prefer physical activity in the garden to sports and fitness, and they often have no time, money and desire to visit, for example restaurant, theatre or night club. On the contrary, newcomers, who brought with them urban habit and want to follow the familiar way of life, consider such

practices like going to the gym or visiting a café with friends as must-have things. They meet these needs mainly in the city that causes significantly higher mobility (commuting) of the newcomers. At average, the long-term residents are older than newcomers and thus have no necessity to spend much time with children or educate them. Also, while the long-term residents keep interpersonal communication practices typical for the close-knit community, the newcomers are much less eager to establish strong social contact with their neighbours in suburbia. The practices of housing are also a remarkable point: presence of a vegetable plot, cellar, barn, poultry, and garden is almost mandatory for detached houses of long-term residents, but only optional for the similar houses of newcomers. These practices of homesteading have different meaning for the long-term residents and newcomers: for the former they are a means of economic survival, but for the latter they are just for amusement and following the fashion.

Differences in the spatial configuration of everyday practices consist in significantly higher dependence of the newcomers on the central city. This main reason is the desire of the newcomers to continue enjoying the benefits of “urban civilisation” and keep urban lifestyle. The most remarkable differences relate to leisure and entertainment and education of children: while long-term residents have these practices in suburbia, the newcomers shift them to the city. Significant differences are observed also for visiting catering services, cultural institutions, beauty industry, and purchase of food, education and work. The less remarkable differences are observed for time with friends, doing sports, leisure with children and civic activity (concentrated more in suburbia than in the city), purchase of non-food products and medical care (concentrated more in the city than in suburbia).

The long-term residents and the newcomers may have the same everyday practices but perform them in different mode. In particular, while newcomers understand leisure time as visiting fashionable restaurant, going to the cinema

with friends, or watching night skies in a telescope on the lawn near the house, for the long-term residents “leisure time” is often reduced to housework, work in the garden or vegetable plot, fishing on the local pond, or just drinking beer in the local hole-in-the-wall. A long-term resident is used to buy vegetables and fruits in an old Soviet-style grocery, while a newcomer, if decide not going to the city, visits for the same purpose a recently open urban-style minimarket, etc. Even for commuting they are using different means of transport: while the newcomers give preferences to personal cars, the long-term residents typically use “marshrutkas”. Like the long-term residents, the newcomers socialise with friends, do sports and spend time with children mostly in Ahronomichne, but these practices take place within confined private spaces, such as in a fenced yard of a detached homestead or cottage. The most public spaces of the village are rarely used by the newcomers because they do not meet their needs: they are badly organised, have typical “rural” aesthetics, and often serve as a place for unregulated street trade or drinking, etc. (Fig. 5).

Finally, differences are visible in self-identification and perception of life in suburbia. While most long-term residents identify themselves as rural inhabitants and link own identity to Ahronomichne, the majority of newcomers identify themselves as suburban residents and prefer to underline their link to the central city rather than to the “unknown suburban village”, a “bedroom community” (quotations from the interview NC-02). The perceived inconveniences also reflect differences in lifestyles, values, and identities: while long-term residents are preoccupied about the lack of employment opportunities and poor social infrastructure (which indicates their rootedness in the village), newcomers worry most about the problems with commuting to the city and lack of places for recreation and leisure in suburbia (which indicates their orientation to the city and simultaneously the desire to “bring the city to the suburbia”). Symptomatically, high rates of new housing construction are disturbing the long-term residents much more than the newcomers:



Fig. 5: Divided everyday practices in Ahronomichne (from the upper left clockwise: backyard of the long-term resident’s house; outdoor space in the cottage town; recreation with children near the newly-build apartment house; unregulated trade in the old part of the village)

Source: Photos by Oleksiy Gnatiuk (2019–2020)

“The attitude [to the new housing] is negative. Of course, in the village council they will tell you that it is good: investors, taxes, landscaping. But we don’t need all that. We need peace. Constantly transport, trucks go on the road, nowhere to hide from the noise. The load on kindergarten and school is growing. New houses are connected to the old water supply system – it is not designed for that. And landscaping... Look at my house! Behind the fence is the area of responsibility of the village council. Did they mow the grass there at least once? We do everything ourselves. Yes, there are several new shops, there is a pharmacy... but in general nothing is developing in the village. Instead, they build up every free piece of land. This is a big business... Those cottages are built on the former lands of our research station.” (Informant LTR-01)

It could be seen that the informant is concerned about both the deterioration of quality of life and the loss of the local identity tied to the research station. The attitude to the newcomers often is also far from being friendly:

“They all are strangers, capitalists, pests. Here they have more comfortable life: quietness, calmness. But they are in Vinnytsia all the time. They work there, they just sleep here. We do not communicate with them. And no one will let in there because of dogs, fences...” (Informant LTR-01)

This unfriendly attitude to the newcomers is enhanced by the trampled pride of the former and current agricultural station employees. In the past, they did important scientific work that was in demand by the economy, but nowadays it seems that no one needs them:

“The station was engaged in selection. Varietal seeds were grown for the whole region. Look – the beets are shooting now, and why? Because it is not a varietal seed. And then there was a distribution list: all kolkhozes received our varietal seeds – wheat, oats, barley, beets. Wheat yield was 70-100 kg/ha ... And now sunflower and rapeseed are planted for big profits, but those crops exhaust the soil” (Informant LTR-02)

Some newcomers are also worried about the continuing construction in Ahronomichne, but their principal reason is to save existing benefits of suburban life:

“The construction is normal thing. The village is developing, this process cannot be stopped, and it is inexpedient to stop. But it should be a controlled development, so that those who already live here could influence what and where to build. There may be high-rise buildings, but their number should be limited. The preference should be for low-rise development, in order to keep the benefits of local life.” (Informant NC-01)

Concerning the vision of the future of the suburbia, it seems that the line of division split the newcomers by type of housing. While inhabitants of detached houses and cottages have joined the long-term residents in their desire to keep the administrative independence of the village from the city, the inhabitants of apartment houses do not see alternatives to the absorption by the city:

“Of course, we must remain independent. We need peace, tranquility, the ability to manage the land on our own. Vinnytsia, what good is it to us? It will be a new split-up of the land plots. Housing prices and living costs will jump immediately.” (Informant LTR-01)

“I am for a strong and independent local government. There must be patriots in power who are able to defend the interests of the village community. Interest in land, for

example. But cooperation can and should be agreed with the city. You can’t run away from this.” (Informant NC-01, cottage resident)

“I see no alternative to merging with the city. In fact, it is already half an urban neighbourhood, although very remote. All work in the city, study in the city. It is necessary to legalise what has already happened.” (Informant NC-02, resident of the apartment house)

It may be concluded that Ahronomichne is divided in terms of everyday practices, self-identifications and perceptions. The long-term residents are still keeping mostly rural lifestyle and rural identity; the newcomers live mostly classical suburban city-oriented lifestyles and consider the village as a bedroom community, consequently falling out of the social life of the settlement. In fact, co-education of children in local secondary school and kindergarten is the unique social practice that promotes communication between the two groups of residents.

5.3 Mixing and hybridising everyday practices and lifestyles

Despite the existing divisions between the old and new suburban residents, we found also mutual interactions of lifestyles and everyday practices (1) of the long-term residents and newcomers and (2) the residents of different type of development, primarily detached houses from one side and multi-storey apartment houses from the other. These interactions result in mixing and hybridisation of everyday practices and, consequently, lifestyles. Mixing is a simultaneous coexistence of different lifestyles and practices in suburbia, while hybridisation is when a person (or household) combines different practices and lifestyles so that is impossible to define the exact type of lifestyle (urban, suburban, or rural).

Rural environment makes an imprint on the housing practices of the newcomers. A lot of the new households have such traditional rural elements of homesteading like a cellar, barn, vegetable plot, garden, and poultry. Interestingly, this refers not only to the residents of detached houses, but to those living in apartment houses as well. It is important to emphasise here that improvised gardens kept near the high-rise apartment buildings is a quite common phenomenon on post-Soviet space, including for the large cities and their mass housing neighbourhoods; in the urban environment, these gardens usually include flowerbeds, vegetable plots and several fruit trees. Nearly 30% of the newcomers identify themselves as rural residents, and almost 40% of them would indicate Ahronomichne, not the city, as their residential place. Despite the fact that the newcomers use personal cars for commuting much more often comparing with the long-term residents, public transport (“marshrutkas”) appears to be the most important mean for commuting in both groups. In relation to the adoption of rural practices, the lifestyles of newcomers may be divided into:

1. “wealthy suburbanism” of detached houses and cottages, which, on the one hand, are more socially closed within their own backyards, but on the other, actively adopt certain rural housing practices, and
2. “suburbanism of apartment houses”, who are more active in using suburban public spaces but have fewer opportunities to acquire rural housing practices; this is the most “urbanised” part of residents in terms of lifestyle.

And vice versa, long-term residents are adopting urban/suburban lifestyles of the newcomers. They try to modernise their houses and fences with fashionable materials,

introduce western-looking grass lawns instead of the classical rural flowerbed, replace classical gardens for wall or dwarf gardens that initially have been hallmarks of the new households. Also, only a third of the long-term households keep cattle, which is small figure for a typical Ukrainian village. Although the long-term residents are less dependent on the city, they acquire the taste of living near a big city and using its benefits: nearly a half of them indicated lack of places for recreation and leisure, which is not much less than among the newcomers. Despite the dominance of rural self-identification, every fourth long-term resident declared urban or suburban identity, and nearly a half of them would prefer Vinnytsia to Ahromichne answering the question “Where are you from?” Even some natives of the village considered themselves to be “urban” residents. The figures from the Table 2 are convincing that some of their everyday practices (purchase of non-food products, visiting cultural institutions, beauty industry and health care institutions) are strongly linked to the city, and another set of practices are more or less equally distributed between the suburbia and the city (work, education, purchase of food products, visiting catering facilities).

The hybridisation of everyday practices in the same household and the age shift from rural to suburban lifestyle with a change of generation is readable from the following interview fragment:

“Would you like to move to Vinnytsia?”

No. And my daughter wouldn't move either. We are not used to living in an apartment. We got used to the own house, to the nature, to the garden. Here you feel the ground under your feet.

You and your daughter run a farm and work in the garden, and the granddaughter?

Granddaughter is not the case! She has never worked in the garden and will not work. Her maximum is to bring water and pour on something. She is in a performance ensemble, she dances, she needs her hands to be beautiful.

She has all the business in Vinnytsia. She studies there, meets her friends there, she walks there, cinemas and all these things... She likes being here [in Ahromichne], but she only sleeps and eats here. She says: ‘I will not tear weeds, I need to earn money.’” (Informant LTR-01)

The penetration of typically urban structures and services to the village is stressed by the facts that (1) in 2018 the village administration moved to a new office on the ground floor of the 7-storey apartment house, a unique situation for Ukrainian village, being a good illustration of its suburban situation; (2) a centre for administrative services, providing 37 different services, including issuance of passports for travelling abroad, was opened in the same building; this was the first institution of this type in Ukraine located in the formally rural area (Fig. 6).

Therefore, we can conclude that the long-term residents are gradually changing their traditional rural way of life, enriching it with several suburban elements. If we imagine that the new residential development in Ahromichne suddenly disappeared, the remaining settlement would not be unambiguously rural in term of visual appearance and lifestyle of the inhabitants. This is a typical rural suburbanism of a peri-urban village, caused by the destruction of the traditional rural economic base (in our case – research station) and the proximity to the city as a powerful labour market, a source of various high-quality services, a magnet of urban lifestyles.

To some extent, we can assume that long-term residents and newcomers are characterised by “parallel lives.” Moreover, the othering of newcomers can be projected onto the othering of spaces that they occupy (Woods and Kong, 2020). Such “spatial parallelism” in suburbia of the second-order city has some visible physical manifestations, in particular concerning area arrangement, composition of homesteading, and mobility. The study also revealed socio-cultural differences in dweller's behaviour, from their self-identification (e.g. suburban vs. rural), everyday practices (e.g. different work or leisure sites preferences) to possible



Fig. 6: Mixing everyday practices in Ahromichne (from the upper left clockwise: partially “modernised” old homestead; old truck serving as a trade warehouse in front of recently opened trattoria and dentistry; strawberry beds near the multi-storey apartment house; entrance to the centre for administrative services and ATM)

Source: Photos by Oleksiy Gnatiuk (2019)

misunderstandings and prejudice. We should also keep in mind that in an era of liquid migration (Engbersen, 2018) migrations of newcomers can be fluid, and therefore suburban community has a plural expression of place attachments, a complicated configuration of relationships between “roots” (fixities) and “routes” (mobilities) (Di Masso, 2019).

6. Conclusions

The study of the everyday practices, self-identities and perceptions seems to be a promising approach to understand the suburbia and suburban spaces as not only static containers but as socially constructed, dynamic and ambiguous entities. Everyday practices in Ahronomichne, representing peri-urban village near the second-order Ukrainian city, differ in terms of their set, spatial configuration and mode of performance. The trajectory of changing lifestyles in the suburbia is drastically defined by the western-type pattern of suburban growth, and that is why the main watershed lies among the long-term residents and the newcomers, the initial bearers of typically rural and typically urban lifestyles respectively. The other factors are type of housing, which determines a particularly high level of diversity of everyday practices in suburban village, as well as age and family status. Consequently, the suburbia comprises a combination of modern features of the urban lifestyle and traditional components of the rural lifestyle (Castle, Wu and Weber, 2011); by means of suburbia, urban and rural areas become “connected vessels” (Drobyshevskaja, 2005). However, it is impossible to state unequivocally about the expansion or contraction of everyday practices, but rather about their gradual transformation, intertwining, mixing and hybridisation (see also Mezentsev et al., 2019; Mezentsev and Provotar, 2020). Accordingly, the suburban spaces enhance their internal diversity and patchiness.

Located near the second-order city outside global urban centres, relatively insulated from urbanisation, former typical rural settlement Ahronomichne now is engulfed by territorial expansion of “a planetary formation of urbanisation” (Brenner and Schmid, 2015). While this suburbia is still quite unevenly captured by urbanisation, it is distinctly more interwoven in urban fabric. Newcomers bring new features to rural area contributing in turn to the production of new (more urbanised) forms of everyday practices.

Can the patterns of the case be extrapolated onto the overall territory of Ukraine? The distinct identity of the research station employees may be considered as a specific feature of Ahronomichne. On the one hand, this identity encourages long-term residents to keep the traditional way of life, but on the other, specific built environment of the village (e.g. presence of the apartment houses already during the Soviet era) facilitates the adoption of typical urban lifestyles. These factors work in opposite directions, and that is why our findings with regard to the mixing and hybridising everyday practices and lifestyles may be extended to most other villages at the urban fringes of large cities (with population of 100,000–500,000) in the central part of the country. The same refers to the revealed motivations of contemporary migrants to suburbia, which is partially supported by the existing literature on Ukrainian cities compared to Vinnytsia in terms of population (e.g. Zakutynska and Slyvka, 2016). At the same time, the conclusions should be applied more delicately to suburban settlements in other regions of the country (e.g. Western of Eastern Ukraine, as Ukraine is very diversified country in terms of historical and cultural

background, as well as current migration patterns), as well as to other types of suburbia (e.g. satellite towns) and other types of the central cities (e.g. the largest metropolises like Kyiv). In particular, there is evidence that suburban fringe of Kyiv shows quite different origin and motivation of suburban migrants (Mezentsev et al., 2020).

Taking into account the above presented results, as well as the findings of the previous recent researches on Vinnytsia and other Ukrainian cities (Gnatiuk, 2017; Zakutynska and Slyvka, 2016; Havryliuk et al., 2021), it is possible to assert that the most economically vibrant large cities in Ukraine have already switched to the suburbanisation stage of urban development (van den Berg, 1999). In particular, rapid suburban development in Ahronomichne was triggered by the factors like the decline of large scale industries, rise of services, certain increase in welfare and private car ownership, as well as the increased appreciation of the living environment. In this sense, the findings support the mainstream stages of urban development model both in numerical figures reflecting migration dynamics and in respect to underlying factors. However, the suburbia may show significant internal diversity even in case of not too big city, which is Vinnytsia. For example, demographic growth in Ahronomichne occurs together with the very weak commercial suburbanisation, while some other suburban villages near Vinnytsia (e.g. Zarvantsi, Iakushyntsi – see Fig. 2) thrive precisely because of the location of large network shopping centres, car repair services, and logistics. In this sense, different settlements within the same suburban area may show different patterns of development depending on their location relative to highways, attractive natural landscapes, local identity, etc.

To summarise, the accented heterogeneity and fragmentation of post-Soviet suburbia is observed even when the process of suburban development generally corresponds to the classical western-type suburbanisation. This is due to the original genetic differences of suburban areas and the spatial selectivity of contemporary suburban development. The suburbs of post-communist cities cannot be considered as a homogeneous formation, but rather as a patched environment and simultaneously a product of the urban-rural interaction, their intertwining, accompanied by the erosion of old identities of the suburban settlements and the formation of new “hybrid” identities. This internal diversity and ambiguity is especially noticeable when complementing the functions and forms of the built environment with the analysis of everyday practices and self-identifications of residents, and the latter can be decisive for the further trajectory of suburban development. Significant level of urban-rural socio-economic disparities in post-communist Europe contributes to the formation of particularly striking forms of interaction, each of which represents a separate version of “suburbanism” as a socio-spatial phenomenon. This means the complexity, nonlinearity and heterochrony of the transition from suburbia to post-suburbia in the post-communist space.

An outside observer, knowing Ahronomichne only from the media, may conclude that it is currently near the end of a single direction route from the agricultural research station to a “luxury village”. However, unweaving a tangled skein of everyday practices, identities and perceptions of the villagers, we see neither single direction route nor the end of the journey. Rather, we detect a complex system of highways, alleys and winding paths in between the agricultural station village, the suburban “luxury village” and the urban

neighbourhood. The understanding of this complexity should keep the urban planners from simple straightforward planning decisions with regard to suburban spaces: the latter need balanced development aimed at the formation of a social mix as a basis for the resilience of suburban communities to the socio-economic challenges of today.

Acknowledgements

The research was funded by the Ministry of Education and Science of Ukraine in the framework of the joint Ukrainian-Austrian project No. 0120U104700 “Ambiguous suburban spaces: Comparative analysis of local trajectories and changing everyday practices”. The authors are thankful to the editor and two anonymous reviewers for their valuable comments, which helped to improve the manuscript, and would like to pay their gratitude to the anonymous informants for sharing their experiences, attitudes and intimate stories.

References:

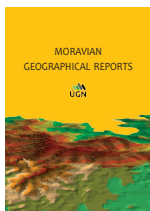
- AERO, T. (2006): Residential choice from a lifestyle perspective housing. *Theory and Society*, 23(2): 109–130.
- AMATO, P. R. (1993): Urban-rural differences in helping friends and family members. *Social Psychology Quarterly*, 56(4): 249–262.
- ANDERSON, K. (2006): Introduction: after sprawl: post-suburban Sydney. In: Anderson, K., Dobson, R., Allon, F., Neilson, B. [eds.]: *E-Proceedings of ‘Post-Suburban Sydney: The City in Transformation’ Conference*, Sydney.
- BORÉN, T., GENTILE, M. (2017): Metropolitan processes in post-Communist states: an introduction. *Geografiska Annaler, Series B: Human Geography*, 89(2): 95–110.
- BOURNE, L. S. (1996): Reinventing the suburbs: old myths and new realities. *Progress in Planning*, 46(3): 163–184.
- BRENNER, N., SCHMID, C. (2014): The ‘Urban Age’ in Question. *International Journal of Urban and Regional Research*, 38(3): 731–755.
- BRENNER, N., SCHMID, C. (2015): Towards a new epistemology of the urban? *City*, 19(2–3): 151–182.
- CASTLE, E., WU, J., WEBER, B. (2011): Place orientation and rural-urban interdependence. *Applied Economic Perspectives and Policy*, 33: 179–204.
- CHESHIRE, P., HAY, D. G. (1989): *Urban Problems in Western Europe – An Economic Analysis*. London, Unwin Hyman.
- DAVIDSON, M., LEES, L. (2005): New-build “gentrification” and London’s riverside renaissance. *Environment and Planning A*, 37: 1165–1190.
- DENYSYK, G., MEZENTSEV, K., ANTIPOVA, E., KIZIUN, A. (2020): Heohrafija povsiakdennia: prostorove riznomanittia povsiakdennoho zhyttia. *Visnyk of V. N. Karazin Kharkiv National University, Series Geography. Ecology*, 52: 130–138.
- DEN HARTOG, H. [ed.] (2006): *Exurbia/Wonen buiten de stad*. Rotterdam, Episode Publishers.
- DI MASSO, A., WILLIAMS, D. R., RAYMOND, C. M., ... VON WIRTHM, T. (2019): Between fixities and flows: Navigating place attachments in an increasingly mobile world. *Journal of Environmental Psychology*, 61: 125–133.
- DROBYSHEVSKAJA, T. (2005): *Osnovy gorodskoj politiki*. Donetsk, Jugo-Vostok.
- DRUMMOND, L., LABBÉ, D. (2013): We’re a long way from Levittown, Dorothy: everyday suburbanism as a global way of life. In: Keil, R. [ed.]: *Suburban Constellations: Governance, Land and Infrastructure in the 21st Century* (pp. 46–51). Berlin, Jovis.
- DUIJZINGS, G. (2013): Introduction. In: Duijzings, G. [ed.]: *Global villages: rural and urban transformations in contemporary Bulgaria* (pp. 1–32). London, Anthem Press.
- DYMITROW, M., STENSEKE, M. (2016): Rural-urban blurring and the subjectivity within. *Rural Landscapes: Society, Environment, History*, 3(1): 1–13.
- ENGBERSEN, G. (2018): Liquid Migration and its Consequences for Local Integration Policies. In: Scholten, P., van Ostaijen, M. [eds.]: *Between Mobility and Migration*. IMISCOE Research Series (pp. 63–76). Springer, Cham.
- EYLES, J. (1989): The geography of everyday life. In: Gregory, D., Walford, R. [eds.]: *Horizons in Human Geography* (pp. 102–117). London, Macmillan.
- FAVA, S. F. (1956): Suburbanism as a way of life. *American Sociological Review*, 21(1): 34–37.
- FEIJTEN, P., HOOIMEIJER, P., MULDER, C. H. (2008): Residential experience and residential environment choice over the life-course. *Urban Studies*, 45: 141–162.
- FISHER, T. (2003): Differentiation of growth processes in the peri-urban region: an Australian case study. *Urban Studies*, 40(3): 551–565.
- FORD, T. (1999): Understanding population growth in the peri-urban region. *International Journal of Population Geography*, 5(4): 297–311.
- GARREAU, J. (1991): *Edge City: Life on the New Frontier*. New York, Doubleday.
- GEYER, H., KONTULY, T. (1993): A theoretical foundation for the concept of differential urbanization. In: Hermanus, G., Kontuly, T. [eds.]: *Differential Urbanization: Integrating Spatial Models* (pp. 290–308). London, UK, Edward Arnold.
- GHOSE, R. (2004): Big sky or big sprawl? Rural gentrification and the changing cultural landscape of Missoula, Montana. *Urban Geography*, 25(6): 528–549.
- GNATIUK, O. (2016): Dakhy z suchasnykh materialiv jak marker modernizatsijnoho vplyvu mista na prymis’ku zonu (pryklad Vinnytsi). *Chasopys kartohrafiiji*, 16: 39–47.
- GNATIUK, O. (2017). Demographic dimension of suburbanization in Ukraine in the light of urban development theories. *Acta Universitatis Carolinae Geographica*, 52(2): 13–25.
- GOLUBCHIKOV, O., PHELPS, N. A., MAKHROVA, A. (2010): Post-socialist post-suburbia: growth machine and the emergence of “edge city” in the metropolitan context of Moscow. *Geography, Environment, Sustainability*, 3(1): 44–54.
- HARRIS, R. (2010): Meaningful types in a world of suburbs. *Research in Urban Sociology*, 10: 15–47.
- HAVRYLIUK, O., GNATIUK, O., MEZENTSEV, K. (2021): Suburbanization, but centralization? Migration patterns in the post-Soviet functional urban region – evidence from Kyiv. *Folia Geographica*, 63(1): 64–84.

- HEIJS, W., CARTON, M., SMEETS, J., VAN GEMERT, A. (2009): The labyrinth of life-styles. *Journal of Housing and the Built Environment*, 24: 347–356.
- HIRT, S. (2007): Suburbanizing Sofia: characteristics of post-socialist peri-urban change. *Urban Geography*, 28(8): 755–780.
- HUKALOVA, I. (2009): Jakist' zhyttia naseleennia Ukrainy: suspil'no-heohrafichna kontseptualizatsija. Kyiv, Drukarnia MVS Ukrainy.
- JANSEN, S. J. T. (2020): Urban, suburban or rural? Understanding preferences for the residential environment. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 13(2): 213–235.
- KANEFF, D. (2013): Rural-urban relations in a global age. In: Duijzings, G. [ed.]: *Global villages: rural and urban transformations in contemporary Bulgaria* (pp. 33–51). London, Anthem Press.
- KEIL, R. (2018): *Suburban Planet: Making the World Urban from the Outside in*. Cambridge, Polity Press.
- KRISJANE, Z., BERZINS, M. (2012): Post-socialist urban trends: new patterns and motivations for migration in the suburban areas of Riga, Latvia. *Urban Studies*, 49(2): 289–306.
- KUBEŠ, J., NOVÁČEK, A. (2019): Suburbs around the Czech provincial city of České Budějovice – territorial arrangement and problems. *Hungarian Geographical Bulletin*, 68: 65–78.
- LEETMAA, K., TAMMARU, T., ANNISTE, K. (2009): From priority-led to market-led suburbanisation in a post-Communist metropolis. *Tijdschrift voor Economische en Sociale Geografie*, 100(4): 436–453.
- LE GATES, R., STOUT, F. [eds.] (1996): *The City Reader*. London – New York: Routledge.
- MALCHYKOVA, D., PYLYPENKO, I. (2017): Vid “rozirvanoho” prostoru do metropolizaciji i suburbanizaciji: Khersonska miska ahlomeracija u novykh vymirakh urbohenezu. In: Mezentsev, K., Olijnyk, Ya., Mezentseva, N., [eds.]: *Urbanistychna Ukrainy: V Epitsentri Prostorovykh Zmin* (pp. 326–338). Kyiv, Fenix.
- MANSHYLINA, T. (2015): *Suspil'no-heohrafichne doslidzhennia rozvytku mist-suputnykiv ta prymiskozi zony Kyjeva*. Abstract of a PhD Thesis. Kyiv, Taras Shevchenko National University of Kyiv.
- MANTEY, D., SUDRA, P. (2019): Types of suburbs in post-socialist Poland and their potential for creating public spaces. *Cities*, 88: 209–221.
- MASSOTTI, L. H. (1973): Prologue: suburbia reconsidered – myth and counter-myth. In: Masotti, L. H., Hadden, J. K. [eds.]: *The Urbanization of the Suburbs* (pp. 15–22). London, Sage.
- MATLOVIČ, R., SEDLÁKOVÁ, A. (2007): The impact of suburbanization in the hinterland of Prešov (Slovakia). *Moravian Geographical Reports*, 15(2): 22–31.
- MATZ, C. J., STIEB, D. M., BRION, O. (2015): Urban-rural differences in daily time-activity patterns, occupational activity and housing characteristics. *Environmental Health*, 14: 88.
- MCMANUS, R., ETHINGTON, P. (2007): Suburbs in transition. *New approaches to suburban history*. *Urban History*, 34(2): 317–337.
- MEZENTSEV, K. (2017): Vstup: prymis'ki prostory, scho zminuijut'sia ta vynykajut'. In: Mezentsev, K., Olijnyk, Ya. [eds.]: *Urbanistychna Ukrainy: V Epitsentri Prostorovykh Zmin* (pp. 261–267). Kyiv, Fenix.
- MEZENTSEV, K., HAVRYLIUK, O. (2015): Testuvannia modeli dyferencial'noji urbanizaciji v Ukraini. *Ekonomichna ta Sotsialna Geografija*, 73: 15–26.
- MEZENTSEV, K., MEZENTSEVA, N. (2017): Zhytlova suburbanizacija v Ukraini: trendy ta vidminnosti. In: Mezentsev, K., Olijnyk, Ya., Mezentseva, N., [eds.]: *Urbanistychna Ukrainy: V Epitsentri Prostorovykh Zmin* (pp. 268–287). Kyiv, Fenix.
- MEZENTSEV, K., PROVOTAR, N. (2020): Neodnoznachni prymis'ki prostory: rozshyrennia chy zvuzhennia povsiakdennykh praktyk? In: Berghauer, S., Dnyisztrjanskij, M., Gyula, F. [eds.]: *Human Geographical Processes in East-Central Europe: Problems, Tendencies and Trends, Vol. 1* (pp. 41–46). Uzhhorod.
- MEZENTSEV, K., PROVOTAR, N., GNATIUK, O., MELNYCHUK, A., DENYSENKO, O. (2019): Neodnoznachni prymis'ki prostory: tendentsiji ta osoblyvosti zminy povsiakdennykh praktyk. *Ekonomichna ta Sotsialna Geografija*, 82: 4–19.
- MEZENTSEV, K., PROVOTAR, N., GNATIUK, O., MELNYCHUK, A., DENYSENKO, O. (2020): Trajektoriji rozvytku prymis'kykh prostoriv. *Scientific Bulletin of Kherson State University – Geographical Sciences*, 13: 63–75.
- MOKHTARIAN, P., CAO, X. (2008): Examining the impacts of residential self-selection on travel behaviour: a focus on methodologies. *Transportation Research B*, 42: 204–228.
- NEFEDOVA, T. G. (2018): The Moscow suburbs: specifics and spatial development of rural areas. *Regional Research of Russia*, 8(3): 225–237.
- OUŘEDNÍČEK, M. (2007): Differential suburban development in Prague urban region. *Geografiska Annaler, Series B: Human Geography*, 89(2): 111–126.
- PISMAN, A., ALLAERT, G., LOMBAERDE, P. (2011): Urban and suburban lifestyles and residential preferences in a highly urbanized society. Experiences from a case study in Ghent (Flanders, Belgium). *Belgeo*, 1–2: 89–104.
- PHELPS, N. A. (2017): Introduction: Old Europe: New Suburbanization? In: Phelps, N. A. [ed.]: *Old Europe: New Suburbanization. Governance, Land and Infrastructure in European Suburbanization* (pp. 3–17). Toronto, University of Toronto Press.
- PHELPS, N. A., TARAZONA VENTO, A., ROITMAN, S. (2015): The suburban question: grassroots politics and place making in Spanish suburbs. *Environment and Planning C: Government and Policy*, 33(3): 512–532.
- PROVOTAR, N., MELNYCHUK, A., GNATIUK, O., DENYSENKO, O. (2019): Minlyvi povsiakdenni praktyky u prymis'kykh prostorakh: metodyka doslidzhennia mistsevykh trendiv. *Ekonomichna ta Sotsialna Geografija*, 81: 34–41.
- REIJNDORP, A. (2004): *Stadswijk. Stedenbouw en Dagelijks Leven*. Rotterdam, NAI Uitgevers.
- REIJNDORP, A., KOMPIER, V., METAAL, S., NIO, I., TRUIJENS, B. (1998): *Buiten Wijk. Stedelijkheid op Afstand*. Rotterdam, NAI Uitgevers.

- SCHNEIDER, W. (1992): The suburban century begins. *Atlantic Monthly*, July 1992: 33–44.
- SHEN, J., WU, F. (2013): Moving to the suburbs: demand-side driving forces of suburban growth in China. *Environment and Planning A*, 45(8): 1823–1844.
- SLAEV, A. D., KOVACHEV, A. (2014): Specific issues of urban sprawl in Bulgaria. *European Spatial Research and Policy*, 21(2): 155–169.
- STANILOV, K., SÝKORA, L. [eds.] (2014): *Confronting Suburbanization: Urban Decentralization in Postsocialist Central and Eastern Europe*. Oxford, Wiley-Blackwell.
- TAMMARU, T. (2001): Suburban growth and suburbanisation under central planning: the case of Soviet Estonia. *Urban Studies*, 38(8): 1341–1357.
- VAN ACKER, V. (2010): *Spatial and Social variations in Travel Behaviour. Incorporating Lifestyles and Attitudes into Travel Behaviour-Land Use Interaction Research*. Zelzate, University Press.
- VAN DEN BERG, L. (1999): The urban life cycle and the role of a market-oriented revitalization policy in Western Europe. In: Summers, A. A., Cheshire, P. C., Senn, L. [eds.]: *Urban Change in the United States and Western Europe: Comparative Analysis and Policy* (pp. 539–558). Washington, D.C., The Urban Institute Press.
- VAN DEN BERG, L., DREWETT, R., KLAASSEN, L. H., ROSSI, A., VIJVERBERG, N. H. T. (1982): *A study of growth and decline*. Oxford, Pergamon.
- WALKER, J. L., LI, J. (2007): Latent lifestyle preferences and household location decisions. *Journal of Geographical Systems*, 9(1): 77–101.
- WALKS, A. (2013): Suburbanism as a way of life, slight return. *Urban Studies*, 50(8): 1471–1488.
- WOODS, O., KONG, L. (2020): Parallel spaces of migrant (non-)integration in Singapore: Latent politics of distance and difference within a diverse Christian community. *Journal of Intercultural Studies*, 41(3): 339–354.
- ZAKUTYNSKA, I., SLYVKA, R. (2016): *Suburbanizatsija v prostorovomu vymiri: Ivano-Frankivs'k i joho okolytsi*. Kyiv, Lohos.

Please cite this article as:

GNATIUK, O., MEZENTSEV, K., PROVOTAR, N. (2021): From the agricultural station to a luxury village? Changing and ambiguous everyday practices in the suburb of Vinnytsia (Ukraine). *Moravian Geographical Reports*, 29(3): 202–216. doi: <https://doi.org/10.2478/mgr-2021-0015>



Peripheral areas and their distinctive characteristics: The case of Hungary

János PÉNZES^{a*}, Gábor DEMETER^b

Abstract

The delimitation and classification of peripheral settlements using multivariate statistical methods is presented in this article, with a case study of Hungary. A combination of four different methods provided the basis for the delimitation of settlements defined as peripheral. As significant overlapping was detected between the results of the different methods, peripheries – more than one-fifth of the Hungarian settlements – were identified in a common set of the results. The independence of the results from the applied methods points to the fact that peripherisation is multi-faceted, and the peripheries of Hungary are stable and well-discernible from other regions. After the identification of peripheral areas, we classified these settlements into groups based on their specific features. Multiple steps specifying the relevant variables resulted in selecting the most appropriate 10 indicators and these served as the basis for a hierarchical cluster analysis, through which 7 clusters (types of peripheries) were identified. Five of them comprised enough cases to detect the most important dimensions and specific features of the backwardness of these groups. These clusters demonstrated a spatial pattern and their socioeconomic and infrastructural features highlighted considerable disparities. These differences should be taken into consideration when development policies are applied at regional levels or below.

Keywords: core-periphery dichotomy, demographic processes, multivariate statistical methods, peripheral areas, peripherisation, regional development planning

Article history: Received 18 August 2020, Accepted 24 April 2021, Published 30 September 2021

1. Introduction

The term ‘periphery’ is not a clearly defined term but has numerous interpretations from spatial to socio-developmental perspectives. As a consequence, the delimitation of peripheral areas might be based on different methods and several indicators supposed to illustrate development levels. In the case of Hungary, during the last few decades numerous methods were tested and used to identify the spatial structure of developed and peripheral (backward) areas. In the current analysis a new attempt is made to delimit the most backward regions at the settlement level (covering the LAU 2 units) within Hungary after 2010 – compared to former experiences.

One of the most important issues relating to this study is how to categorise the most backward and peripheral settlements (often a synonym for backwardness in Hungarian discourse). This task was assigned to regional planning entities through different intervention policies, including social, educational and employment policies. Multivariate statistical methods might provide an appropriate tool for

the categorisation of peripheral settlements. But another important methodological issue is the selection of the most relevant statistical data that describe the features of development and the dimensions of spatial social inequalities. Thus, the current paper aims to find the appropriate indicators for a multivariate statistical analysis, through which the most peripheral settlements of Hungary can be identified and separated from one another based on their characteristics and specific features.

2. Theoretical background

2.1 The concept of a core-periphery relation and the types of peripheries

The concept of core-periphery relations is based largely on an explanation of uneven capitalist development (Hirschman, 1958) that causes divergence in the development of regions regarding their economic position and the level of concentration of resources and capital (Williamson, 1965). The approaches and theoretical backgrounds have changed

^a University of Debrecen, Department of Social Geography and Regional Development Planning, Debrecen, Hungary (*corresponding author: J. Péntzes, e-mail: penzes.janos@science.unideb.hu)

^b Institute of History, Research Centre for the Humanities, Eötvös Loránd Research Network, Budapest, Hungary

during the last decades. The objectives of the core-periphery models have been determined, on the one hand, by research on the transformation of societies and production modes, and on the other by the effects of these changes on given areas at different territorial levels (Ramírez, 2009). The core-periphery relations tend to be analysed not only with scalar datasets but increasingly within networks (Borgatti and Everett, 1999) and with vector data (Erlebach et al. 2019). Peripheral positions might appear in global, national and regional contexts and in local structural relations, with interlinkages among them (Kreckel, 2004; Kühn, 2014; Erlebach et al., 2019) representing a fractal-like pattern (Halás, 2014; Erlebach et al., 2019).

In the social sciences, the core-periphery dichotomy is regarded as a basic paradigm, but its dual meaning was clarified by Immanuel Wallerstein, who extended this bipolar concept by introducing the definition of ‘semi-periphery’ (Wallerstein, 1976). The terms and concepts of core and periphery are regarded as inter-relational, inter-dependent and derived from each other (Kühn, 2014). Cores are characterised by proactive measures, semi-peripheries are dominated by successful adaptive models, while a periphery is usually dominated by reactive (and often unsuccessful) measures – thus the interdependence turns into an asymmetric relation. Due to this close relation, it is difficult to create a reliable overall definition for core and periphery, both conceptually and empirically (Bernt and Colini, 2013).

Thus, the diverse meaning and content of peripherality can be perceived rather through categorisations. Reynaud separated four kinds of peripheries (dominated; abandoned; integrated and exploited; integrated and annexed), and two types of centres (dominant and hypertrophic) (Reynaud, 1981). Certain territories do not fit this dichotomy: isolated (isolate) and blind-spot (angle mort) regions can therefore be classified as marginal areas (Leimgruber, 2007). As part of the discussion about geographical marginality, four types of regions were proposed: geometric, ecological, economic and social (Leimgruber, 1994). Nemes-Nagy identified three approaches to the core-periphery relationship, separating locational (geographical), economic (level of development-related) and social (political power-related) approaches (Nemes-Nagy, 1996). Novotný and colleagues created the following subgroups after the analysis and synthesis of individual authors’ approaches to peripherality and marginality: geometric, political, ecological, economic and social (Novotný et al., 2015).

The Hungarian scientific discourse and regional policy tend to primarily focus on two aspects in connection with peripherality: peripheral locations with disadvantageous transport accessibility (e.g. Tóth, 2006, Lócsei and Szalkai, 2008; Kiss, 2012) and areas that are socially and economically underdeveloped (Nagy et al., 2012). These aspects interrelate with each other in the case of Hungary, causing socioeconomic problems aggravated by the risk of transport-related exclusion (Tagai et al., 2018).

The delimitation of peripheral areas is, therefore, generally considered along with multiple indicators and different methods. The multidimensional character of peripherality satisfies the demand for generalising instead of using a specific category (Halás, 2008). In spite of their multidimensional character, most geographical studies arguably focus on static descriptions, instead of investigating the process of peripheralization (Kühn, 2014; Lang, 2015).

2.2 Delimitation methodologies of peripheral areas in East-Central Europe

Because of their multidimensional character, peripheral areas are difficult to delimit by universally accepted methodologies. The various features of spatial development lead to diverse procedures to demarcate these areas in each country. Significant changes could be discerned in the methodology during the last few decades, especially in indicators due to changing socioeconomic conditions, rapidly developing statistical databases and the evolving approaches of stakeholders. Nonetheless, almost all approaches have some relation to the ground-breaking work of Berry (1964) at the outset of the Quantitative Revolution in Geography.

During the socialist era, the study of economic and infrastructural indicators was common (e.g. Beluszky, 1976; Potrykowska, 1985). At the same time, demographic variables were also included in the development studies, emphasising the direct relation between economic prosperity and the dynamic growth in population numbers (e.g. Gawryszewski and Potrykowska, 1988; G. Fekete, 1991).

The transformations of political regimes and the collapse of socialist socioeconomic structures caused a rapid increase in the importance (and numbers) of indicators describing the rising structural crisis (e.g. unemployment or industrial sector) in transitional Central European countries (Dövényi, 2001; Kovács, 2004). The proliferation of innovations that resulted from the transition to market economies has also received greater attention in the post-socialist countries (Rechnitzer, 1993). The widening territorial statistical background and the rapid increase in the possibilities for analysis caused a boom in the application of different methodologies and in the number and variety of socioeconomic and infrastructural indicators derived from the investigation of the spatial structure. After 2010, the revaluation of natural and environmental components could be detected, primarily as the result of the increasing role of sustainable development concepts (e.g. Nagy and Koós, 2014; Papp et al., 2017; Bański et al., 2018).

2.3 Altered spatial patterns in Eastern Central Europe and in Hungary after the transition

Now that the socioeconomic spatial structures have been transformed in East-Central Europe after the political transition to capitalism, similar spatial characteristics and dichotomies can be detected mainly in the countries that form the Visegrád Group (Sokol, 2001; Komornicki and Czapiewski, 2006; Péntzes, 2013b; Novotný et al., 2015). Thus, regional inequalities significantly increased during the early 1990s as a direct consequence of the transition from a centrally planned state economy to the privatised market economy (Nemes-Nagy, 2006), and the spatial pattern became even more polarised (Nemes-Nagy, 2000; Szabó, 2003; Havlíček et al., 2005). The capital-labour relationship has become the main driver behind iniquitous, uneven capitalist development (Timár, 2007).

The sudden and profound transitional changes significantly affected the occurrence and economic situation of peripheral areas. The rest of the traditionally backward areas had to face deepening socioeconomic problems. Rural areas were victimised by the unsuccessful transformation of the ownership and production structure of agriculture (Csatári and Farkas, 2008), along with the significant degradation of the market framed by the Council for

Mutual An increasing spatial concentration of peripheral areas became visible in the eastern regions of the Visegrád countries (e.g. Gorzelak, 1996).

At the same time, some parts of the peripheral settlements began to develop due to favourable socioeconomic conditions, especially at the Western border which became trespass able again and in the vicinity of the largest towns (Heidenreich, 2003; Halás and Hurbánek, 2008; Egri and Kószegi, 2018). Suburbanisation became one of the most important processes determining internal migration in the countries of Eastern Central Europe, especially in the areas surrounding the capital cities and larger towns (Kovács, 2004). This development has had a significant effect on the development path of the attached settlements.

The positive impact of polycentric spatial development concepts (Copus, 2001) on the mitigation of intra-regional disparities is debated (Malý, 2016; Mulíček and Malý, 2019). In Hungary, functional regions are dominated by Budapest and its metropolitan region (Sütő, 2008; Péntzes and Pálóczi, 2017; Szabó et al., 2014). The outstanding position and concentrated economic performance of the largest towns is strengthened by the transport network, with Budapest at its centre (Egri and Kószegi, 2020). Moderate and decreasing intra-regional inequalities could be observed in the intensive commuting zones of Hungary's developed regions, while small and medium sized towns as centres of employment in the backward regions (Sütő, 2008) showed island-like development patterns and weak commuting relations, resulting in high within-region disparities even after the millennium (Péntzes, 2013a).

2.4 Peripheries in Hungary before and after the political transition

Peripheral areas in Hungary are characterised by 'traditional' peripherality, and some authors claim that the roots of Central European backwardness could be traced back to the Middle Ages, as compared to Western Europe (Baranyi, 2004). Disadvantageous natural conditions significantly influenced the development possibilities of settlements and resulted in the conservation of outdated types of social formations and cultivation methods during the 18th century. Disadvantageous social-demographic traditions might have also contributed to the step backward for these Central European countries (e.g. in the case of the Ormánság territory along the River Dráva in southwestern Hungary). The failure of some territories to reap the benefits of the general economic boom during the last decades of the 19th century deepened the marginalisation of the peripheral areas. The construction of railway lines generated new geographical peripheries being at a disadvantage, as they were situated far from the main lines. In other words, underdeveloped areas started to form with expressively unfavourable socioeconomic indicators even before the Trianon Peace Treaty (breaking up the geographical makeup and economic structure of Hungary at the time), whereas the latter also had deep, unfavourable impacts on the present borderlands of the country (Demeter, 2018; 2020; Szilágyi, 2019; Péntzes, 2020). The new borders deepened the previously existing problems while generating new ones. Urban hinterlands were separated from the urban centres by the new border – primarily in the case of north-eastern, eastern and southern Hungary (Süli-Zakar, 1992). These backward areas were not only observable in the interwar period (Szilágyi, 2020), but some have persisted even up to the present. Beside these, the

territorial changes after Trianon determined the enormous strengthening of Budapest within the spatial pattern, one that can be regarded as monocentric notwithstanding the attempts of the regional policy in the 20th century.

During the socialist era, new inequalities were generated by the construction of socialist industrial towns, centrally controlled redistribution, an exaggerated support of industrialisation and the forced transformation of agricultural ownership. The (re)distribution of developmental resources was in complete accord with the settlement hierarchy through the system of settlement councils (Perczel-Gerle, 1966). In this respect, small settlements were at the end of the chain of redistribution, and their access to resources was strictly limited or even impossible. The National Settlement Network Development Framework Plan of 1971 made this situation even more difficult. Public services and infrastructural elements began to vanish in the smaller villages only to reappear in the cities as the result of the concentration of financial resources in large metropolises (Beluszky, 1979).

The scientific investigation of peripheral (i.e. 'unfavourable') settlements was initiated during the mid-1970s (Beluszky, 1976). This research analysed the spatial disparities in living conditions with special attention to the infrastructural and institutional supply and accessibility.

The first official action plan by the Hungarian Cabinet to develop the most unfavourable (according to their economic situation) settlements as part of the Hungarian regional policy's first major developmental attempts started in 1986 (Tomcsányi, 1986); however, the political transition to capitalism aborted these efforts. The transformation crisis - generating territorial inequalities too - urged for interventions by Hungarian regional policy and prompted the regularly updated delineations of the supported (most backward) settlements (these delimitations were accomplished by the Hungarian Central Statistical Office – HCSO). The goal behind the delimitation of backward settlements was to allocate the developmental resources for the most deprived territories and settlements appropriately (however, the effectiveness of these attempts is disputed – see Nagy, 2009). Hungarian researchers and scientific institutes developed numerous methods with different approaches: for instance, focusing on the spatial capital, territorial deprivation and human development in order to outline the spatial developmental pattern of Hungary (for a summary, see Péntzes, 2015).

This research brought attention to the rapid rise in unemployment and a quickly developing structural crisis in the heavy industrial and coal mining areas (e.g. in the surrounding areas of Salgótarján, Ózd, Kazincbarcika, Edelény in north-eastern Hungary, and Komló, Sásd in South Hungary). Besides these locations, the towns of Ajka, Oroszlány, Várpalota (in north-western Hungary) also had to face a significant decline in their local industrial economies. The latter territories, however, could restructure their economy or – through commuting – profit from direct foreign investments targeting the nearest larger towns.

The transitional crisis areas are located near the traditional backward areas in north-eastern and southwestern Hungary (Kovács and Koós, 2018). As the result of this, extended peripheral areas were formed after the political transition (the current state of which is described below). At the same time, the status of the former peripheries in western and north-western Hungary consisting of typically small

villages, began to thrive due to the rapid growth of the region accelerated by direct foreign investments (mainly in the automotive and electronic industry and their related supplier chains) (Molnár et al., 2020) and – especially after 2010 – due to cross-border commuting to Austria (Kiss and Szalkai, 2014; Egedy, 2017).

Regional inequalities – as demonstrated by taxable income, for example – have typically decreased in the post-millennium age in Hungary (Pénzes et al., 2014), but the process of peripheralisation may even take place within these stagnating or decreasing spatial disparities (Šimon, 2017). As a result of the above briefly summarised processes, it is highly possible that peripheral settlements may differ from each other in their characteristics – not only regarding their geographical location but also their socioeconomic indicators. Using multivariate statistical methods, we attempt to identify these groups and their distinctive features (e.g. Bernard and Šimon, 2017; Bański et al., 2018).

3. Data and methods

In the current study, four different methods are applied in order to create a more comprehensive and complex methodology to identify peripheral settlements (LAU2 territorial level) after 2010. The selected methods are all appropriate for the study of territorial development and peripherality to certain extent, but all have different characteristics and focus. The described methods refer to the same LAU2 territorial level (3,155 settlements in Hungary), for this reason the modifiable area unit problem (MAUP) is not significant as these researches are based on the most detailed territorial data publically available. The research thus cannot deal with the local level within-settlement territorial segregation.

1. The index of territorial deprivation was adapted to the Hungarian circumstances by the Institute for Regional Studies (IRS) of the Hungarian Academy of Sciences. The multidimensional territorial deprivation index gives a reliable long-term overview about spatial social processes based on census years through seven variables (Kovács, 2010; Koós, 2015).
2. The Hungarian index of objective well-being (the formula of this index was also developed by the IRS) reflect most of the proposals in the Stieglitz-Sen-Fitoussi Report (Stieglitz et al., 2009). This method provides an

exceptionally complex and sensitive indicator thanks to its ‘holistic’ view. The Hungarian objective well-being index contained 30 indicators categorised into 10 groups (see Nagy and Koós, 2014). The results of objective well-being were also included in the investigation because of its international importance.

3. The HCSO developed the recent delimitation of the favoured settlements of the regional policy on the basis of socioeconomic and infrastructural development (altogether 24 indicators were applied). The 1,054 settlements (one third of the Hungarian settlements) with the lowest development values were classified as disadvantageous (105/2015 [23rd April] governmental decree). This methodology was also regarded as essential to become part of our comprehensive analysis of peripheral settlements. The computations were repeated by the authors.
4. Finally, the fourth complex indicator was created in order to provide a methodologically reliable way to facilitate delimitation of peripheral settlements. The components of the complex indicator known as “territorial development index” were selected from 136 various social, demographic, economic and infrastructural indicators with the help of a multistep and accurate narrowing process which resulted 7 indicators (Pénzes, 2015, 2020). This method provided the basis for investigating the Hungarian spatial pattern and the location of peripheral areas below (Fig. 1 – discussed later).

All of the briefly demonstrated methods are appropriate for sorting the settlements according to development level. After computing the results, a comparison was made with the help of a correlation matrix using Pearson-coefficient (multivariate calculations were accomplished with the IBM SPSS 24.0). The objective of this analysis was to detect the statistical relationship among the different methods (Tab. 1).

The groups of peripheral settlements were delineated by using the threshold of the recent governmental document (105/2015 [23rd April] governmental decree), which meant the delimitation of 1,054 locations with the lowest development values. The overlapping of the results of the four mentioned different methods was also investigated (Fig. 2), and the results of this comparison (the common set of the four methods) provided the basis for the delimitation of the confirmed peripheral settlements investigated

	Index of territorial deprivation, 2011	Index of objective well-being, 2011	Composit indicator of the HCSO, 2013	Territorial development index, 2016
Index of territorial deprivation, 2011	1.000	0.860	0.859	0.847
Index of objective well-being, 2011	0.860	1.000	0.895	0.820
Composit indicator of the HCSO, 2013	0.859	0.895	1.000	0.831
Territorial development index, 2016	0.847	0.820	0.831	1.000

Tab. 1: Correlation matrix of the investigated complex development indicators

Sources: author’s computations based on the datasets from Hungarian Central Statistical Office and TeIR; Koós, 2015; Nagy and Koós, 2014; 105/2015 (23rd April) governmental decree of the Hungarian Government

in this study. This group of settlements was analysed below by multivariate methods in order to discover their characteristics and to classify them.

For this set of settlements altogether a total of 53 different demographic, socioeconomic, and infrastructural indicators were collected on the LAU2 settlement level (from 2016 and the 2011 census), and normality tests were computed to select those indicators appropriate for further multivariate analyses. A total of 36 indicators showed normal distribution (some of them only after logarithmic transformation).

The Principal Component Analysis (PCA) was applied (using the Varimax rotation) to discover the relationship of the selected indicators. The computed 7 components

explained the 81.1% of the total variance. Based on the r values in the rotated component matrix and the created correlation matrix, 10 indicators in total were finally selected for further processing. The following indicators represented the most significant correlation with the components in the rotated components matrix:

- ageing index – number of elderly (above the age of 65) population compared to the young population (below the age of 18);
- death rate per 1,000 inhabitants (in per mille);
- rate of children with (multiple social) disadvantages among persons under age 18 (in percentage);
- activity rate (in percentage);

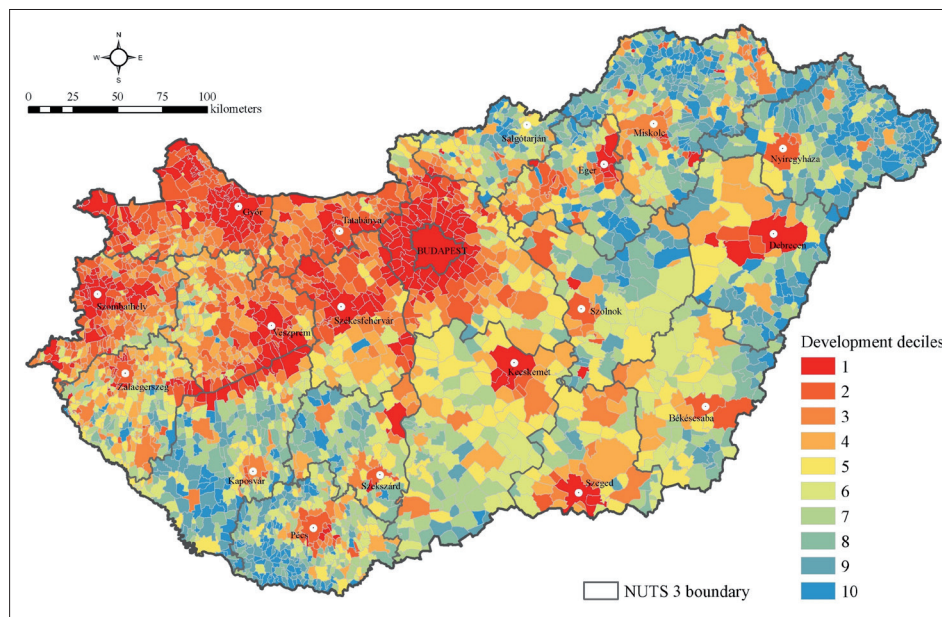


Fig. 1: The development pattern shown by the deciles of the Territorial Development Index of the Hungarian settlements in 2016

Sources: author's elaboration based on the datasets from Hungarian Central Statistical Office and TeIR

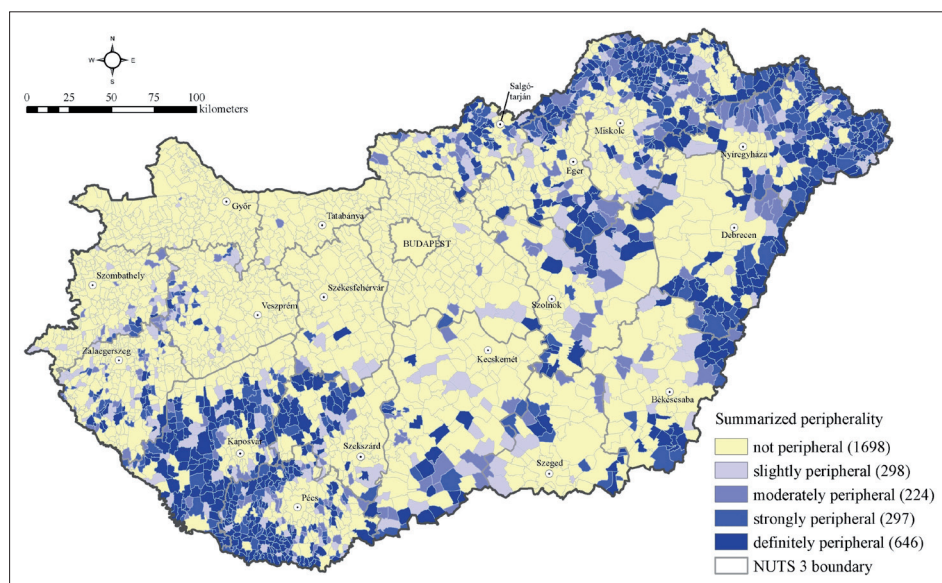


Fig. 2: Summarised pattern of peripherality/backwardness based on the results of four different computations on development level (slightly peripheral: indicated as periphery by one of the methods – definitely peripheral: delimited as periphery by all four methods)

Sources: authors' elaboration based on the datasets from Hungarian Central Statistical Office and TeIR; Koós, 2015; Nagy and Koós, 2014; 105/2015 [23rd April] governmental decree of the Hungarian Government

- ratio of dwellings without comfort (substandard dwellings) (in percentage);
- taxable income per inhabitant (in HUF/capita);
- number of taxpayers per 100 inhabitants (in person);
- registered crimes per 1,000 inhabitants (in pieces);
- number of registered enterprises per 1,000 inhabitants (in pieces); and
- number of broadband internet connections per 100 inhabitants (in pieces).

There were 8 indicators derived from 2016, while the ‘activity rate’ and the ‘ratio of dwellings without comfort’ were from 2011 (from the census dataset).

These 10 listed indicators were statistically appropriate to classify peripheral settlements. A hierarchical clustering procedure was applied using the most often-cited Ward method (e.g. Pászto et al., 2019) and squared Euclidean distance measurement by standardised variables.

The resulting clusters were characterised by some of the most important indicators. It is worth pointing out that the proportion or number of Roma population was not part of the set of indicators used for the delineation of peripheral areas. However, the presence of the Roma population is mentioned in the description because of their sharply disparate demographic behaviour influencing most of the indicator values (e.g. health status or mortality) (Rosicova et al., 2009; Nagy et al., 2015; Sárváry et al., 2019) and partly because of the significant overlap between the spatial location of the Roma and the backward areas (Pásztor, 2011; Mušinka et al., 2014; Taylor et al., 2018).

4. Results

Hungary’s spatial development pattern showed characteristic regional disparities as illustrated by the territorial development index (TDI – computed on the basis of datasets from 2016) (Fig. 1). The values of the TDI-index were ranked into deciles in decreasing order. The results clearly demonstrate the separation of core and peripheral territories within the country. The most characteristic and developed zone was constituted by the agglomeration of Budapest. Extended developed areas were located near the county seats (especially in the north-western Hungary, in the surroundings of Győr, Székesfehérvár, Szombathely, Veszprém). These suburban zones tended to be linked to each other, forming a generally developed region with only island-like peripheral settlements. The neighbouring territory of the Lake Balaton appeared as a continuous, developed belt. County seats in southern and eastern Hungary had limited effect on the development level of their surroundings. Small and medium-sized towns stand isolated (and were unable to increase their surroundings’ level of development) within the continuous peripheral zone along the north-eastern, eastern and southwestern border regions (near the eastern Slovakian, Ukrainian, Romanian and Croatian borders), forming the external periphery. The so-called inner periphery in the Eger–Szolnok–Debrecen triangle along the Middle-Tisza territory became even more visible after the political transition.

The stripe of peripheral settlements extended along the state border of Hungary from Nógrád county (westward from Salgótarján) to Békés county (southward from Békéscsaba) through the surroundings of Ózd (between Salgótarján and Miskolc), the Cserehát (northward from Miskolc), Bodroghöz, Bereg, Szatmár, Nyírség (northward

and eastward from Nyíregyháza) and Bihar (southward from Debrecen). It is important to emphasise the backwardness of the South-Transdanubian region too (southward from the Lake Balaton, primarily westward from Kaposvár and southward from Pécs). The territory of the inner periphery is clearly visible. Territorially most concentrated (at the same time traditional) socioeconomic peripheries and the deepest backwardness was detected in the Cserehát (north of Miskolc) and Ormánság (Drava River) areas.

These regional-scale disparities had already existed during the socialist era, and they became more visible during the transition period from communism to capitalism. The West-East developmental slope was stressed by the spatial concentration of peripheral areas in northeastern Hungary, while the better position of central Hungary (with Budapest in its core) was contrasted even more by the compact backward zone in southwestern Hungary (Nemes-Nagy, 2006).

The aforementioned four methodologies provided a comprehensive and broad quantitative basis to delineate the set of peripheral settlements after 2010. Despite the difference in methodological tools and sets of indicators, significant overlap could be detected in the spatial patterns. This draws the attention to the ‘rigidity’ of spatial patterns (Tab. 1). This feature of Hungary became especially visible after the millennium. On the one hand it meant that core and peripheral areas are well discernible on regional scale, and also that changes in the location and pattern of these backward areas are basically negligible in the last decades. On the other hand, backwardness (and the development as well) became multidimensional – as all the indicators describe a similar pattern of development regardless of differences in methods and datasets.

The overlapping of results is clearly demonstrated by Figure 2. Approximately 53.8% of the Hungarian settlements were not indicated as backward by any of the introduced developmental calculations, whereas more than one fifth of the settlements (20.6%) were delimited as peripheral by all (4) methodologies. These settlements could be labelled as “definitely peripheral” in their socioeconomic and infrastructural development because even differing methods confirmed their backwardness. The categories on Figure 2 between these two extremities reflect the numbers of research that classified the settlement as peripheral. The group of “definitely peripheral” Hungarian settlements is primarily in the focus of the current research in the following paragraphs.

The backwardness of the settlements in the categories of peripherality is clearly seen by some of the demonstrative economic indicators (Tab. 2). These indicators tend to represent declining values parallel to the increase of backwardness. In the case of the ‘definitely peripheral’ category the rate of unemployment is almost three times higher than the Hungarian average, the taxable income per capita hardly reaches half of the national average and real estate prices show an almost fivefold difference. Peripherality is also related to settlement size: increasing development was typical in case of higher average population. The definitely peripheral settlements are usually small villages, with an average population of approximately 800, which is only one fourth of the Hungarian average (however, the latter includes Budapest, with its more than 1.7 million inhabitants). There were only four settlements with town administrative rank (namely Cigánd, Hajdúhadház, Nagybajom and Nagyecséd) among the definitely peripheral

Categories	Average population number of settlements	Rate of unemployment among the population with the age 15–64 (%)	Yearly taxable income per capita (1,000 HUF)	Average prices of real estates (million HUF)
Not peripheral	4,946.1	3.33	1,142.3	12.90
Slightly peripheral	1,208.2	6.97	784.0	3.79
Moderately peripheral	1,213.0	7.94	733.2	3.06
Strongly peripheral	890.6	9.24	638.8	2.72
Definitely peripheral	795.2	11.52	582.3	2.11
National average	3,106.4	4.18	1,074.3	11.55

Tab. 2: The characteristics of settlements in the categories of peripherality in 2016

Sources: authors' computations based on the datasets from Hungarian Central Statistical Office and TeIR

group of settlements (according to the administrative division there were 346 towns in Hungary in 2016) (Bujdosó et al., 2016).

The geographical location of the definitely peripheral settlements was quite concentrated. Almost 20% of these settlements were located in Borsod-Abaúj-Zemplén (19.5%) and in Baranya (19.3%) counties, while Szabolcs-Szatmár-Bereg (16.1%) and Somogy (14.6%) counties accounted for an additional 30% (4 counties out of the 19 comprise more than 50% of the backward settlements). As a result of the quite uneven dispersion of settlements, some of the counties are characterised by a high ratio of definitely peripheral settlements compared to the total number of settlements in the county. More than one third of the settlements were in the most backward category in Szabolcs-Szatmár-Bereg, Baranya, Hajdú-Bihar, Somogy and Borsod-Abaúj-Zemplén counties, and more than 20% of the settlements in Tolna, Békés and Heves counties were also categorised as peripheral. At the same time, none of the settlements were definitely peripheral in Győr-Moson-Sopron and in Komárom-Esztergom counties, and the ratio was under 1% in Pest, Fejér and Vas counties too.

The set of peripheral settlements might be segmented by different dimensions as overviewed in this study. As a part of the current investigation, a hierarchical cluster analysis was carried out in order to detect sub-groups within the group of 'definitely peripheral' settlements. This analysis covered 646 settlements (with 5.24% of the population of Hungary in 2016), and differentiation was done based on the values of the recently listed 10 indicators selected by the principal component analysis. The most appropriate outputs were produced by the 7 clusters division confirmed

by the classification results from the predicted group membership of the discriminant analysis (81.9% of original grouped cases were correctly classified). The 7 resulting clusters can be discerned by some recurring characteristic features (see Tabs. 3–6). As cluster 3 and 4 includes only 6–6 settlements, the analysis focused primarily on the 5 larger clusters.

All clusters reflected disadvantageous demographic, socioeconomic and infrastructural features, but some of their characteristic (distinctive) features are highlighted below.

Cluster 1 included 120 settlements with approximately 92,000 inhabitants (Fig. 3). Moderate aging and an above average ratio of Roma population characterised these settlement. Slightly disadvantageous social, educational and employment scenarios, below average economic conditions and moderate levels of infrastructure are suggested by the indicators. The spatial pattern of this cluster was typically dispersed, but higher concentration could be detected in the eastern part of Szabolcs-Szatmár-Bereg county and in the southern part of the Hungarian Great Plain. High abundance of Cluster 1 could be found in northern Somogy, western Tolna and eastern Baranya. The settlements of this cluster located in the Southern Great Plain typically had larger populations with characteristically lower proportions of Roma. This cluster had the oldest building stock among the definitely peripheral settlements.

Cluster 2 was the largest, with 231 settlements containing approximately 230,000 inhabitants. Juvenile age characteristics seemed to be dominant in much of the Roma population. The social, educational and employment situation could be regarded as moderately disadvantageous,

Clusters	Number of settlements	Total number of population	Average population number of settlements
Cluster 1	120	92,129	767.7
Cluster 2	231	226,079	978.7
Cluster 3	6	2,069	344.8
Cluster 4	6	1,005	167.5
Cluster 5	122	107,951	884.8
Cluster 6	48	29,072	605.7
Cluster 7	113	55,412	490.4
Definitely peripheral settlements	646	513,717	795.2

Tab. 3: The characteristics of settlement-types within the group of definitely peripheral settlements

Sources: authors' computations based on the datasets from Hungarian Central Statistical Office and TeIR

and economic conditions below average were accompanied by moderate levels of infrastructure. Most of the settlements could be found in the traditional borderland peripheries (north-eastern and south-western Hungary) and in the vicinity of the ‘massive’ backward zone of the Cserehát (see Cluster 6). Clusters 3 and 4 included only a limited number of settlements.

Cluster 5 included 122 settlements and almost 110,000 inhabitants. The young age demographics, rapid growth, and high percentage of Roma population could be observed as characteristic. Significantly disadvantageous social,

educational and employment situations, below average economic conditions and moderate levels of infrastructure were detected in the case of these settlements. Most of the settlements in this cluster seemed to be located in the former structural crisis areas whose employment problems after the regime change led to complex cumulative social and economic backwardness. The average size of the settlements was almost 900 inhabitants.

Cluster 6 covered settlements with the worst conditions: 48 settlements and almost 30,000 inhabitants were in this cluster. An extremely young demographic structure with

Clusters	Change in the number population between 2001–2011 (%*)	Natural reproduction per 1,000 inhabitants between 2001–2011*	Migration balance per 1,000 inhabitants between 2001–2011*	Aging index in 2016 (%)	Ratio of Roma population by the census 2011 (%*)	Ratio of Roma population by the estimation of local governments from 2010–2013 (%) percentage
Cluster 1	- 12.1	- 114.5	- 6.9	137.0	8.8	21.3
Cluster 2	- 7.8	- 29.0	- 49.3	88.8	14.0	27.2
Cluster 3	- 13.4	- 10.9	- 123.5	77.0	19.7	43.8
Cluster 4	- 7.9	- 476.7	397.2	307.4	9.4	17.2
Cluster 5	- 5.7	5.3	- 62.1	64.4	22.4	38.3
Cluster 6	0.2	89.2	- 87.6	30.6	44.2	64.9
Cluster 7	- 10.3	- 25.6	- 77.8	70.4	21.2	40.2
Definitely peripheral together	- 8.0	- 31.8	- 48.6	82.7	17.2	31.9
National average	- 2.6	- 39.0	12.7	128.5	3.2	8.8

Tab. 4: The demographic characteristics of settlement-types within the group of definitely peripheral settlements in 2016. Sources: authors' computations based on the datasets from Hungarian Central Statistical Office and TeIR *census data from 2011. Below and above average data are indicated by grey background

Clusters	Rate of children with disadvantage and cumulative disadvantage among the persons under the age 18 (%)	Yearly taxable income per capita (1,000 HUF)	Number of income taxpayers compared to 100 inhabitants	Rate of unemployed among the population with the age 15–64 (%)	Rate of public employees among the population with the age 15–64 (%)	Average finished schoolyears, among the population with the age 7 and over, in years*
Cluster 1	37.9	602.5	45.1	9.2	11.9	8.97
Cluster 2	50.3	643.0	48.7	10.9	15.4	8.96
Cluster 3	58.4	575.7	48.8	10.2	22.2	9.04
Cluster 4	61.9	370.7	36.6	10.2	20.6	7.95
Cluster 5	57.5	520.1	43.1	13.1	15.4	8.51
Cluster 6	78.7	373.4	39.6	16.8	25.9	7.52
Cluster 7	68.5	538.8	46.9	12.3	21.8	8.51
Definitely peripheral together	54.9	582.3	46.1	11.5	16.1	8.75
National average	12.1	1,074.3	49.8	4.2	3.4	10.80

Tab. 5: The income and employment characteristics of settlement-groups within the definitely peripheral settlements in 2016. Sources: authors' computations based on the datasets from Hungarian Central Statistical Office and TeIR *census data from 2011. Below and above average data are indicated by grey background

a high percentage of Roma could be detected. Expressively disadvantageous social, educational and employment conditions characterised this cluster, with poor economic conditions and low levels of infrastructure. A slight population increase was observed as massive migration loss was counterbalanced by a significant natural reproduction rate. The rate of socially challenged children with cumulative disadvantages is extremely high. The settlements in this cluster are dominantly concentrated in the traditional backward area of the Cserehát, northward from Miskolc in northern Hungary and in the edge of Bodroghöz with weak connections. These tendencies drew attention to the formation of a subregion with segregated and marginalised populations (this process could be described as ‘territorial ghettoisation’) (Virág, 2006).

Cluster 7 included 113 settlements with more than 55,000 inhabitants. The average population size is below 500 inhabitants, thus this cluster contains the group of peripheral small villages. Besides this, the remaining descriptive features were similar to those in Cluster 5. Evidently, a juvenile age demographic structure was accompanied by the high percentage of Roma population. An obvious disadvantageous social and educational situation can be detected here. Dependence on employment (due to the extremely important role of public employment), below average economic conditions and moderate level of infrastructure can also be observed. This type of peripheral settlement was primarily located west of Pécs and northward from Miskolc in the surroundings of the settlements in Cluster 6 (dominated by Roma population).

Clusters	The ratio of constructed dwellings between 2007 and 2016 (%)	Average prices of real estate in 2016 (million HUF)	Income of the local government from local taxes per capita in 2016 (1000 HUF)	Ratio of dwellings with piped gas in 2016 (%)	Number of broadband internet connections per 100 inhabitants in 2016	Number of personal cars per 1,000 inhabitants in 2016
Cluster 1	0.52	2.17	12.75	48.5	15.61	243.1
Cluster 2	1.10	2.39	9.70	47.6	14.05	229.2
Cluster 3	2.83	2.55	2.42	47.3	10.20	241.2
Cluster 4	0.92	1.38	6.99	14.2	4.28	177.1
Cluster 5	1.16	2.20	13.32	41.1	8.57	204.3
Cluster 6	1.61	1.76	4.37	22.6	6.85	130.8
Cluster 7	1.07	2.00	6.49	33.1	9.41	203.6
Definitely peripheral together	1.02	2.23	10.32	43.8	12.24	218.0
National average	4.10	11.59	50.80	72.9	27.55	338.1

Tab. 6: The economic and infrastructural characteristics of settlement-groups within the definitely peripheral settlements in 2016. Sources: authors' computations based on the datasets from Hungarian Central Statistical Office and TeIR. Below and above average data are indicated by grey background

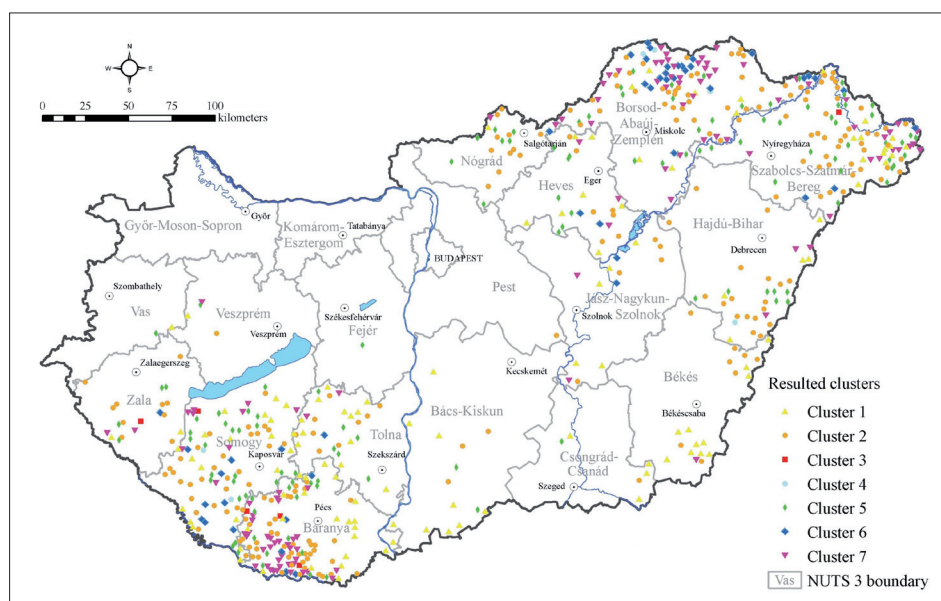


Fig. 3: Types of the definitely peripheral settlements as indicated by the results of the cluster analysis in 2016. Sources: authors' elaboration based on the datasets from Hungarian Central Statistical Office and TeIR

5. Discussion

The results of the comparative analysis drew attention to the spatial pattern of peripheral areas, showing territorial concentration, and to the ongoing processes of spatial marginalisation with several cumulative socioeconomic symptoms. The different approaches to peripherality and marginality (Novotný et al., 2015) significantly overlap each other in the case of the concentrated backward areas along the state border of north-eastern and southwestern Hungary (for this reason, the two phenomena are hard to separate). The pattern and situation of ‘definitely peripheral’ areas strengthen any scepticism about the chance of polycentric development (Malý, 2016; Mulíček and Malý, 2019), and confirm the ongoing and enduring polarisation at a localised scale (Copus, 2001). The ‘rigid’ spatial pattern represented only limited alteration in the last decades due to transport investments (Tóth, 2006; Egri and Kószegi, 2020), and developments financed by the Cohesion Fund of the EU (Kovács and Koós, 2018), because of the impact of the hierarchy of settlements on the financial resource allocation.

The resulting clusters tend to highlight different characteristics and probably different paths or reasons behind their general backwardness and disadvantageous demographic, social, economic and infrastructural situation. The geographical location of the different groups tends to confirm the existence of semi-periphery and the fuzzy-like character of backwardness instead of the dual concept of core–periphery. Both the borderland peripheries and the inner peripheries were inhomogeneous, that is, composed of several different clusters.

The analysis of differences between the clusters of the investigated peripheral settlements might elicit some proposals in support of potential future policy interventions. The main problem to which we want to draw attention, however, is that clusters showing territorial concentration require different treatment from those areas, where peripherality shows a dispersed pattern, or a spatially compact backward zone, composed of settlements belonging to numerous different clusters. The fuzziness and intermingling makes allocation of sources difficult, as well as the dispersed patterns, because the problems of these areas cannot be always resolved by a large investment, but sometimes numerous smaller and well-targetted measures are required in development planning and socio-politics. In short, a differentiated regional planning is required to overcome the problems of peripheral areas in Hungary.

Cluster 1 is regarded as the least backward of all the clusters. The situation in Cluster 2 could be improved by the expansion of education and basic social services, with the controlled intervention of the state specified by local conditions. Clusters 6 and 7 demonstrated the most characteristic spatial concentration in the traditional backward areas in Hungary, while cluster 3 partly represented higher density close to previously mentioned zones. Clusters 1 and 5 were dispersed regarding their spatial pattern. Clusters 5 to 7 reflect disadvantageous demographics with the rapid growth of the marginalised Roma communities (Váradi and Virág, 2014; Péntes et al., 2019), and selective migration that deepens the unfavourable situation (Michálek and Podolák, 2010; Kubeš and Kraft, 2011; Mischuk and Wesolowska, 2012; Kebza, 2018). This population growth, especially in the case of the ‘definitely peripheral’ settlements, caused even an increase in population numbers in some of the settlement groups – in contrast to the findings of Musil and Müller

(2006), Kubeš and Kraft (2011), or Mischuk and Wesolowska (2012). The situation is exacerbated by the processes of the real estate markets (Pósfai and Nagy, 2017). The worsening condition and aging dwellings in these areas are reflected in the extremely low real estate prices, which – initiating a vicious circle – hinders escape from these backward settlements, whereas low real estate prices attract more and more deprived people.

This paper did not investigate processes of peripheralisation and did not trace the “way to backwardness” – as generally proposed by Kühn (2014) and Lang (2015). Regardless, the developmental paths of peripheral settlements should be investigated in order to discover backwardness factors that became dominant during the last three decades. Previous studies have already highlighted the driving processes and shifts in zones of peripherization (Győri and Mikle, 2017, Demeter, 2018, Demeter, 2020, Papp et al., 2021). We rather stress the urgent need for a more sophisticated, territoriality differentiated approach in regional development planning, as discussed above.

Comprehensive but adaptive state interventions should be implemented to slow down the spatial polarisation and mitigate its socio-economic consequences in Hungary, processes that seem to be very concentrated. The situation is crying for urgent steps that cannot only be solved with European Union tenders (Kovács and Koós, 2018). The most important objective should be to prevent the creation of extended and contiguous / compact groups of settlements with backward features by supporting the emergence of local centres, or by the deconcentration of investments, even if still concentrated in larger towns with better accessibility (parallel to the improvement in basic local infrastructure). Besides respecting the European idea of an integrated territorial approach, regional and local specificities should also be consciously taken into account (Kubeš and Kraft, 2011; Malý and Mulíček, 2016), and new approaches to territorial government should be implemented (Leick and Lang, 2018), including not simply a decentralisation of decision making but a realistic consideration of local demands, possibilities and experience.

6. Conclusions

This study has focussed on the delimitation and classification of peripheral settlements with an application of multivariate statistical methods, using the example of Hungary – as a representative country that experienced structural changes both after the collapse of the socialist regime and after the accession to the EU – within one generation. After giving a comprehensive overview of the most important methodologies applied to delimit peripheral settlements in Hungary after 2010, settlements indicated as peripheral by all four analysed methods were considered as ‘definitely peripheral’, and this group was subject of further examination. The strong spatial correlation and significant overlaps between these methods illustrates the ‘rigid’ spatial development pattern of Hungary, becoming even more polarised after the millennium. Core and peripheral areas (in varying degrees) show remarkably distinctive spatial (regional) patterns.

More than one fifth of the Hungarian settlements (646 settlements) was regarded as ‘definitely peripheral’ (being socio-economically peripheral according to all investigations). Initially, 53 different demographic, social, economic and

infrastructural variables were involved in the investigation to describe and characterise these settlements. Using normality tests and Principal Components Analysis, this number was reduced to the most appropriate 10 indicators, which provided the basic dataset for the application of hierarchical cluster analysis, which grouped the 646 cases into 7 clusters. Five of these groups had special identifiable characteristics that distinguished the groups from one another. The territorial pattern of the clusters did not indicate any sharp boundaries between them as the clusters showed mixed territorial patterns, even though some spatial segregation became visible.

The problems of most peripheral settlements seemed to have a close correlation to the rapid growth and significantly increasing percentage of the Roma population. The poverty and marginalisation with cumulative socioeconomic backwardness is especially concentrated in north-eastern and southwestern Hungary.

Future research should focus on those initiatives and interventions (on the government level [or by its institutional network], on the local governmental level, or on the level of church and civil society – NGOs) that mitigate the problems that were discovered. As our results pointed to the differing characteristics of backward settlements in Hungary, these would require special, territorially adaptive measures and targeted attempts, unique solutions to improve their condition.

Acknowledgement

„János Péntes' researches are supported by the ÚNKP-17-4 New National Excellence Program of the Ministry of Human Capacities”. Gábor Demeter's research was supported by the MTA BTK Lendület Ten Generations Research Group.

References:

- BAŃSKI, J., DEGÓRSKI, M., KOMORNICKI, T., ŚLESZYŃSKI, P. (2018): The delimitation of areas of strategic intervention in Poland: A methodological trial and its results. *Moravian Geographical Reports*, 26(2): 84–94.
- BARANYI, B. (2004): Gondolatok a perifériaképződés történeti előzményeiről és következményeiről. *Tér és Társadalom*, 18(2): 1–21.
- BELUSZKY, P. (1976): Területi hátrányok a lakosság életkörülményeiben – Hátrányos helyzetű területek Magyarországon. *Földrajzi Értesítő*, 25(2–4): 301–312.
- BELUSZKY, P. (1979): Településformáló folyamatok a falusi térségekben. In: Halay, T. [ed.]: *Gazdaság, település és társadalomszerkezet III.* (pp. 253–281). Budapest, MSZMP KB Társadalomtudományi Intézete.
- BERNARD, J., ŠIMON, M. (2017): Vnitřní periferie v Česku: Multidimenzionalita sociálního vyloučení ve venkovských oblastech. *Sociologický časopis/Czech Sociological Review*, 53(1): 3–28.
- BERNT, M., COLINI, L. (2013): Exclusion, marginalization and peripheralization. Conceptual concerns in the study of inequalities. Working Paper. Erkner, Leibniz Institute for Regional Development and Structural Planning.
- BERRY, B. J. L. (1964): Approaches to regional analysis: A synthesis. *Annals of the Association of American Geographers*, 54(1): 2–11.
- BORGATTI, S. P., EVERETT, M. G. (1999): Models of core/periphery structures. *Social Networks*, 21(4): 375–395.
- BUJDOSÓ, Z., GYURKÓ, Á., HÁGEN, I. (2016): Socio-economic aspects of the urbanization in Northern Hungary in the 21st century. *Folia Geographica*, 58(2): 35–53.
- COPUS, A. K. (2001): From core-periphery to polycentric development: Concepts of spatial and aspatial peripherality. *European Planning Studies*, 9(4): 539–552.
- CSATÁRI, B., FARKAS, J. Z. (2008): Agrarian and rural development in Hungary, 1990–2005. In: Baňsky, J., Bednarek, M. [eds.]: *Contemporary changes of agriculture in East-Central Europe* (pp. 147–164). Warsaw, Polish Academy of Sciences, Institute of Geography and Spatial Organization; Polish Geographical Society.
- DEMETER, G. (2018): Területi egyenlőtlenségek, perifériák és funkcionális régiók elkülönítése a történeti Magyarország területén (1890–1910). *Történeti Térinformatikai Tanulmányok*, 5: 1–71.
- DEMETER, G. (2020): Estimating Regional Inequalities in the Carpathian Basin – Historical Origins and Recent Outcomes (1880–2010). *Regional Statistics*, 10(1): 23–59.
- DÖVÉNYI, Z. (2001): Development and spatial disparities of unemployment in Hungary. In: Meusburger, P., Jöns, H. [eds.]: *Transformations in Hungary: essays in economy and society* (pp. 207–224). New York–Heidelberg, Physica–Verlag.
- EGEDY, T. (2017): A külföldre ingázás statisztikai, demográfiai és területi jellemzői Magyarországon. *Területi Statisztika*, 57(4): 385–405.
- EGRI, Z., KÓSZEGI, I. R. (2018): A gazdasági-társadalmi (komplex) térszerkezet kelet-közép-európai képe. *Területi Statisztika*, 58(1): 27–56.
- EGRI, Z., KÓSZEGI, I. R. (2020): A közúti elérhetőség szerepe a kelet-magyarországi gazdasági teljesítményben és gazdaságfejlesztésben. *Területi Statisztika*, 60(6): 653–687.
- ERLEBACH, M., HALÁS, M., DANIEL, J., KLAPKA, P. (2019): Is there congruence in the spatial patterns of regions derived from scalar and vector geographical information? *Moravian Geographical Reports* 27(1): 2–14.
- GAWRYSZEWSKI, A., POTRYKOWSKA, A. (1988): Rural depopulation areas in Poland. *Geographia Polonica* 54: 81–100.
- G. FEKETE, É. (1991): Dinamikus, depressziós és stagnáló területek Borsod-Abaúj-Zemplén megyében 1870–1987 között. *Földrajzi értesítő*, 40(3–4): 317–332.
- GORZELAK, G. (1996): The regional dimension of transformation in Central Europe. *Regional Policy and Development 10*. London, Regional Studies Association, Jessica Kingsley Publishers.
- GYŐRI, R., MIKLE, G. (2017): A fejlettség területi különbségeinek változása Magyarországon, 1910–2011. *Tér és társadalom*, 31(3): 144–164.
- HALÁS, M. (2008): Priestorova polarizacia spoločnosti s detailnym pohľadom na periferne regiony Slovenska. *Sociologický časopis/Czech Sociological Review*, 44(2): 349–369.
- HALÁS, M. (2014): Modelovanie priestorového usporiadania a dichotómie centrum – periféria. *Geografie*, 119(4): 384–405.

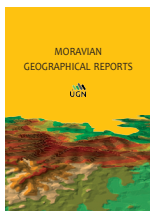
- HALÁS, M., HURBÁNEK, P. (2008): Identifikácia a klasifikácia periférnych regiónov (pokus o syntézu). In: Džupinová, E. et al. [eds.]: Periférnosť a priestorová polarizácia na území Slovenska (pp. 109–136). Bratislava, Geo-grafika.
- HAVLÍČEK, T., CHROMÝ, P., JANČÁK, V., MARADA, M. (2005): Vybrané teoreticko-metodologické aspekty a trendy geografického výzkumu periférnych oblastí. In: Novotná, M. [ed.]: Problémy periférnych oblastí (pp. 6–24). Praha, Univerzita Karlova v Praze.
- HEIDENREICH, M. (2003): Regional Inequalities in the Enlarged Europe. *Journal of European Social Policy*, 13(4): 313–333.
- KEBZA, M. (2018): The development of peripheral areas: The case of West Pomeranian Voivodeship, Poland. *Moravian Geographical Reports*, 26(1): 69–81.
- KISS, J. P. (2012): Hátrányos helyzetű rurális térségek elérhetőségének változásai (1984–2008). In: Nemes-Nagy, J. [ed.]: Térfolyamatok, térkategóriák, térelemzés. *Regionális Tudományi Tanulmányok* 16 (pp. 61–79). Budapest, ELTE Regionális Tudományi Tanszék.
- KISS, J. P., SZALKAI, G. (2014): A foglalkoztatás területi koncentrációjának változásai Magyarországon a népszámlálások ingázási adatai alapján, 1990–2011. *Területi Statisztika*, 54(5): 415–447.
- KOMORNICKI, T., CZAPIEWSKI, K. [eds.] (2006): *Europa XXI – 14. Core and peripheral regions in Central and Eastern Europe*. Warsaw, Polish Academy of Sciences.
- KOÓS, B. (2015): A szegénység és depriváció a magyar településállományban az ezredfordulót követően – avagy kísérlet a települési deprivációs index létrehozására. *Tér és Társadalom*, 29(1): 53–68.
- KOVÁCS, K. (2010): Területi-társadalmi egyenlőtlenségek a rendszerváltozás utáni Magyarországon. In: Fábrián, A. [ed.]: Párbeszéd és együttműködés. *Területfejlesztési Szabadegyetem 2006–2010* (pp. 15–32). Sopron, Nyugat-Magyarországi Egyetem Kiadó.
- KOVÁCS, K., KOÓS, B. (2018): A település-állomány jóléti pozíciójának mintázatai és azok változása 1990–2016. *Észak-magyarországi stratégiai füzetek*, 15(3): 13–30.
- KOVÁCS, Z. (2004): Socio-economic transition and regional differentiation in Hungary. *Geographical Bulletin*, 53(1–2): 33–49.
- KUBEŠ, J., KRAFT, S. (2011): Periferní oblasti jižních Čech a jejich sociálně populační stabilita. *Sociologický časopis/ Czech Sociological Review*, 47(4): 805–829.
- KÜHN, M. (2014): Peripheralization: Theoretical Concepts Explaining Socio-Spatial Inequalities. *European Planning Studies*, 23(2): 367–378.
- LANG, T. (2015): Socio-economic and political responses to regional polarisation and socio-spatial peripheralisation in Central and Eastern Europe: a research agenda. *Hungarian Geographical Bulletin*, 64(3): 171–185.
- LEICK, B., LANG, T. (2018): Re-thinking non-core regions: planning strategies and practices beyond growth. *European Planning Studies*, 26(2): 213–228.
- LEIMGRUBER, W. (1994): Marginality and marginal regions: problems of definition. In: Chang Chang-Yi, D. et al. [eds.]: *Marginality and Development Issues in Marginal Regions* (pp. 1–18). Taipei, IGU–National Taiwan University.
- LEIMGRUBER, W. (2007): Geographical marginality – past and new challenges. In: Jones, G. et al. [eds.]: *Issues in Geographical Marginality – General and theoretical aspects* (pp. 3–12). Grahamstown, South Africa, IGU–Rhodes University.
- LŐCSEI, H., SZALKAI, G. (2008): Helyzeti és fejlettségi centrum-periféria relációk a hazai kistérségekben. *Területi Statisztika*, 48(3): 305–314.
- MALÝ, J. (2016): Impact of Polycentric Urban Systems on Intra-regional Disparities: A Micro-regional Approach. *European Planning Studies*, 24(1): 116–138.
- MALÝ, J., MULÍČEK, O. (2016): European territorial cohesion policies: Parallels to socialist central planning? *Moravian Geographical Report*, 24(1): 14–26.
- MICHÁLEK, A., PODOLÁK, P. (2010): Socio-economic disparities and migration in Slovakia. *Moravian Geographical Report*, 18(2): 36–45.
- MISZCZUK, A., WESOŁOWSKA, M. (2012). Demographic and settlement transformations in peripheral regions (based on the example of eastern Poland). *Annales UMCS, Geographia, Geologia, Mineralogia et Petrographia*, 67(1): 141–151.
- MOLNÁR, E., KOZMA, G., MÉSZÁROS, M., KISS, É. (2020): Upgrading and the geography of the Hungarian automotive industry in the context of the fourth industrial revolution. *Hungarian Geographical Bulletin*, 69(2): 137–155.
- MULÍČEK, O., MALÝ, J. (2019): Moving towards more cohesive and polycentric spatial patterns? Evidence from the Czech Republic. *Papers in Regional Science*, 98(2): 1177–1194.
- MUSIL, J., MÜLLER, J. (2006): *Vnitřní periferie České republiky, sociální soudržnost a sociální vyloučení*. Praha, CESES FSV UK.
- MUŠINKA, A., ŠKOBLA, D., HURRLE, J., MATLOVIČOVÁ, K., KLING, J. (2014): *Atlas rómskych komunit na Slovensku 2013*. Bratislava, UNDP.
- NAGY, A. (2009): A hazai területfejlesztés eddigi történetéből: A hazai területfejlesztési források felhasználásának tapasztalatai. *Falu Város Régió*, 16(3): 54–61.
- NAGY, E., TIMÁR, J., NAGY, G. (2012): The changing meaning of core–periphery relations of a non-metropolitan “urban region” at the Hungarian–Romanian border. *DISP - The Planning Review*, 48(2): 93–105.
- NAGY, E., TIMÁR, J., NAGY, G., VELKEY, G. (2015): The everyday practices of the reproduction of peripherality and marginality in Hungary. In: Lang, T., Henn, S., Sgibnev, W., Ehrlich, K. [eds.]: *Understanding geographies of polarization and peripheralization: perspectives from Central and Eastern Europe and beyond* (pp. 135–155). London, Palgrave MacMillan.
- NAGY, G., KOÓS, B. (2014): First results in modelling objective well-being in Hungary at lower territorial level. *Regional Statistics*, 4(2): 71–86.
- NEMES-NAGY, J. (1996): Centrumok és perifériák a piacgazdasági átmenetben. *Földrajzi Közlemények*, 120(1): 31–48.
- NEMES NAGY, J. (2000): Regional inequalities in Hungary at the end of the socio-economic transition. In: Kovács, Z. [ed.]: *Hungary towards the 21st century – the*

- human geography of transition (pp. 87–98). Budapest, Geographical Research Institute, Hungarian Academy of Sciences.
- NEMES-NAGY, J. (2006): Regional inequalities: general models and the case of the transition countries. *Romanian Review of Regional Studies*, 2(1): 23–34.
- NOVOTNÝ, L., MAZUR, M., EGEDY, T. (2015): Definition and delimitation of peripheries of Visegrad countries. *Studia Obszarów Wiejskich*, 39: 35–48.
- PAPP, I., PÉNZES, J., DEMETER, G. (2021): A közlekedési hálózatok és a komplex területi fejlettség időbeli összehasonlító vizsgálatának nehézségei és egy megoldási lehetősége a történelmi Magyarország példáján. *Területi Statisztika*, in press.
- PAPP, S., NAGY, G., BOROS, L. (2017): A kedvezményezett települések objektív életminőség alapján történő lehatárolási lehetőségei. *Területi Statisztika*, 57(6): 639–664.
- PÁSZTO, V., MACKŰ, K., BURIAN, J., PÁNEK, J., TUČEK, P. (2019): Capturing cross-border continuity: The case of the Czech-Polish borderland. *Moravian Geographical Reports*, 27(2): 122–138.
- PÁSZTOR, I. Z. (2011): Location of the gypsies in the Northern Great Plain and North Hungary Regions. In: Kozma, G. [ed.]: *New Results of Cross-Border Co-Operation* (pp. 151–160). Debrecen, Didakt Kiadó.
- PÉNZES, J. (2013a): A foglalkoztatottság, az ingázás és a jövedelmi szint összefüggései Északkelet- és Északnyugat-Magyarországon. *Területi Statisztika*, 53(3): 202–224.
- PÉNZES, J. (2013b): The dimensions of peripheral areas and their restructuring in Central Europe. *Hungarian Geographical Bulletin*, 62(4): 373–386.
- PÉNZES, J. (2015): A kedvezményezett térségek lehatárolásának aktuális kérdései. *Területi Statisztika*, 55(3): 206–232.
- PÉNZES, J. (2020): The impact of the Trianon Peace Treaty on the border zones – an attempt to analyse the historic territorial development pattern and its changes in Hungary. *Regional Statistics*, 10(1): 60–81.
- PÉNZES, J., BUJDOSÓ, Z., DÁVID, L., RADICS, Z., KOZMA, G. (2014): Differing development paths of spatial income inequalities after the political transition – by the example of Hungary and its regions. *Economy of Region*, 33(1): 73–84.
- PÉNZES, J., PÁLÓCZI, G. (2017): Comparative research of the results of functional regionalization methods – by the network of commuting in Hungary. *DEUROPE*, 9(3): 29–41.
- PÉNZES, J., PÁSZTOR, I. Z., TÁTRAI, P., KÓTI, T. (2019): Roma population in Hungary – spatial distribution and its temporal changes. *DEUROPE*, 11(3): 138–159.
- PERCZEL, K., GERLE, G. (1966): *Regionális tervezés és a magyar településhálózat*. Budapest, Akadémiai Kiadó.
- PÓSFAL, Z., NAGY, G. (2017): Crisis and the Reproduction of Core-Periphery Relations on the Hungarian Housing Market. *European Spatial Research and Policy*, 24(2): 17–38.
- POTRYKOWSKA, A. (1985): Spatial structure of functional urban regions in Poland. *Geographia Polonica* 51: 113–126.
- RAMÍREZ, B. (2009): Core-Periphery Models. In: Kitchin, R., Thrift, N. [eds.]: *International Encyclopedia of Human Geography* (pp. 286–291). Amsterdam-Oxford, Elsevier.
- RECHNITZER, J. (1993): Innovations and regional policy. In: Hajdú, Z. [ed.]: *Hungary: Society, State, Economy and Regional Structure* (pp. 221–244). Pécs, Hungarian Academy of Sciences, Centre for Regional Studies.
- ROSICOVA, K., GECKOVA, A. M., VAN DIJK, J. P., ROSIC, M., ZEZULA, I., GROOTHOF, J. W. (2009): Socioeconomic indicators and ethnicity as determinants of regional mortality rates in Slovakia. *International Journal of Public Health*, 54(4): 274–282.
- SÁRVÁRY, A., KÓSA, Z., JÁVORNÉ ERDEI, R., GYULAI, A., TAKÁCS, P., SÁNDOR, J., SÁRVÁRY, A., NÉMETH, Á., HALMAI, R., ÁDÁNY, R. (2019): Socioeconomic status, health related behaviour, and self-rated health of children living in Roma settlements in Hungary. *Central European Journal of Public Health*, 27(1): 24–31.
- ŠIMON, M. (2017): Multi-scalar geographies of polarisation and peripheralisation: A case study of Czechia. In: Šroda-Murawska, S., Szymańska, D. [eds.]: *Bulletin of Geography. Socio-economic Series*, No. 37, (pp. 125–137). Toruń, Nicolaus Copernicus University.
- SOKOL, M. (2001): Central and Eastern Europe a decade after the fall of state socialism: regional dimensions of transition processes. *Regional Studies*, 35(7): 645–655.
- STIEGLITZ, J. E., SEN, A., FITOUSSI, J. P. (2009): Report by the Commission on the Measurement of Economic Performance and Social Progress [online]. Available at: http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf
- SÜLI-ZAKAR, I. (1992): A study of state borders as factors blocking socio-economic progress in North-Eastern Hungary. *Földrajzi Közlemények International Edition*, 40: 53–63.
- SÜTŐ, A. (2008): Város és vidéke rendszerek és típusaik Magyarországon. *Falu Város Régió*, 15(3): 51–64.
- SZABÓ, P. (2003): Regional development disparities in the European Union. In: Jakobi, Á. [ed.]: *Frontiers of Geography* (pp. 109–119). Budapest-Heidelberg, Eötvös Loránd University.
- SZABÓ, T., SZABÓ, B., KOVÁCS, Z. (2014): Polycentric urban development in post-socialist context: the case of the Budapest Metropolitan Region. *Hungarian Geographical Bulletin*, 63(3): 287–301.
- SZILÁGYI, Z. (2019): Regional Differences in Development and Quality of Life in Hungary during the First Third of the Twentieth Century. *Hungarian Historical Review*, 8(1): 121–152.
- TAGAI, G., BERNARD, J., ŠIMON, M., KOÓS, B. (2018): Two faces of peripherality: labour markets, poverty, and population dynamics in Hungary and Czechia. *Regional Statistics*, 8(2): 19–45.
- TAYLOR, A., TÁTRAI, P., ERŐSS, Á. (2018): Visible minorities in remote areas: A comparative study of Roma in Hungary and indigenous people in Australia. *Hungarian Geographical Bulletin*, 67(1): 43–60.
- TIMÁR, J. (2007): Different Scales of Uneven Development – in a (No Longer) Post-socialist Hungary. *Treballs de la Societat Catalana de Geografia*, 64: 103–128.

- TOMCSÁNYI, M. (1986): A gazdaságilag elmaradott térségek néhány sajátos területrendezési és területfejlesztési kérdése. *Településfejlesztés*, 6(4): 15–18.
- TÓTH, G. (2006): Centre-Periphery Analysis about the Hungarian Public Road System. Paper presented at the 46th Congress of the European Regional Science Association, Volos, Greece, 30 August–3 September 2006.
- VÁRADI, M. M., VIRÁG, T. (2014): Faces and Causes of Roma Marginalization: Experiences from Hungary. In: Szalai, J., Zentai, V. [eds.]: *Faces and Causes of Roma Marginalization in Local Contexts: Hungary, Romania, Serbia* (pp. 35–66). Budapest, Central European University.
- VIRÁG, T. (2006): The regional ghetto. *Review of Sociology of the Hungarian Sociological Association*, 12(1): 51–70.
- WALLERSTEIN, I. (1976): *The Modern World System: Capitalist Agriculture and the Origins of European World Economy*. Cambridge, Cambridge University Press.
- WILLIAMSON, J. G. (1965): Regional Inequality and the Process of National Development: A Description of the Patterns. *Economic Development and Cultural Change*, 13(4, Part II): 1–84.
- 105/2015 [23rd April] governmental decree of the Hungarian Government – about the delineation of favoured settlements and its conditionality.

Please cite this article as:

PÉNZES, J., DEMETER, G. (2021): Peripheral areas and their distinctive characteristics: The case of Hungary. *Moravian Geographical Reports*, 29(3): 217–230. doi: <https://doi.org/10.2478/mgr-2021-0016>



How are allotment gardens managed? A comparative study of usage and development in contemporary urban space in Germany and Poland

Magdalena SZCZEPAŃSKA^{a*}, Ewa KACPRZAK^a, Barbara MAĆKIEWICZ^a, Lidia PONIŻY^b

Abstract

This article aims to analyse the development and use of allotment gardens (AGs) and plots in Westphalia and Lippe (Germany) and Wielkopolska (Poland) to assess what functions are feasible in their current stage, thus, contributing to an ongoing discussion on the role of AGs in contemporary urban space. The analysis considered ecosystem services, green infrastructure and urban agriculture. Characteristic features of AGs were identified by means of a survey of plot-holders, in-depth interviews with representatives of allotment associations, and exploratory walks. The management and use of AGs differs in both regions in terms of accessibility, common areas, impact on the landscape and plots development. AGs in Westphalia and Lippe are accessible and developed in a way which meets needs of external users. They fit harmoniously into the surrounding landscape. However, AGs in Wielkopolska are not as accessible, prioritise internal users, and do not always blend in with their surroundings. In Westphalia and Lippe, in addition to recreational and edible plant-growing plots, there are also educational and integration ones, while in Wielkopolska main categories of plots were more numerous and varied; from recreational with a predominance of ornamental plants to fully-cultivated. However, the considerable freedom that Polish plot-holders enjoy gives rise to the gradual marginalisation of edible-plant growing.

Keywords: allotment gardens, plot development, plot types, comparative analysis, Germany, Poland

Article history: Received 6 January 2020, Accepted 19 May 2021, Published 30 September 2021

1. Introduction

The development of allotment gardens (hereinafter AGs) in Europe dates back to the 18th century. The first AGs, both in Germany and Poland, were created in the period of intensive industrialisation, during the first half of the 19th century (Poland was partitioned under Russian, Prussian and Austro-Hungarian rule at the time). In the years 1830–1840, AGs were established in Cologne, Leipzig, Berlin, Frankfurt, as well as in Koźmin Wielkopolski and Wrocław, which are currently located within today's Polish borders, but were still part of the Prussian partition at that time (Duś, 2014; Weckwerth, 1999). AGs were built on the outskirts of dynamically developing industrial cities or in areas unsuitable for the construction of buildings inside urban centres. They were designated for the poor, usually living in multi-family buildings, to improve their living conditions by

being able to produce food for their personal use, and spend time in the open air (e.g. Acton, 2011; Bellows, 2004; Crouch and Ward, 1997; Keshavarz and Bell, 2016). Throughout their history, AGs always adapted to changing conditions. In times of war and crisis, crops grown on plots alleviated food shortages, and huts often acted as dwellings (Calvet-Mir and March, 2019; Colasanti et al., 2012; Drake and Lawson, 2014; Pawlikowska-Piechotka, 2010). After 1945, when Europe was divided into East and West, economic development and strong urban growth meant that interest in AGs in Western countries decreased (Drilling et al., 2016). In West Germany during the 1970s, when a household could buy all its vegetables cheaply in supermarkets, AGs were deemed to be something outdated, and there was no need to cultivate vegetables any more (Maćkiewicz et al., 2021). Conversely, during the socialist era in the Soviet bloc countries,

^a Department of Agriculture and Rural Geography, Faculty of Human Geography and Planning, Adam Mickiewicz University in Poznań, Poland (*corresponding author: M. Szczepańska, e-mail: szmagda@amu.edu.pl)

^b Department of Integrated Geography, Faculty of Human Geography and Planning, Adam Mickiewicz University in Poznań, Poland

AGs gained popularity and were important for sourcing horticultural produce, which was not readily available on the market. These regimes were supportive and even protective of allotment gardening (Tóth et al., 2018). Later, the socio-economic transformation in these countries was accompanied by numerous changes in AGs, i.e. an increase in the number of vacant and neglected plots, as well as the productive function being systematically limited in favour of recreation (Bewältigung der Leerstandsproblematik..., 2013; Dzikowska et al., 2019; Szkup, 2013.). In the meantime, AGs in Western Europe have reinvented themselves. The previous idea of coping with famine has been replaced by a focus on healthy food production and socially and physically active environments (Simon-Rojo et al., 2016). However, the question arises about the extent to which all these aforementioned changes and different socio-economic conditions have influenced the spatial development of AGs and plots and their function in contemporary urban space? By studying AGs in West Germany and Poland, the article attempts to answer the following research questions:

1. What does the development of contemporary AGs and their constituent plots look like?
2. What functions of AGs and plots are feasible due to their current development?
3. Is the development of AGs and plots different in both regions? If so, in what aspects?

Doing so the study contributes to closing a significant research gap. While publications devoted to the issue of allotment garden development can be found in the literature, they are few of them, and these usually only refer to single gardens (e.g. Dymek and Bednorz, 2017) or AGs in one particular city (e.g. Seville City Council, 2017; Szkup, 2013). It is definitely more often the case that references to the development of allotment gardens or allotments constitute the background not the substance of the research (see e.g. Borysiak et al., 2017; Duś, 2014; Sovová and Krylová, 2019). Selected aspects of this issue are addressed only to a limited extent in publications focusing on the design of allotment gardens (see Długozima, 2012; Trejja et al., 2016; Zammit and Erjavec, 2016), their iconosphere (Sulima, 1990) and architecture (e.g. Hochhäusl, 2014; Romanowski, 2012; Tschuppik, 2001). Therefore, there is a lack of studies that approach the development of allotment gardens in a comprehensive way, while taking into account a broader, e.g. regional, spatial scope, not to mention the lack of studies which would approach this issue in an international context.

This article is the result of a multifaceted research on the functioning of modern allotment gardening in Germany and Poland. So far, we published the paper comparing the legal regulations on allotment gardening (Kacprzak et al., 2020) and the paper concerning the profiles of allotment gardeners (Maćkiewicz et al., 2021). This article provides new insight into the use and development of AG in contemporary urban space. The article is structured as follows: Section 2 presents the theoretical background, Section 3 characterises the case study areas and methods applied and the research design. Section 4 explores the development of AGs in terms of their legal basis (4.1), spatial management (4.2) and development of plots (4.3). Section 5 discusses our study findings. Conclusions and recommendations are provided in Section 6.

2. Theoretical background

With the development of cities, the contemporary form of AGs came into being. Consequently, AGs are an integral part

of the functional, spatial and landscape structure of modern urbanised areas (Bellows, 2004; Crouch and Ward, 1997; Duś, 2011) and thus constitute a multifunctional object of urban policy (Drescher et al., 2006; Drilling et al., 2016; Poniży and Stachura, 2017). From the urban planning perspective, AGs help soften the perception of the urban landscape, especially densely built-up urban areas, by offering green spaces for recreation in the immediate vicinity of multi-storey residential buildings (Costa et al., 2016). However, in many European countries, the growth of urban populations and the associated need for compact development and transport systems has subjected AGs to urbanisation pressures (Koopmans et al., 2017; Trembecka and Kwartnik-Pruc, 2018). AGs are often treated as a stock of potential investment land (Giedrych and Poniży, 2013; Maćkiewicz et al., 2018). Therefore, AGs' location, functional connections and landscape cohesion with their surroundings is an important issue. What is of particular importance is the accessibility of AGs to the general urban population (Bonny, 2010; Acton, 2011), and how land use and infrastructure is adapted to the needs of a wide range of users and the policies of the modern city. Contemporary AGs should therefore be considered as part of green infrastructure (Breuste, 2010; Szczepańska et al., 2016). According to Mell (2008), green infrastructure refers to the connective matrices of green spaces that can be found in and around urban and urban-fringe landscapes. By providing multiple complementary ecological, economic and social benefits, it enables planners to create multifunctional, innovative and sustainable places. In addition, it promotes the ecosystem, as well as human health and well-being (Tzoulas et al., 2007), and provides abiotic, biotic and cultural functions to develop and contribute to sustainable urban development (Ahern, 2007). AGs play an important role for individual plot users as well as for the general urban population, environment and urban economy (Appel et al., 2011; Van den Berg et al., 2010). They contribute to improving the quality of life, facilitate social interaction, activate residents, enable recreation, including education and therapy, and strengthen the sense of proximity to nature (Costa et al., 2016; Sovová and Krylová, 2019). AGs also have an impact on the local natural environment such as habitats, biodiversity and microclimate (Barrico et al., 2018; Cabral et al., 2017; Speak et al., 2015).

Since the beginning of the 21st century, AGs have also been considered in terms of the concept of ecosystem services (Barthel and Isendahl, 2013; Breuste and Artmann, 2015; Camps-Calvet et al., 2015), i.e. the values and benefits that city dwellers can attribute to internal ecosystems located in the city. The Millennium Ecosystem Assessment (2005) classified 4 different groups of ecosystem services: provisioning services, regulating services, supporting services and cultural services. AGs provide services for all the above-mentioned groups (Kronenberg et al., 2013; Langemeyer et al., 2016; Speak et al., 2015). For the reasons outlined above, they should be treated as a multifunctional element of sustainable urban space, and thus receive special legal protection, and be managed in a well-thought-out way that would take into account both their multiple functions and the interests of the local community. In this context, it is extremely important to investigate the spatial management of AGs, which determines and guides the implementation of various services.

It cannot be denied that AGs providing productive services are unique when compared with the other managed green spaces in the urban space, as they are one of the entities in the production system of urban agriculture (Mougeot, 2006),

and are also taken into consideration in the concepts of urban agriculture (Drilling et al., 2016; Duží et al., 2017) and urban foodscape (Morgan, 2014; Port and Moos, 2014; Viljoen and Bohn, 2014). Research by Barthel et al. (2010, 2015) demonstrates that food security has always been a key resilience facet for people living in cities. Moreover, they point out that agricultural production, including that carried out in allotment gardens, is not "the antithesis of the city", but often an integrated urban activity that contributes to the resilience of cities. So far, the scientific discourse reveals a lack of research on the relationship between allotment management and food production. It is therefore worth extending this research stream, since evaluating AGs' spatial development and use is becoming increasingly essential to urban agriculture, as well as to spatial planning and ecosystem services.

The discussion on the development of AGs is also part of concepts concerning the identification and shaping of urban space. The literature distinguishes between the following types of space: public (under the control of society in general), semi-public (under social control), semi-private (shared use, under communal control) and private (under private control, ensuring that residents maintain their territoriality) (Newman, 1996; Lefebvre and Nicholson-Smith, 1991). AGs can be considered a 'special space'. The view expressed by DeSilvey (2003) is that AGs are a kind of 'third space' characterised by multiple dichotomies – private and public, production and consumption or work and leisure – and all at the same time. Spilkova and Vágner (2016) draw attention to the issue of private space-public space relations in the context of garden accessibility. They are of the opinion that "public access gardens with the open regime (or partially regulated open regime) of the allotments represent a suitable solution beneficial both for the continuity of the allotment gardens and for the public quest for green areas and community development" (Spilkova and Vágner, 2016, p. 238). It is emphasised that maintaining large public landscaped areas is costly, while AGs are an "efficient complex" maintained by allotment holders (Duš, 2011; Spilkova and Vágner, 2016). On the other hand, scientific publications also point out that the development of allotments, as private space, can be an expression of "fierce individualism" and can consequently lead to the urban landscape being disrupted (Acton, 2011; Costa et al., 2016). The section indicates that the development of AGs connects with many theoretical concepts of the shaping of urban space and is part of a broader geographical debate on the usage of public and private spaces. However, there is still a research gap in terms of the relevance of issues relating to the spatial management of AGs in the concepts presented.

3. Methods and data

3.1 Case study area

Germany and Poland are both pioneers and current leaders in European allotment gardening (Tab. 1). In 2017, the number of plots in each country exceeded 910,000 (BDG, 2018a; Environmental, 2018). In German allotments, there were 911,900 plots, covering about 40,000 hectares, which were used by 5 million people – plot-holders, their families, friends and acquaintances. In Poland, there were 911,200 plots, which were covering almost 32,000 hectares. It has been estimated that about 3–4 million people used them. In both countries allotments feature a common space. On German allotments, this common area

makes up 30–40% of the total surface of AGs, whereas in Poland it is 21% (BMVBS, 2008, 2013; LV, 2019a; Environmental, 2018).

The distribution of allotments in both countries is highly diversified by region (Fig. 1) and associated with industrialisation and urbanisation processes. Allotment gardening is typical for urban areas. Plot-holders' organisations exert a very strong influence on the way allotment gardening functions and develops. The German Federation of Allotment Gardens (Der Bundesverband Deutscher Gartenfreunde e. V., BDG), established in 1921, is a non-governmental organisation representing the interests of allotment associations in Germany. Its main aim is to promote allotment gardening, social communities, and also environmental and landscape protection (BDG, 2018b); 19 national and 330 regional associations operate under the patronage of the BDG. In Poland, the Polish Allotment Federation (Polski Związek Działkowców, PZD), set up in 1927, plays a leading role in the management of allotments as a nationwide allotment association for establishing and running family allotments, as well as representing and protecting the interests of its members. The most important aims of the organisation include developing AGs, ensuring active recreation and opportunities to grow horticultural crops for the personal use of plot-holders and their families, protecting the natural environment, and improving both the ecological standards of the surroundings and the social conditions of local communities (Charter of Polish Allotment Federation, 2018).

Field studies were conducted in two regions in 2016–2018. In the German state of North Rhine-Westphalia, there are about 120,000 plots (13.2% of all German plots) in over 1,600 gardens (5,500 ha) managed by two regional associations that belong to the BDG (LV, 2019a). Among them is the Regional Federation of Allotment Gardens Westphalia and Lippe (Landesverband Westfalen und Lippe der Kleingärtner e.V. – hereinafter referred to as Westphalia and Lippe region), an organisation operating in the eastern part of the state, with 72,000 members and 750 gardens (LV, 2019b; LWLK, 2018). In Poland's Wielkopolskie Voivodeship, there are 89,300 plots (9.8% of all Polish plots) in 564 gardens (4,100 ha). The Polish Allotment Association in Poznań District (PZD Okręgowy Zarząd Poznań – hereinafter referred to as Wielkopolska region) is a unit of the PZD and covers the central part of the Wielkopolskie Voivodeship. It comprises 291 gardens (2,500 ha) and the total number of plots is 52,400 (PZD, 2019). These regions were selected for the study due to their similar origins. In both the past and the present, these regions are among the leading regions for the development of allotment gardening in both countries. An additional factor for the choice of these

Specification	Germany	Poland
Number of plots	911,900	911,200
Covered area (ha)	40,000	32,000
Average area of plots (m ²)	370	351
Common space (%)	30–40	21
Number of plots per 1 mil. inhabitants	11,032	23,727

Tab. 1: Allotment gardening in Germany and Poland
Source: own work based on materials from BDG (BDG, 2018a), VGRdL. (2019) and data from Statistics Poland (Environmental, 2018)

regions was their cooperation between the most important regional allotment gardening organisations spanning more than 30 years.

3.2 Research design

In the first stage of the study, the research area was selected using the desk research method, and a survey questionnaire was prepared. Then, based on statistical data from national and regional allotment associations (BDG and PZD) and Statistics Poland, the state of development of modern allotment gardening in Germany and Poland and in the two selected regions was identified. In the next stage, the legal basis of allotment gardening in both countries was

assessed in order to determine its influence on the way that allotment gardens and plots are managed. The materials gathered during desk research were verified during the field research. This field research formed the basis for assessing the management of allotment gardens and plots. The survey results were subjected to statistical analysis. In this way, it was possible to capture the characteristic features of the present-day development of German and Polish AGs and plots. Furthermore, similarities and differences between the two regions regarding these features were identified. The basic types of plots were also distinguished. In the final stage of the research procedure, recommendations were formulated (Fig. 2).

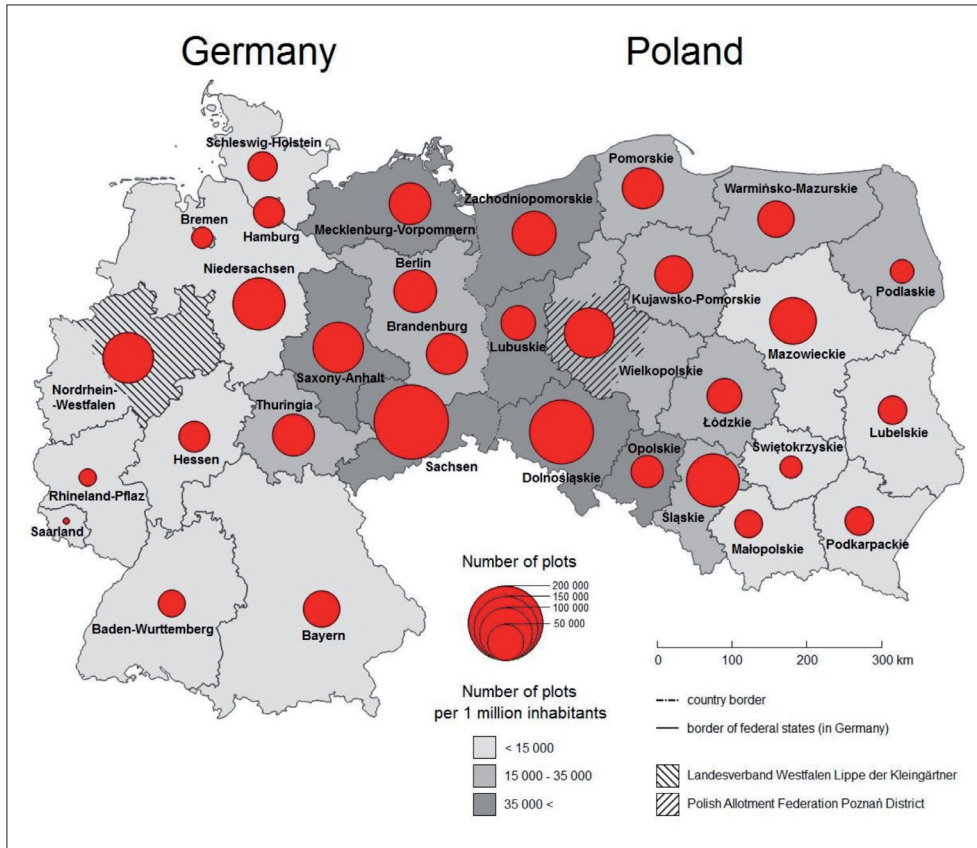


Fig. 1: Allotment gardens in Germany and Poland in 2017
 Source: own work based on materials from BDG (BDG, 2018a), VGRdL (2019) and data from Statistics Poland (Environmental, 2018).

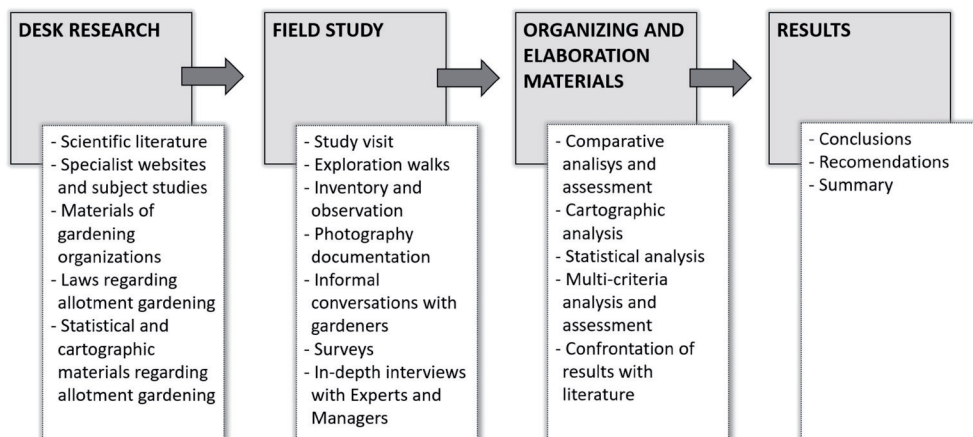


Fig. 2: Research design

Field studies of AGs conducted in Germany and Poland from June to September 2016 were of particular importance. The research was conducted in gardens situated in North-Rhine Westphalia, in Westphalia and Lippe region (42 gardens, 5.7% of the total number of gardens in the region), which were managed by the BDG. In Poland, the research involved gardens located in the Wielkopolskie Voivodeship and associated with Wielkopolska region (32 gardens, 6.2% of gardens in the district) of the PZD. AGs in the two regions were selected on a random basis. As a part of study visits, comparative analysis and assessment were made of various elements, including spatial-functional patterns of gardens, constructions and communal garden infrastructure, as well as garden equipment, fencing, the internal networks of thoroughfares (access roads, paths), available utilities including irrigation methods, protection of gardens against negative influences from the neighbourhood, management of waste and sewage, the structure of crops and choice of trees and shrubs, and also the elements enhancing the biodiversity of gardens. Moreover, a lot of valuable information, e.g. concerning the practical application of legal solutions existing in both countries was gathered during exploratory walks (by means of interacting with allotment gardeners). In the course of field research, an inventory of allotment management was produced, photos were taken and observations were made of how the gardens function. An important part of the research was informal conversations with gardeners, as these allowed us to obtain unofficial data. Surveys were carried out among plot-holders and participation was voluntary (Tab. 2).

Paper questionnaires were distributed to the allotment holders present on the plots, who completed them in the presence of the researchers. Some of the questionnaire forms were left in the garden offices under agreement with the garden managers along with the request that they would be filled in by the allotment holders and returned by post. The questionnaire comprised of 33 questions (open,

close, multiple-choice) relating to the aspects such as the infrastructure available on the plot, plot architecture and use of AG infrastructure. Altogether, 780 paper questionnaires were distributed (440 in Westphalia and Lippe region, 340 in the area of Wielkopolska region and the rate of return was 25.4% (112 surveys) in Germany and 35.6% (121 surveys) in Poland. Statistica: test ANOVA, Pearson's coefficient @ were used for the analysis of study findings.

Surveys were supplemented by the interviews with persons managing the AGs (e.g. Manager DE 1–4, Manager PL 1–5). Four coded structured interviews (9.5% allotments) were obtained from Westphalia and Lippe region and five interviews (15.6%) from Wielkopolska region. Valuable information was also collected during 30–60-minute, in-depth interviews (Expert DE and Expert PL) with the president of Westphalia and Lippe region, as well as with the president of Wielkopolska region. Managers and experts were asked about the development and use of an AG and plots. The in-depth interview method provides insight, as it is an interview about the research objective (Kvale and Brinkman, 2009; Seidman, 2013; Yeo et al., 2013).

The case study method used enabled us a comprehensive assessment of the management of AGs and plots in two regions: Westphalia and Lippe in Germany and Wielkopolska in Poland. This method, typical for social sciences, produced answers to the research questions, thus enabling analysis of complex phenomena of spatial, social and economic nature. The case study method refers to real phenomena and provides the opportunity to generalise on the basis of a well-documented case (Yin, 2009; Flyvbjerg, 2006; Kuhn, 1987). Using both case study and survey research in this study facilitated a multifaceted description of the investigated phenomenon. Although from a formal point of view, the sample is not representative, after a review of the literature and an analysis of materials received from BDG and PZD and interviews with the heads of these organisations, it was concluded that the cases show characteristic features of the way how German and Polish allotment gardens are managed. The sample size is related to the organisational and technical capabilities of the authors.

4. Results

4.1 Legal basis of allotment gardens and plot development

Two acts of law, the Bundeskleingartengesetz of 1983 in Germany and the Act on family allotments of 2013 in Poland, are the basic legal documents regulating how AGs function in both countries (Bundeskleingartengesetz, 1983; Ustawa o rodzinnych ogrodach działkowych, 2013). The provisions of the German and Polish laws on the organisational principles of how gardens function are similar. In both cases, the idea is as follows: AGs are to be divided into separate plots, have public infrastructure and operate according to the provisions for environmental protection. However, it should be emphasised that the German legislation also indicates a need for landscape protection. The presence of a hut is acceptable in both countries but the permissible surface of a hut in Poland is currently by 11 m² greater than in Germany (DE 24 m², PL 35 m²). Moreover, only German regulations impose functional divisions on plots: a minimum of one third must be designated for the cultivation of horticultural crops. Thus, the productive function of allotments is supported or even "secured". The Polish act puts the emphasis on the role of AGs and such issues as the establishment and functioning of AGs, their

Specification	Germany (%)	Poland (%)
<i>Age structure</i> ¹		
Less than 35 years	7.3	4.1
36–50 years	24.5	11.6
51–65 years	39.1	50.4
66–80 years	27.3	33.1
80 and more years	1.8	0.8
<i>Educational structure</i> ²		
Basic	5.5	1.7
Vocational	51.4	24.2
Secondary	31.2	55.8
Tertiary	11.9	18.3
<i>Professional activity</i> ³		
Full-time	47.3	35.5
Part-time	7.3	2.5
Pensioner	43.6	60.3
Other	1.8	1.7

Tab. 2: Socio-professional features of plot-holders according to the case study survey

Notes: ¹Germany (N = 110), Poland (N = 121); ²Germany (N = 109), Poland (N = 120); ³Germany (N = 110), Poland (N = 121)

Source: authors' survey

development and the obligations of plot-holders. The acts do not regulate the choice and location of plants nor the operation of environmentally-friendly elements, such as apiaries.

In the case of Germany, questions related to AGs are also regulated at the state level. According to Article 29(3) of the North Rhine-Westphalia constitution, AGs should receive support (Verfassung..., 1950). This appeal is made to all entities, e.g. the country, communes or associations and involves both financial assistance and support for horticulture as a whole (Kleingärten und Kleingartenanlagen, 2019). Both countries apply regulations on AGs specifying how they function. In Germany, they are formulated by allotment associations and include rules for obtaining a plot, organising and developing it, and rules for the participation of plot-holders in work on an AG alongside other responsibilities. Questions of environmental protection and animal husbandry in gardens are regulated, for instance, in Dortmund's AGs, the rules of integrated protection against pests should be complied with, which means no herbicides are allowed. Healthy plant residues must therefore be composted to improve soil quality. Tall trees are not acceptable, neither deciduous nor coniferous. The breeding of large animals, e.g. cattle and other livestock, and also pigeons, is not permitted, although apiaries are allowed. According to the regulations, any buildings should blend in with the landscape. Moreover, fencing, garden gates and paths must be adjusted to the general image of the garden (Mitgliedsbuch..., 2010). In Poland, the "Regulations on family allotments" prepared in 2015 by the Polish Allotment Federation are currently in force and set specific rules on how plots can be used and developed, as well as how an AG functions and can be developed, and the rules on using the common area and garden infrastructure. Planting ornamental trees including conifers is allowed on condition that they are slow-growing species and forms. A plot must be equipped with a compost bin and its holder is obliged to compost organic waste. There can be apiaries in gardens and under proper hygiene and sanitation conditions, pigeons, hens and rabbits can also be kept (Regulamin..., 2015).

Moreover, particular AGs apply internal regulations (in accordance with the provisions of the act and general regulations), for example, on the issues of water availability,

car parking, etc. A comparison of current regulations on German and Polish AGs showed that they differ, e.g. in terms of the provisions regarding the duties of plot-holders (obligatory work for an AG), adjustment of garden infrastructure to the landscape, the permissible surface of huts, compulsory cultivation of one third of the plot, the choice of plant species and the approach to biodiversity.

4.2 Spatial management of allotment gardens

Research conducted in both regions revealed many differences and similarities in the development and use of AGs and their plots (Tabs. 3 and 4). In both countries, AGs consist of two areas – the common space and individual plots with publicly accessible thoroughfares (roads, paths). It was observed that the individual plots vary in size (area occupied) in the different AGs. In the Westphalia and Lippe region, common space accounts for about one third of the total area of AGs and sometimes consists of several functional parts. These common areas have such features as educational centres (specialised building or common room with an extensive educational area), restaurants, bars, recreational area (gazebo with barbecue, benches) and educational plots, including sensory flower beds adapted for those with disabilities. The species structure of the plants in this part of the garden corresponds to the legal requirements. It is worth noting the high level of investment in this part of the garden and the care for its appearance. All plot-holders are under the obligation to engage in maintaining the communal parts of an AG used for integration, activation, education and therapy purposes.

However, in the AGs surveyed in Wielkopolska region, this is usually a compact and multifunctional area occupying about one fifth of the garden. This part is usually equipped with a community centre and office (with usually a small educational display – bookcase, table with books and leaflets), recreational area with a playground and playing field, information boards and garbage containers, outbuildings, shop and a place for storing various types of waste (including often bio-waste coming from the plots). Educational paths, which are a kind of novelty in the development of common space, are rare. The standard of this space is usually lower than in their German counterparts. The common space of Wielkopolska region AGs surveyed

Specification	Germany		Poland	
	Number of indications	%	Number of indications	%
Paved paths	72	64	72	60
Parking	70	63	57	47
Benches	31	28	21	17
Washing places	46	41	24	20
Playgrounds	23	21	29	24
Sports field/sports equipment	0	0	12	10
Allotment community centres	31	28	63	52
Compost bins/	18	16	25	21
Outbuildings	1	1	16	13
Notice boards	58	52	90	74
Restaurant/bar	16	14	3*	2
Shop	0	0	13	11

Tab. 3: Use of AG public infrastructure by plot-holders in Germany (N = 112) and Poland (N = 121) (Note: *Shop with outdoor/seasonal bar area e.g. bench, table or umbrella). Source: authors' survey

often feature tall trees and coniferous plants (including thuyas, spruces and junipers), which is not in accordance with the existing regulations.

Respondents' views on the use of public infrastructure confirms the differentiated management identified for the gardens (Tab. 3). The elements most often used in AGs in both regions are paths, parking lots and notice boards. In the AGs studied, a difference can be seen in the level of use of such aspects of public infrastructure as sports fields, outbuildings, restaurants or bars and shops.

The degree to which a garden is accessible and how it fits into its surrounding landscape varies between the regions studied. The field research and the analysis of orthophotos showed that the standard AG in the Westphalia and Lippe region blends into its surroundings and as such constitutes a harmonious part of the landscape. Fencing (gate, fence) does not isolate the garden space from adjacent areas. It is accessible to both the community of plot-holders and external users and the communal areas in AGs are open to everyone. Garden paths often act as a shortcut/a way through the garden and connect to thoroughfares in the neighbourhood. On the other hand, a standard AG in Wielkopolska region is often a closed space for use by authorised persons. Often fencing on AGs is high and made of precast concrete blocks tightly enclosing the garden space. Locked gates are frequently solid and non-transparent, equipped with locks, cameras and intercoms, thus making it difficult for outsiders to access AGs. As a result, the garden is often a barrier to

movement and inconsistent with its surroundings. Plot-holders are anxious about their property as well as the safety of their guests, especially children. That is why AGs often are accessible only by plot-holders, their families, friends and groups who are formally invited. Finally, there is no obligation to work on maintaining the space of AG and its community.

Moreover, in German conditions, some cities require specific kinds of huts and special construction designs are available. As a result, huts are a relatively harmonious component of AGs. As there is no similar requirement in Polish law, it is often the case that AGs in Wielkopolska region are not consistent with their surroundings. The lack of architectural and construction standards regarding huts (in terms of design, colour and building materials) results in excessive diversity, which in extreme cases gives the impression of slums. In agglomerations, residents' access to urban greenery and thus to AGs is important. However, strong urbanisation pressure may limit this possibility. Therefore, in the matter of AGs, especially with regard to how they develop, it is important to listen to experts, who are the official representatives of AGs and cooperate with local authorities.

The scope of collaboration between urban authorities and AGs in the regions studied is diverse and interpreted in various ways. German experts perceive this cooperation as AGs being present in spatial planning and in the process of landscaping an urban unit: "(...) in the state, 95% of AGs

Criterion	Germany	Poland
Relation to spatial planning of city	strong – presence of AGs in spatial planning of an urban unit. New AGs are created in accordance with spatial development plans	moderate – not all AGs are included in the spatial development plans, some AGs are intended for other functions
Common space	proportion of surface area of AG from 30 to 40%	proportion of surface area of AG from 18% to 22%
Functions of common space	priority for space development is education, integration, activation, therapy, growth in biodiversity; moreover, the maintenance of joint space requires the engagement of all plot-holders	development enabling integration, neither participation nor personal engagement required in maintenance of joint space of AG
Common space available for visitors not related to AG	freely accessible	available for limited groups of people – usually: plot-holders' families and their friends; gate often locked, intercom, closed-circuit television and instant monitoring, key, remote control
Landscape cohesion (relation with surroundings)	development of AGs blends into landscape to large extent: <ul style="list-style-type: none"> gardens open to the urban community fences, gates fit harmoniously into their surroundings; they do not constitute an insurmountable barrier for city dwellers garden paths are often integrated into the transport routes of the city 	development of AG blends into landscape to various degrees, not always coherent <ul style="list-style-type: none"> few gardens open to the urban community high fence, usually concrete, surrounding the garden; the garden is usually a barrier to traversing
Functions of AG	recreation and plant-growing with stable productive function	recreation and plant-growing with a tendency to marginalise the productive function
Environmentally friendly development and elements of AG's infrastructure	display plots/educational plots and educational boards and paths in the common area	few AGs have educational boards or paths in the common area

Tab. 4: Comparison between the development of AG in Westphalia and Lippe region (Germany) and Wielkopolska region (Poland). Source: authors' elaboration based on survey, interviews and study visits

belong to the city or commune, thus the resources of AGs are taken into account and their future functioning in the development of the city is determined” (Expert DE). The city promotes AGs as open green areas (Manager DE1), mainly for recreation and ecological food production (Manager DE2). In Polish conditions, when speaking about cooperation, attention is usually paid to financial issues – “(...) a city’s authorities usually subsidise AGs, but only those open to city inhabitants” (Expert PL). It is also important that the city helps in an attempt to put an end to the phenomenon of permanent residence on plots (Manager PL4).

According to experts, in cities in the two regions analysed, the availability of AGs and plots (supply) is guaranteed. At present, in Westphalia and Lippe region “(...) the areas of AGs are large enough, and new AGs are created in accordance with spatial development plans. In new residential areas, a need for AGs will be recognised and they will be designed and equipped accordingly. Currently, no AGs are being liquidated, neither partially nor entirely” (Expert DE). It is worth emphasising that “(...) according to the applicable regulations, already existing AGs must be redesigned in order to be more open and have attractive spaces, play areas and infrastructure. The liquidation of AGs due to the construction of housing estates or industrial investments is very rare. This is likely to happen in the future when there is greater demand for housing” (Manager DE4). In the Wielkopolska region “(...) the number of plots ensures any willing owners have the possibility of obtaining one. The liquidation of AGs carried out by urban authorities is the result of the city’s development plans, i.e. the construction of roads and housing, and this is most often only partial, involving a few plots. The city of Poznań has taken steps to restore liquidated plots and, where possible, to use this opportunity to designate additional areas of the city for the creation of a larger AGs than the liquidated ones. Possibilities for new AGs have appeared in smaller cities (Mosina, Czerwonak, Środa Wielkopolska), although in large cities, the location of new AGs is restricted by a lack of vacant areas. It is important, however, for any restored AGs (those replacing liquidated ones) to be situated in new housing neighbourhoods” (Expert PL).

German and Polish experts are united in the view that AGs must be developed in compliance with the provisions of the legal acts on allotment gardening (Bundeskleingartengesetz, 1983; Ustawa o rodzinnych ogrodach działkowych, 2013). In both countries, there is an ongoing debate on the ways of developing AGs with respect to their future role in the urban structure and how they

are perceived by its inhabitants. In Poznań, where “(...) demand and supply for AGs are balanced, care should first be taken to improve the development standards of existing ones. On the other hand, in towns with a surplus of plots, AGs are often poorly developed and resemble a chessboard, with abandoned plots adjacent to cultivated ones. In the near future, if it is not possible to give plots to those willing to take them on, field and legal regulations ought to be introduced in agreement with the city authorities to make it possible to improve AGs and return free areas to the city” (Expert PL). In Germany, experts meeting at the 2007 congress (Kleingärten mit Zukunft..., 2007) noted that extending the social functions of AGs was followed by modernisation of allotment gardening, which is visible in the development of AGs and plots. Developing the technical infrastructure (water, sewage system, electricity) on a plot influences its maintenance costs. Thus, questions arise about access of plots for the less affluent. It is worth emphasising that over the last few years support for investment in AGs from external funds has increased in Wielkopolska region, and this support comes primarily from local governments (city and commune offices). In 2017, 26 AGs received subsidies for the infrastructure construction or modernisation. The local government helped to build and modernise allotment community centres and external fencing, to make renovations and harden AGs pathways, as well as modernise the electricity supply network. Moreover, grants from the Provincial Environmental Protection and Water Management Fund supported the construction of educational paths in four AGs. Other subsidies helped to start outdoor gyms, enriching the recreational possibilities of two AGs. The city of Poznań has for several years supported investments in AGs. PLN 250,000 (EUR 56,000) was allocated for this purpose in the 2018 budget on condition that such co-financed AGs will be open to the public. Such activities contribute to improving the image of AGs, which are often perceived by city dwellers as space appropriated by allotment-holders as areas for their individual recreation (Expert PL).

4.3 Spatial arrangement of plots

AG plots in Westphalia and Lippe region and Wielkopolska region differ in terms of the number and size of the plots. The study indicates that the average surface area of a plot in the German allotments analysed is slightly larger than in the Polish ones (DE = 398.5 m² and PL = 378.2 m²). Plot area differs widely and the average area in both regions surpasses the national average (see Tabs. 1 and 5).

Specification	Surface area (m ²)							
	Act		Surveys					
	Germany	Poland	Germany			Poland		
		min	max	mean	min	max	mean	
Plots (m ²)	> 400	> 500	250	680	398.5	210	650	378.2
Huts (m ²)	24	35	10	60*	22.2	3	35**	24.1

Tab. 5: The surface area of huts and plots in Westphalia and Lippe region (Germany) and Wielkopolska region (Poland). Source: authors’ survey

Notes: *the consistent indications of German respondents showed that the surface of the hut was exceedingly large. During study visits, no huts were identified that exceeded the regulation size; **despite the fact that Polish respondents always gave the surface of their hut as being in accordance with the applicable standards, study visits revealed the existence of oversized huts. In bold – differences for plot size and huts were found by ANOVA to be statistically significant for independent groups: $p = 0.0498$ and $p = 0.0369$, respectively (significance level 0.05; for Germany and Poland)

In both regions, the allotment arrangement includes: a part with a recreational infrastructure (swing, sandpit, barbecue area, etc.), cultivation (edible beds, greenhouses, hothouses, apiaries, etc.), ornamental (beds with ornamental plants, lawn) and a hut, tool shed, fence and paths. German allotment holders have been found to adhere to legal requirements when developing their plot: in addition to being a place for recreation and leisure, a plot is always at least 1/3 part used for food production (fruit, vegetables, herbs) (Figs. 3 and 4). In the case of Polish plots, individual parts are very different in size (Fig. 5) and sometimes do not exist at all. Marginalisation or even disappearance of the cultivation section was observed (Fig. 6). The lack of any obligatory plot cultivation, as is the case in Germany, makes the recreational function more significant, so much so that this is frequently the sole function of plots. Consequently, grass is the main "crop" on the plot (Figs. 5 and 6). The field research indicates that the way plots are arranged is a result of the particular attitudes of allotment holders and the legal framework within which the AGs operate.

In light of the surveys, the basic element of the plot equipment in the AGs surveyed is a brick hut (DE = 84%, PL = 76%). In both regions, huts have a similar surface area (DE = 22.2 m² and PL = 24.1 m²) and are consistent

with the existing regulations in both countries (Tab. 5). The terrace (DE = 71%, PL = 54%) and tool shed appears just as often (DE = 64%, PL = 69%). The respondents' plots have diversified technical infrastructure (Tab. 6). Although access

Specification	Germany		Poland	
	Number of cases	%	Number of cases	%
Conventional electricity	103	92	92	76
Solar energy	3	3	0	0
Wind energy	1	1	0	0
Waterworks	95	85	82	68
Well	22	20	25	21
Collective sewage system	22	20	6	5
Cesspool (septic tank)	3	3	35	29
Small water treatment plant	3	3	1	1

Tab. 6: Utilities available on a plot in Germany (N = 112) and Poland (N = 121). Source: authors' survey



Fig. 3: Example of cultivation and recreation plot – note the predominance of cultivation. (Dortmund, Westphalia and Lippe region, 2016). Source: Photos taken by the authors



Fig. 4: Example of recreation and cultivation plot – note the presence of conifers (including tall trees) (Dortmund, Westphalia and Lippe region, 2016). Source: Photos taken by the authors



Fig. 5: Example of a traditional plot development – note the presence of cultivation (Gniezno, Wielkopolska region, 2016). Source: Photos taken by the authors



Fig. 6: Example of a new trend in the development of a plot – note the predominance of lawns and conifers (cypresses) (Gniezno, Wielkopolska region, 2016). Source: Photos taken by the authors

to electricity is not essential for traditional plot gardening, it is standard. The same is true of access to water and the sewage system. The use of unconventional energy sources in some German plots is worth noting.

The majority of huts on plots do not have heating (DE = 56%, PL = 67%), and if they do, the method of heating differs significantly. In German huts, gas (29%) and electric heating (12%) are used, whereas in Polish ones, a fireplace (17%) is more common. Polish plots are more ornamental and recreational, with rockery gardens, hedges, flower beds and swings appearing more often. In Germany, on the other hand, the elements of equipment selected indicate their plant-growing and ecological character (greenhouses, beehives, ponds, birdhouses and bird feeders), as well as recreational equipment (benches and grills) (Fig. 7).

The hut, a basic element of the plot, influences how it is perceived – the perception of the aesthetics of the plot and the landscape cohesion of the whole garden (Tab. 7). Experts from both regions stressed that allotment holders are bound by provisions regulating the size of these buildings and the way in which they are used. However, in German conditions, some cities and towns require specific kinds of huts, e.g. made

of wood or stone (Manger DE4). “Every type of hut needs a special construction design; in Dortmund 14 such designs are available” (Expert DE). Additionally, when selling a plot, its vegetation and hut must be restored to a state that meets the rules in force (Manager DE2), which limits the possibility of extending huts and retains the relatively harmonious and coherent landscape of AGs. Despite the fact that the surveys did not reveal the presence of any oversized huts (possibly because some allotment holders were afraid to admit that they were breaking the law), both expert statements and field surveys confirmed this fact. In Poland, despite specific regulations on the size of huts, “(...) they are oversized and in some cases permanently inhabited” (Manager PL1). “Court judgments ordering demolition are issued, but are often not executed due to the costs” (Expert PL). It is worth noting that in older AGs there are no above-standard-size huts (Manager PL3), which is related to the former, more restrictive legislation. The field survey confirmed the existence of huts built during the communist period, when aesthetics were of lesser importance due to shortages of building materials. At that time, huts were built, e.g. from parts of old trucks or other suitable remnants. In Poland, there are no legal regulations or local by-laws regarding the architectural and

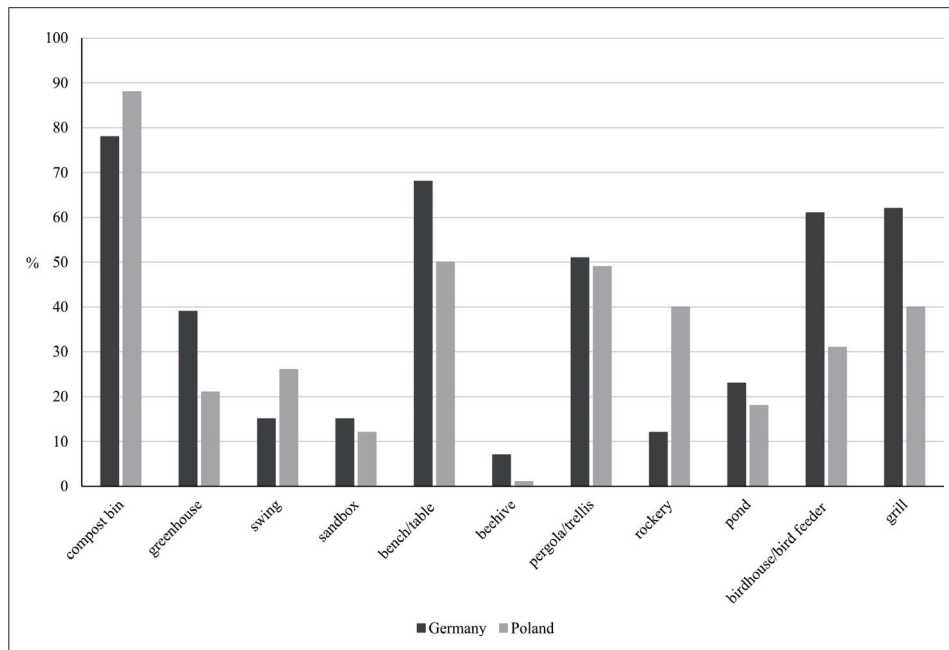


Fig. 7: The equipment of plots in Germany (N = 112) and Poland (N = 121)

Source: authors' survey

aesthetic principles of hut construction. The considerable diversity of these buildings in the survey findings in extreme cases creates an impression of a slum dwelling and prompts discussions on the aesthetics of AGs.

Furthermore, German huts are sometimes equipped with illegal toilets or even bathrooms, while in AGs from Wielkopolska region, mainly in Poznań, permanent residence on AGs is increasingly common (i.e. illegal housing function). This is often influenced by good access to the infrastructure (the standard is a hut with a toilet, bathroom and kitchen) and the convenient location of an AG.

The findings from field research are in line with the opinion of Expert PL, who pointed out that “Regulations in Poland do not impose any specific rules regarding the way of developing a plot. What can exert a considerable influence on the improvement of environmental conditions is proper infrastructure of AGs and their equipment, as well as a tendency to expand biologically active areas” (Expert PL). In German AGs “(...) the reasonable and economical use of water is advisable” (Expert DE). Particular attention is paid to the collection and use of rainwater (Manager DE3) and also to reducing soil sealing – thereby increasing its permeability (Manager DE 4). In Poland, in accordance with the Regulations on family allotments, “(...) every plot-holder is obliged to keep a compost bin. Water management, however, depends on the individual plot-holder, although

water charges help encourage reasonable use. Green garden avenues are increasingly popular, while asphalt and concrete are rare“ (Manager PL4). However, field research did reveal that on the plots rainwater is recovered occasionally, whereas nesting boxes, beehives and insect hotels rarely appear. Although compost bins are compulsory on Polish plots, they are rarely used properly. Plot-holders often only have mock compost to keep up appearances.

On the basis of the survey results, an attempt was made to determine the links between recreational and productive development and selected social characteristics of the allotment holder. It was assumed that the recreational development of a plot includes a table, bench, barbecue, swing, sandpit, rockery, pergola and pond. The productive development included infrastructure elements used for cultivation and food production: a tool shed, greenhouse, cold frame, polytunnel and beehive. Pearson's coefficient (r) was applied according to the type of data. These results are presented in Table 7.

The highest values of the correlation coefficient were recorded in the case of the development for productive purposes of Polish allotments - with the increase of the level of education, professional activity of the allotment holder, the occurrence of elements of production infrastructure is reduced. In the case of German allotments, the level of correlation coefficient for these variables was very low. An

Variables	Recreational development		Productive development	
	DE	PL	DE	PL
Allotment holder's education	0.179	- 0.016	- 0.165	- 0.212
Allotment holder's economic activity	0.161	0.046	- 0.076	- 0.240
Net monthly income	0.051	- 0.052	- 0.017	0.033
Number of persons in household	0.268	0.098	- 0.017	- 0.152

Tab. 7: Correlations between recreational and productive development and selected social characteristics of the allotment holder (Pearson correlation coefficient; $\alpha = 0.05$)

Source: authors' survey

analogous situation occurred in the Polish plots in relation to the elements of recreational infrastructure. The recreational management of German allotments was influenced by the number of persons in the household.

Large coniferous trees and shrubs commonly grow on the plots surveyed Wielkopolska region, although this is not in accordance with the garden regulations. Oversized trees sometimes cause conflict between allotment holders. German regulations prohibit the planting of any large coniferous trees and shrubs on the plot. As a result, tall trees (deciduous and coniferous) appear sporadically in the plots in Westphalia and Lippe region. Moreover, evergreen shrubs (e.g. coniferous) ones are rarely found in German plots, which may be related to better enforcement of legal regulations than in Poland.

In addition, field studies in both regions plot fences that are too high and non-transparent are sometimes. However, in Germany, allotment fences are mostly low and openwork. Allotment owners often use useful plants (e.g. raspberries, gooseberries), occasionally evergreens, in the hedges that form the fence. On the other hand, the fences of Polish allotments are often strips of tall, dense evergreen plants (common species used are thujas and junipers).

Various types of plot developments were recorded, resulting from both legal provisions and how they are observed. In Poland, where the standard requirements related to plot development are more lenient, their functional types vary to a much greater extent. The following main categories of plots were identified Wielkopolska region: recreational with a predominance of ornamental plants, recreational with a predominance of horticultural crops, holiday plots, residential plots, and fully-cultivated plots. However, the latter plots appear very rarely. It is worth mentioning that there are also educational-integration plots, although their presence is very limited. In Westphalia and Lippe region, in addition to recreational and edible plant-growing type plots, there are also educational and integration plots. Vacancies and abandoned (unused) plots occur in both countries. In both countries, the concept of model plots also exists, although it is perceived differently. In Germany, model plots are mainly ecology-oriented, while in Poland the ornamental appearance of a plot still seems to be most important. In Wielkopolska region, this approach to developing a plot is supported by the “Zielony Poznań” competition, during which “the most beautiful plot” is

selected. Although other competitions are held (e.g. the Model Plot, Family Allotment of the Year, organised by PZD, in which ecology is taken into account, the appearance of an individual plot still plays a major role. Therefore, the look of a single plot is important for the city authorities, PZD and plot-holders themselves, whereas insufficient attention is paid to the aesthetics of the AG as a whole.

5. Discussion

Today's AGs are an integral part of a modern city. The position of AGs is related both to the heritage of sociable city planning and also to the attitudes of gardeners resisting economic pressures. In effect, AGs are community-controlled green enclaves opposed to the pressure of neoliberal urbanism (Bartłomiejski and Kowalewski, 2019). Our research shows that representatives of allotment gardening in both Germany and Poland perceive AGs as an important subject of urban policy. Plot-holders in both regions point to significant changes in allotment gardening due to the changing needs of their users and also to the needs of other urban residents. According to Duś (2011), gradual changes in the way of developing and arranging the plot and using the allotment is the consequence of socio-economic changes in urban centres. This was also noted by Breuste (2010), Duží et al. (2017), Sovová (2015), Spilková and Vágner (2018), Tóth, et al. (2018). Our research indicates that cooperation between AGs and municipalities in both countries is on different levels of development, on a different scale and also takes different forms. In Westphalia and Lippe region, AGs are promoted as open green areas, mainly for recreation and ecological food production. Existing AGs must be redesigned in order to be more open and have attractive spaces, play areas and amenities. AGs' cooperation with the city is also reflected in their presence in the spatial planning of urban units, and new AGs are created in accordance with spatial development plans. The liquidation of AGs due to the construction of housing estates or other investments is very rare. In new residential areas, the need for AGs is recognised and they are designed and equipped accordingly. For AG experts from Germany, the issues of spatial planning in the context of the location and operation of AGs are of key importance.

By contrast, in Wielkopolska region, not all AGs are included in the spatial development plans. In addition, in such plans some AGs are earmarked for other functions.

Criterion	Germany	Poland
Landscape cohesion (external relations)	<ul style="list-style-type: none"> • huts with a coherent “architectural style” • fencing usually built in compliance with regulations 	<ul style="list-style-type: none"> • variety in the “architectural styles” of huts • fencing often built in contravention of regulationny
Huts	most huts meet legal requirements	huts are sometimes oversized
Structure of plant species in plot	meet legal requirements, i.e. significant of plot is covered with crops; coniferous shrubs appear sporadically	no legal requirements – major share of trees and coniferous shrubs as well as large (deciduous) trees, ornamental plants and lawns
Environmentally friendly development and elements of plots infrastructure	nesting boxes, beehives, insect hotels, wide use of recovered water, common use of composter	formally composters are obligatory, though these are often merely mock composters; nesting boxes, beehives, insect hotels, tanks for rainwater recovery are rare

Tab. 8: Comparison between the development of plots in Westphalia and Lippe region (Germany) and Wielkopolska region (Poland)

Source: authors' elaboration based on survey, interviews and study visits

Liquidation of AGs carried out by urban authorities results from urban development projects, i.e. the construction of roads and housing. Local authorities are obliged to restore liquidated AGs within the same city, although this is usually in a less favourable location (e.g. in terms of public transport). Moskalonek, Połom and Puzdrakiewicz (2020) emphasise that older plot users are often unable to reach these new locations. Sifting AGs to more outlying locations also deepens the deficit of biologically active areas in the central districts of cities (Borysiak et al., 2017). Furthermore, experts from Polish AGs emphasised supporting how AGs function (e.g. Co-financing of investment in gardens, solving problems related to illegal residence) and directly indicated the need to protect them.

Other studies also confirm this need to protect AGs in the urban space, e.g: planning protection (Poniży and Stachura 2017; Szkup and Pytel, 2016), legal protection (Calvet-Mir and March, 2019; Trembecka and Kwartnik-Pruc, 2018; Weirich, 2007) and historical and cultural protection (Acton, 2011). Studies by Lorbek and Martinsen (2015), Spilková and Vágner (2016), Gibas and Boumová (2020) also raise the issue of AGs protection in a situation of increasing urbanisation and investment pressure. Simon-Rojo et al. (2016) indicate that following the collapse of the communist system in Central and Eastern Europe, the structures of allotment gardens changed dramatically, e.g. in the Czech Republic and Slovakia, some gardens disappeared due to pressure to build new residential or commercial areas. Both German and Polish respondents also stressed the need to cooperate with municipal authorities, as well as to include AGs in urban planning studies and municipal policy. In this way, they show the unique potential AGs have for the functional and spatial structure of the city. That said, it is difficult not to agree with Bartłomiejski and Kowalewski (2019), who claim that Polish urban development policies continue to make little use of their social, spatial and environmental resources. Spilková and Vágner (2016) point out that local authorities easily become disoriented in their conceptualisation of AGs, for AGs intersect with so many topics in urban planning.

AGs provide ecosystem services (Breuste and Artmann, 2015; Borysiak and Mizgajski, 2016) and are an important element of the green infrastructure (Breuste, 2010), which in areas with high urban pressure is becoming particularly important. The comparison of AGs in the two regions shows that they differ in the approach and creation of environmentally friendly development and elements of AG's infrastructure. In Westphalia and Lippe region, as in Germany as a whole, great attention has long been paid to implementing system services by means of allotment gardening (BMVBS, 2008). It should be emphasised that North Rhine-Westphalia is the only state where support for the allotment garden movement is enshrined in the state constitution (Article 29(3)). The funds are used to create new AGs, expand and renovate existing gardens in order to integrate them into urban and regional green systems (MULNV, 2009). In Poland, the "Open Programme for the Social Development of AGs" was only recently developed and promoted, calling for the construction of modern gardens through different types of activities. It takes into account the community needs of the allotment community as well as other urban residents. It highlights the importance of AGs in the provision of cultural ecosystem services – allotment gardens as the green lungs of cities, a place for rest, recreation, learning, common integration, but also leisure activities for the whole local

community (PZD, 2016). The "Open programme for modern management and use of allotments to meet the needs of modern families" was also adopted, which highlights the need to maintain and develop ecosystem-based productive services in Polish AGs (PZD, 2019). In Westphalia and Lippe region, the development of AGs and allotments is more diverse – multifunctional, allowing for the provision of a wider range of ecosystem services. In contrast, in Wielkopolska region, the greater importance of recreational development was observed. Allotment holders emphasised the use of sports grounds and shops, which may indicate that they spend their holidays on the allotment or even live there permanently. Such activities are particularly evident in naturally attractive areas, where it can even be the case that allotments are withdrawn for holiday recreation (Moskalonek et al., 2020). Furthermore, research by Borysiak, Mizgajski and Speak (2017) conducted in Poznan allotment gardens indicates that wresting AGs from city centres results in reduced support and regulation for ecosystem services.

It has been argued that the AGs studies are the "third space" being characterised by strong dichotomies (DeSilvey, 2003; Spilková and Vágner, 2016). German AGs are open to the outside, a conglomerate of private and public space. In contrast, AGs in Poland are mostly closed spaces. It is hardly accessible or even inaccessible to other city dwellers. However, the "opening" of AGs is now somehow "forced" by the municipal authorities offering funds for the modernisation of infrastructure. Our study - especially the in-depth interviews with PL Experts - shows that the limited accessibility of Polish AGs leads to them being perceived as misappropriated space – private/individual recreational space. Orzechowska-Szajda and Podolska (2013) also notice that in Poland the way AGs function as mostly closed areas is one of the reasons for the reluctance to this form of space management. Such a state of affairs makes it difficult to promote and protect AGs operating in the urban tissue subject to pressure from other forms of use.

Similarly, research conducted in the Czech Republic has shown that "(...) allotments also feature relatively large enclosed enclaves, separated from public paths by locked passages that prevent public use (...). The gardeners do wish to keep a certain level of privacy and security, however, which can be interpreted as a sign of the privatisation of these spaces" (Sovová and Krylová, 2019, p. 116). Koopmans et al. (2017) emphasise that "the prospect of the allotments being publicly accessible is perceived as an intrusion that disturbs the appreciated home-like intimacy". Both in Poland, where AGs may be entered only by plot-holders, their families, friends and groups formally invited, and in the Czech Republic "When exploring the nature of social encounters in the allotments, we noticed that most were rather "private" – gardeners would invite their family or friends to their plot, or they would meet in small groups with their garden neighbours" (Sovová and Krylová, 2019, p. 115). Mokras-Grabowska (2020, p. 251) admits that in Poland access to AGs is still very limited but she points out that "they create the identity of local communities" and sees them as "symbolic spaces", and "familiar and friendly".

In the regions studied, as in other parts of Germany and Poland, AGs are a traditional element of the urban landscape (Bell et. al., 2016, Pawlikowska-Piechotka, 2010). They are also an integral element of the urban structure and, together with other forms of land use, form a common urban organism (Szkup and Pytel, 2016). However, the way AGs

are inscribed into the urban landscape differs. In Germany, a harmonious fit with the surroundings is fostered by legal requirements. According to the law, when developing AGs and plots of land, environmental, nature conservation and landscape management aspects must be taken into account (Bundeskleingartengesetz, 1983). In Polish cities, although AGs often co-create a larger green area, they are clearly separated in this space. Studying AGs in Warsaw, Bieganski (2015, pp. 10–11) also noticed that many of them are separated from the city by a robust fence. This results in isolation with "an unfriendly curtain separating privileged allotment holders from residents reliant on public green spaces". Research conducted in Wielkopolska region AGs shows that the reason for the isolation of allotment holders is the need to create a safe space. Sulima (1990) describes AGs as a space "between paradise and a rubbish heap", bringing together both positive (paradise is nature) and negative (a rubbish heap is artefacts) elements, which undoubtedly affects the perception of its integration into the urban landscape. It is also common among landscape architects and planners to perceive allotment gardening as an anachronism, a remnant of the communist period, and a relic of an earlier era (Kosmala and Kamińska, 2013). Szkup and Pytel (2016) point out that the creation of AGs in Poland was a spontaneous phenomenon, very often not taking urban plans into account. In addition, the "temporariness" of these plans significantly influenced the location of AGs, which was not always rational and in subsequent decades led to their being liquidated or relocated. Research conducted in AGs in Łódź indicates that although not all huts and plots are well cared for, in urban complexes, especially in industrial districts, gardens often play a shielding and masking role against non-aesthetic urban development (Szkup and Pytel, 2016).

This study indicates that in both countries, the regulations concerning plot development are not fully respected. This is also confirmed by research carried out by Giedych and Poniży (2013), Lorbek and Martinsen (2015), Oldengott (2007), Weirich (2007). In the German region, errors in the implementation of legal regulations are highlighted, which is related to insufficient knowledge of regulations or their overinterpretation (MULNV, 2009). In Poland, the existing legal acts concerning the use of plots have become more flexible compared to previous provisions (Kacprzak et al., 2020). Plot-holders have ever greater liberty in diversity of plot development. On the one hand, this suits their needs much better, but on the other, is conducive to abandoning cultivation, increasing lawn area, uncontrolled expansion of oversized huts and permanent residence on plots (Bellows, 2004; Duś, 2014; Dymek and Bednorz, 2017; Orzechowska-Szajda and Podolska, 2013). The present study also confirms Romanowski's observations (2012, p. 281), who notes that "regulations on AGs determine the rules of their development and use of a plot, but these are only quantitative criteria concerning the size of buildings and are general in terms of functionality and aesthetics". No attention is paid to the spatial layout of a plot and its compatibility with the neighbourhood. This results in a great diversity in plot development, especially regarding the share of land designed for the cultivation of horticultural crops as well as the construction of huts. The unsightly development of some plots was observed, which also reflects previous practices coming from the period when building materials were difficult to obtain. Thus, not incidentally the actual development of Polish AGs and their plots results in AGs being perceived as slums and causes their negative public

perception. Orzechowska-Szajda and Podolska (2013) are of a similar opinion and underline that AGs in Poland are sometimes perceived as a space that causes many aesthetic controversies. In the Wielkopolska region AGs, we observed the presence of both neat and tidy plots and plots resulting from accidental collecting and hoarding (so called Diogenes Syndrome). This does not facilitate the protection and promotion of AGs in Poland, as it is difficult to protect an "ugly space", that is used by "selected" city dwellers. Crouch and Wiltshire (2012, p. 128) analysed designs on a plot in Great Britain in terms of the future for allotments in urban landscapes, and see AGs as "Landscape marrying regulation with disorder; an anarchic invention, a never-ending work in progress". This is analogous to Czech studies, where the appearance of allotments is specific. All of our research sites allowed for small houses or garden sheds on the plots, but there were no norms regarding their appearance (other than a size limit). (...) Appearance was a major point of criticism in some recent discussions about the future of Czech allotments (Sovová and Krylová, 2019, p. 113). Kožešník (2018) and Gibas and Boumová (2020) point out that allotments were described as "resembling slums" or "ulcers on the face of the city". No strong relationship was found between recreational and productive development and selected social characteristics of the allotment holder, This is probably due to the fact that (as noted during the field research) the way the plot is developed reflects the personality of the allotment holder and especially their motivations for having one (Mačkiewicz et al., 2021). This is also supported by Crouch's observations (2000), according to whom AGs are neither places of agricultural production within the city, nor places for passive leisure, they are somewhere in between.

The study showed that the standard of development of AGs and plots (materials used, quality of workmanship, and level of investment) varied in the regions surveyed. The Polish plots are highly differentiated in this respect, ranging from the very neglected to the very "fancy", from a very low level of investment to a kind of "splendour", while the standard of those in the German region is more even/uniform. This is probably related to do with different legal regulations concerning the rules for valuing a plot in case of liquidation of AGs or transfer of a plot to another tenant. In Westphalia and Lippe region, as in the entire state, the value of the plot (hut, crops) is not subject to free market mechanisms, which curbs investment impulses in favour of taking over the plot in a socially responsible way (LWLK, 2013). In Poland, when AGs are liquidated, the amount of compensation should reflect the market value. Plot prices are regulated by supply and demand, depending primarily on the level of investment and location (Rostkowska, 2017; Law, 2013). In the last year, due to the restrictions resulting from the Covid-19 pandemic, there has been a boom in demand for plots in AGs, which has fed through into increases in their prices (Kazmierczak, 2020; Karpieszuk, 2020).

Based on the assessment of plot development, it was found that plot types and their functions also differ in the two regions. The increased importance of recreational functions in AGs is noted in both countries. Its intensification is mentioned by scholars such as Bell et al., 2016; Pawlikowska-Piechotka, 2012. Simon-Rojo et al. (2016), who emphasise that in many countries of Northern, Western and Central Europe, although allotment gardens are common and have a long tradition, their functions have changed from self-sufficiency to recreation, despite local legislation or regulations specifying a minimum area allocated to food

production. This was the case in Germany. In Poland, relaxation of regulations on the acceptable size of huts and on plot development has led to cultivation being replaced by recreation, and sometimes even illegal housing. The considerable freedom that Polish plot-holders enjoy gives rise to various types of negative phenomena, such as gradual marginalisation of the edible-plant growing function and the accompanying arbitrariness in plot development, which is particularly reflected in the increasing space devoted to lawns and huts. As a result, plots are becoming more and more mono-functional – only recreational. This process began in the 1990s (Bellows, 2004; Dymek and Bednorz, 2017; Duś, 2014). Klepacki and Kujawska (2018) argue that at present Polish plots and AGs are becoming more akin to pleasure gardens.

On the basis of their spatial-functional analysis of the organisation of individual plots in AGs located in Poznań, Borysiak et al. (2016) distinguished four types of usage: vegetable cultivated, vegetable cultivated-ornamental, ornamental, abandoned with their corresponding plant characteristics. Their study indicates even more diversified ways of using and managing plots, which translates into a greater number of their types. While identifying them, the increasing tendency of Polish plot-holders to focus on recreation was observed. A similar trend was observed in the Czech Republic, where, as Sovová and Krylová (2019) note, the use of gardens is slowly changing. Through their observations they confirmed that gardens now provide recreation beyond cultivating plants and one in four plots is composed solely of greenery. The increasing plot space devoted to lawns and the fact that this often covers the entire plot should be regarded as an extremely worrying trend, as it is evidence of the disappearance of the productive function, which is one of AGs' core functions (see e.g. Sovová, 2015; Sovová and Krylová, 2019). Cultivation of fruit and vegetables has been replaced by the intensive cultivation of lawns. Copious watered, fertilised and 'protected' with pesticides, these lawns are exclusively a non-food crop.

Moreover, as the most common part of open green spaces and urban green infrastructure, lawns are important contributors to the homogenisation of urban landscapes and loss of urban biodiversity (Ignatieva and Stewart, 2009; Ignatieva and Ahrné, 2013; Ignatieva et al., 2020). To describe the low environmental value of modern lawns, the term "green desert" was coined by Allen et al. (2010). For these reasons, it is very important to restrict the excessive expansion of lawns in AGs, and at the same time, to introduce nature-based solutions in their place, such as alternative sustainable lawns e.g. native species lawns, meadow-like lawns, spontaneous lawns or sustainable lawn alternatives e.g. grass-free lawns (see e.g. Ignatieva et al., 2020; Yang et al., 2019). What is more, our research confirms that we should evaluate in positive terms the legal requirement of allocating a minimum one third of the area of German plots to cultivation, as this guarantees that the productive function of the plot is retained. Maintaining food production on at least part of the plot is not only in line with the founding principles of allotment gardens but is also of particular importance at the present time, when many cities all over the world are initiating urban agriculture and food urbanism by developing local food strategies and supporting urban agriculture projects (see e.g. Drescher, 2006; Koopmans et al., 2017). The growing interest in food production is observed among urbanities (Duží et al., 2017; Scheromm, 2015). Moreover, cultivating food on AGs is also line with the recommendations of the

"Milan urban food policy pact" (2015). However, it is obvious that this should be one of AGs' many functions, and not the sole function of an AG.

Our study has some limitations which result from the strong regional focus, as the research is limited to only two regions, one in Germany and one in Poland. In the future, however, it would be advisable to extend the scope of analysis to other regions and countries. Further studies comparing the development and physical arrangement of AGs in Northern and Western Europe with Central Europe, as well as comparisons between the countries of the former Eastern Bloc, seem to be particularly important. Moreover, the study concentrated on urban AGs and did not take into account different types of urban areas and the size of cities. Our study suggests that the type of area (urban, rural) and the size of the centre have an impact on how AGs and plots are developed. It would be worth taking these aspects into account in future studies.

6. Conclusions and recommendations

This research made it possible to identify characteristic features of contemporary AGs and plots in Westphalia and Lippe region (Germany) and Wielkopolska region (Poland), as well as to reveal dissimilarities in their development. Despite the common, pioneering beginnings of the development of allotment gardening in both regions, the development of AGs and plots is different. They functioned in different socio-economic conditions, which had a strong impact on shaping the needs of city dwellers, and thus on the development of AGs and plots' functions. The development and use of AGs differs in both regions in terms of the accessibility and development of common areas of AGs, adjustment to the landscape, the scope of collaboration with local authorities, the types of plots and the way they are developed. This results primarily from existing legal provisions, the approach to their observance and the individual attitudes of plot-holders.

Our research shows that German allotment gardening is more open to the needs of direct and indirect users – city dwellers. The legal regulations reconcile the variety of needs, imposing the principles of management that take leisure and food production into account. AGs offer the city and its inhabitants' space for recreation, food growing, social integration and contact with nature. In effect, in Westphalia and Lippe region, in addition to recreational and edible plant-growing type plots, there are also educational and integration plots.

In turn, in Poland, after the transformation of the socio-economic system begun in 1989, AGs underwent sudden, insufficiently controlled identity changes, the consequences of which threaten the multi-functionality of AGs and their provision of all ecosystem services. AGs in Wielkopolska region are not as accessible, do not prioritise internal users, and do not always blend in with their surroundings. The importance of the recreation function grew markedly, which was particularly evident in the way plots are developed. Although the main categories of plots in Wielkopolska region were more numerous and varied than in Westphalia and Lippe region i.e. from recreational with a predominance of ornamental plants to fully cultivated, the considerable freedom that Polish plot-holders enjoy gives rise to the gradual marginalisation of edible-plant growing and accompanying great arbitrariness in plot development, especially reflected in the growing trend for lawns and

huts. As a result, in the case of Polish cities, ambiguous legal regulations on development related to the production function and problems with respecting legal regulations may lead to the disappearance of food production on plots in the near future.

The recommendation is to amend Polish legislation not only by introducing a provision regarding the mandatory use of a part of the plot for food production, but also the obligation to apply pro-ecological solutions in AGs. AG associations should also take special care to ensure the observance and enforcement of legal provisions by plot-holders. Together with local authorities they should promote AGs as multi-functional, open green areas, suitable for recreation, socialisation and ecological food production. Spatial policy should specify management conditions for new AGs created as a result of changes in land use. In the case of existing gardens, the current management principles should be reviewed and adapted to the needs of their users and city dwellers, and their location in the city's space. Regarding the AGs from Westphalia and Lippe region, it is necessary to maintain and comply with the regulations currently in force, as well as to continue the already adopted directions of action.

This study can be a useful source of information for city authorities, garden organisations and allotment holders in shaping the development of AGs and allotments both for the contemporary allotment user and the whole urban community. The study can also prove helpful in creating a positive image of allotment gardens and raising greater awareness of their importance among users of urban space, in this way, contributing to shaping the perception of AGs as an important element of the recreational, natural and agricultural structure of urban space. The study's results can also be used in promoting and protecting this form of land use and in formulating new strategies and local urban policies. This is particularly important in terms of improving the quality of life of city dwellers and better integration of AGs into green infrastructure and thus providing a wider range of ecosystem services.

Acknowledgements

We would like to thank the following: Mr. Zdzisław Śliwa – President of the Polish Allotment Association in Poznań District and Mr. Wilhelm Spieß – President of the Regional Federation of Allotment Gardens Westphalia and Lippe for sharing their long-term experience and expertise in the area of allotment gardening. Special thanks to Mr. Werner Heidemann from the Regional Federation of Allotment Gardens Westphalia and Lippe for his hospitality and help. We would also like to thank Ms. Claudia Kiefer from the Regional Federation of Allotment Gardens Westphalia and Lippe and Ms. Agata Wróbel and Ms. Magdalena Klessa-Kiec from the Polish Allotment Association in Poznań District for their help in organising the survey process.

References:

- ACTON, L. (2011): Allotment Gardens: A Reflection of History, Heritage, Community and Self. Papers from the Institute of Archaeology, 21: 46.
- AHERN, J. (2007): Green infrastructure for cities: the spatial dimension. In: Novotny P. et al. [eds.]: Cities of the future. Towards integrated sustainable water and landscape management (pp. 267–283). London, IWA Publishing.
- ALLEN, W., BALLMORI, D., HAEG, F. (2010): Edible Estates: Attack on the Front Lawn. Metropolis Books.
- APPEL, I., GREBE, C., SPITTHÖVER, M. (2011): Current Gardening Initiatives. Allotment Gardens and New Gardens in German Cities. Kassel, Kassel University Press.
- BARRICO, L., CASTRO, H., COUTINHO, A. P., GONÇALVES, M. T., FREITAS, H., CASTRO, P. (2018): Plant and microbial biodiversity in urban forests and public gardens: Insights for cities' sustainable development. *Urban Forestry & Urban Greening*, 29: 19–27.
- BARTHEL, S., ISENDAHL, C. (2013): Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. *Ecological Economics*, 86: 224–234.
- BARTHEL, S., FOLKE, C., COLDING, J. (2010): Social-ecological memory in urban gardens – Retaining the capacity for management of ecosystem services. *Global Environ. Change*, 20: 255–26.
- BARTHEL, S., PARKER, J., ERNSTSON, H. (2015): Food and green space in cities: A resilience lens on gardens and urban environmental movements. *Urban Studies*, 52(7): 1321–1338.
- BARTŁOMIEJSKI, R., KOWALEWSKI, M. (2019): Polish urban allotment gardens as 'slow city' enclaves. *Sustainability*, 11(11): 3228.
- BDG (2018a): Bundesverband – Zahlen und Fakten [online]. [cit. 20.11.2019]. Available at: <https://www.kleingartenbund.de/de/bundesverband/zahlen-und-fakten/>
- BDG (2018b): Bundesverband [online]. [cit. 20.10.2019]. Available at: <https://www.kleingartenbund.de/de/bundesverband>
- BELL, S., FOX-KÄMPER, R., KESHAVARZ, N., BENSON, M., CAPUTO, S., NOORI, S., VOIGT, A. (2016): *Urban Allotment Gardens in Europe*. London/New York, Routledge.
- BELLOWS, A. C. (2004): One hundred years of allotment gardens in Poland. *Food and Foodways*, 12(4): 247–276.
- Bewältigung der Leerstandsproblematik in Kleingartenanlagen in strukturschwachen Regionen (2013). *Forschungen*, Heft 158, Hrsg. Berlin.
- BIEGAŃSKI, L. (2015): Czy ogrody działkowe powinny być tematem polityki zagospodarowania przestrzennego? In: Kosmala, M. [ed.]: *Ogrody Działkowe w Miastach – Bariera czy Wartość?* (pp. 5–19). Toruń, PZITS.
- BMVBS – Bundesministerium für Verkehr, Bau und Stadtentwicklung / BBR - Bundesamt für Bau, Stadt- und Raumforschung (2008): *Städtebauliche, ökologische und soziale Bedeutung des Kleingartenwesens*. Berlin, Bonn.
- BMVBS – Bundesministerium für Verkehr, Bau und Stadtentwicklung (2013): *Bewältigung der Leerstandsproblematik in Kleingartenanlagen in strukturschwachen Regionen*. *Forschungen* 158, Berlin.
- BONNY, E. (2010): *The Landscape and Culture of Allotments: A Study in Hornchurch, Essex*. Nottingham, University of Nottingham.
- BORYSIK, J., MIZGAJSKI, A. (2016): Cultural services provided by urban allotment garden ecosystems. *Ekonomia i Środowisko*, 4: 292–306.

- BORYSIK, J., MIZGAJSKI, A., SPEAK, A. (2017): Floral biodiversity of allotment gardens and its contribution to urban green infrastructure. *Urban Ecosystems*, 20(2): 323–335.
- BREUSTE, J. H. (2010): Allotment Gardens as Part of Urban Green Infrastructure: Actual Trends and Perspectives in Central Europe. In: Muller, N., Werner, P., Kelcey, J. G. [eds.]: *Urban Biodiversity and Design* (pp. 463–475). Wiley-Blackwell.
- BREUSTE, J. H., ARTMANN, M. (2015): Allotment Gardens Contribute to Urban Ecosystem Service: Case Study Salzburg, Austria. *Journal of Urban Planning and Development* 141(3): A5014005.
- Bundeskleingartengesetz vom 28. Februar 1983 (BGBl. I S.210), zu letzt geändert durch Artikel 11 des Gesetzes vom 19.9.2006, (BGBl. I S.2146) [online]. [cit. 03.12.2019]. Available at: <https://www.gesetze-im-internet.de/bkleingg/BJNR002100983.html>
- CABRAL, I., KEIM, J., ENGELMANN, R., KRAEMER, R., SIEBERT, J., BONN, A. (2017): Ecosystem services of allotment and community gardens: A Leipzig, Germany case study. *Urban Forestry & Urban Greening*, 23: 44–53.
- CALVET-MIR, L., MARCH, H. (2019): Crisis and post-crisis urban gardening initiatives from a Southern European perspective: The case of Barcelona. *European Urban and Regional Studies*, 26(1): 97–112.
- CAMPS-CALVET, M., LANGEMEYER, J., CALVET-MIR L., GÓMEZ-BAGGETHUN, E. (2015): Ecosystem services provided by urban gardens in Barcelona, Spain: Insights for policy and planning. *Environmental Science and Policy*, 62: 14–23.
- Charter of Polish Allotment Federation (Statut PZD 2018) (2018): PZD [online]. [cit. 07.09.2019]. Available at: <http://pzd.pl/uploads/renata/Statut%202017%20zarejestrowany%20z%20przypisami.pdf>
- COLASANTI, K. J. A., HAMM, M. W., LITJENS, C. M. (2012): The City as an 'Agricultural Powerhouse'? Perspectives on Expanding Urban Agriculture from Detroit, Michigan. *Urban Geography*, 33(3): 348–369.
- COSTA, S., FOX-KÄMPER, R., GOOD, R., SENTIC, I. (2016): The position of urban allotment gardens within the urban fabric. In: Bell, S. et al. [eds.]: *Urban Allotment Gardens in Europe* (pp. 201–228). London/New York, Routledge, Taylor and Francis Group.
- CROUCH, D. (2000): Reinventing allotments for the twenty-first century: the UK experience. *Acta Hort.* 523: 135–142.
- CROUCH, D., WARD, C. (1997): *The Allotment: Its Landscape and Culture*. 3rd Ed. Nottingham, Five Leaves Nottingham.
- CROUCH, D., WILTSHIRE, R. (2012): Designs on the plot: the future for allotments in urban landscapes. In: Viljoen, A. et al. [eds.]: *Continuous productive urban landscapes* (pp. 124–131). Elsevier.
- DESILVEY, C. (2003): Cultivated histories in a Scottish allotment garden. *Cultural Geographies*, 10(4): 442–468.
- DŁUGOZIMA, A. (2012): Wzornictwo ogrodów działkowych In: Rylke, J. [ed.]: *Wzornictwo ogrodowe* (pp. 51–67). Warszawa, Wydawnictwo Sztuka Ogrodu Sztuka Krajobrazu.
- DRAKE, L., LAWSON, L. J. (2014): Validating verdancy or vacancy? The relationship of community gardens and vacant lands in the U.S. *Cities*, 40: 133–142.
- DRESCHER, A. W., HOLMER, R. J., IAQUINTA, D. L. (2006): Urban homegardens and allotment gardens for sustainable livelihoods: Management strategies and institutional environments. In: Nair, P. K., Kumar, B. [eds.]: *Tropical Homegardens: A Time tested Example of Sustainability* (pp. 317–338). Springer, Dordrecht.
- DRILLING, M., GIEDYCH, R., PONIŹY, L. (2016): The idea of allotment gardens and the role of spatial and urban planning. In: Bell, S. et al. [eds.]: *Urban Allotment Gardens in Europe* (pp. 35–61). London/New York, Routledge, Taylor and Francis Group.
- DUŚ, E. (2011): Miejsce i rola ogrodów działkowych w przestrzeni miejskiej. *Geographia. Studia et Dissertationes*, 33: 79–100.
- DUŚ, E. (2014): Recreational use and health functions of allotments gardens in the Katowice conurbation, Poland. *Environmental & Socio-economic Studies*, 2(2): 16–25.
- DUŹI, B., FRANTÁL, B., ROJO, M. S. (2017): The geography of urban agriculture: New trends and challenges. *Moravian Geographical Reports*, 25(3): 130–138.
- DYMEK, D. (2015): Fenomen "sztucznie" użytkowanych działek jako konsekwencja wyroku Trybunału Konstytucyjnego z dnia 11 lipca 2012 roku. *Prace Komisji Krajobrazu Kulturowego*, 29: 135–142.
- DYMEK, D., BEDNORZ, L. (2017): Zagospodarowanie Rodzinnych Ogrodów Działkowych (ROD) na przykładzie ROD im. Józefa Chociszewskiego w Poznaniu. *Studia Miejskie*, 25(25): 133–147.
- DZIKOWSKA, A., KRZEMINSKA, A. E., ZAREBA, A. D. (2019): Allotment Gardens as Significant Element Integrating Greenery System of the City. *IOP Conference Series: Earth and Environmental Science*, 221(1): 1–15.
- Environment 2018 (Ochrona Środowiska 2018) (2018): Warszawa, GUS.
- FLYVBJERG, B. (2006): Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2): 219–245.
- GIBAS, P., BOUMOVÁ, I. (2020): The Urbanization of Nature in a (Post) Socialist Metropolis: An Urban Political Ecology of Allotment Gardening. *International Journal of Urban and Regional Research*, 44(1): 18–37.
- GIEDYCH, R., PONIŹY, L. (2013): Ogrody działkowe jako przedmiot polityki przestrzennej i ekologicznej miast na przykładzie Warszawy i Poznania. *Przegląd Komunalny*, 2(105): 48–53.
- HOCHHÄUSL, S. (2014): Grass Roots Modernism: Architecture and Organization in Austrian Settlements and Allotment Gardens, 1921–1925. In: Elleh, N. [ed.]: *Reading the Architecture of the Underprivileged Classes* (pp. 119–136). London, Routledge.
- IGNATIEVA, M., AHRNÉ, K. (2013): Biodiverse green infrastructure for the 21st century: from "green desert" of lawns to biophilic cities. *Journal of Architecture and Urbanism*, 37(1): 1–9.
- IGNATIEVA, M., HAASE, D., DUSHKOVA, D., HAASE, A. (2020): Lawns in Cities: From a Globalised Urban Green SPACE phenomenon to Sustainable Nature-Based Solutions. *Land*, 9(3): 73.

- IGNATIEVA, M., STEWART, G. H. (2009): Homogeneity of urban biotopes and similarity of landscape design language in former colonial cities. Cambridge, Cambridge University Press.
- KACPRZAK, E., MAĆKIEWICZ, B., SZCZEPAŃSKA M. (2020): Legal regulations and development of German and Polish allotment gardens in the context of the production function. *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, 82(3): 197–215.
- KARPIESZUK W. (2020): Koronawirus. Ceny działek ROD ostro w górę. "Urządzają licytację, kto da więcej" [online]. [cit. 10.03.2021]. Available at: <https://warszawa.wyborcza.pl/warszawa/7,54420,25947051,ucieczka-przed-koronawirusem-na-dzialke-w-miescie-ich-ceny.html>
- KAŹMIERCZAK, M. (2020) Boom na ogródki działkowe przez koronawirusa. Jak nabyć działkę w ROD? [online]. [cit. 10.03.2021]. Available at: <https://www.bankier.pl/wiadomosc/Boom-na-ogrodki-dzialkowe-ROD-przez-koronawirusa-Jak-nabyc-dzialke-7872545.html>
- KESHAVARZ, N., BELL, S. (2016): A history of urban gardens in Europe. In: Bell, S. et al. [eds]: *Urban Allotment Gardens in Europe* (pp. 8–32). London/New York, Routledge, Taylor and Francis Group.
- Kleingärten mit Zukunft – Lebenswerte Stadt Dokumentation Kongress: 11. Mai 2007 (2007): Natur & Stadtgrün. Hamburg [online]. [cit. 17.10.2019]. Available at: <http://www.hamburg.de/contentblob/134998/data/dokumentation-kleingartenkongressdruckversion.pdf>
- Kleingärten und Kleingartenanlagen (2019): Förderung des Kleingartenwesens [online]. [cit. 20.12.2019]. Available at: <https://www.umwelt.nrw.de/landwirtschaft/acker-und-gartenbau/kleingarten-und-kleingartenanlagen/>
- KLEPACKI, P., KUJAWSKA, M. (2018): Urban Allotment Gardens in Poland: Implications for Botanical and Landscape Diversity. *J. Ethnobiol.*, 38 (1): 123–137.
- KOOPMANS, M. E., KEECH, D., SOVOVÁ, L., REED, M. (2017): Urban agriculture and place-making: Narratives about place and space in Ghent, Brno and Bristol. *Moravian Geographical Reports*, 25(3): 154–165.
- KOSMALA M., KAMIŃSKA M. (2013): O działkach i parkach – działkowcy Torunia i Warszawy. In: Kosmala M. [ed.]: *Ogrody Działkowe w Miastach – Bariera czy Wartość?* (pp. 107–117). Toruń, PZITS.
- KOŽEŠŇÍK, M. (2018): Český zahrádkářský svaz – Územní sdružení Praha-město. Presentation at Praha & Příroda – Urban Gardening. Centre for Architecture and Metropolitan Planning, 19. 4. 2018, Prague.
- KRONENBERG, J., BERGIER, T., LISICKI, P. (2013): Usługi ekosystemów w praktyce a ogrody działkowe. *Przegląd Komunalny*, (8): 53–56.
- KUHN, T. S. (1987): What are scientific revolutions? In: Kruger, L. et al. [eds.]: *The probabilistic revolution*, Vol. 1: Ideas in history (pp. 7–22). Cambridge, The MIT Press.
- KVALE, S., BRINKMAN, S. (2009): *InterViews: Learning the Craft of Qualitative Research Interviewing*. London, Sage.
- Landesverband Westfalen und Lippe der Kleingärtner e. V. Mitgliederversammlung (2018): [online]. [cit. 17.10.2019]. Available at: <https://www.kleingarten.de/de/landesverband/>
- LANGEMEYER, J., LATKOWSKA, M. J., GÓMEZ-BAGGETHUN, E. (2016): Ecosystem services from urban gardens. In: Bell, S. et al. [eds]: *Urban Allotment Gardens in Europe* (pp. 115–141). London/New York, Routledge, Taylor and Francis Group.
- LEFEBVRE, H., NICHOLSON-SMITH, D. (1991): *The production of space* (Vol. 142). Oxford, Blackwell.
- LORBEK, M., MARTINSEN, M. (2015): Allotment Garden Dwellings: Exploring Tradition and Legal Framework. *Urbani izziv*, 26 (supplement): 98–113.
- LV – Westfalen and Lippe (2019a): Landesverband - Grün für alle [online]. [cit. 19.11.2019]. Available at: <https://www.kleingarten.de/de/landesverband/ueber-uns/gruen-fuer-alle>
- LV – Westfalen and Lippe (2019b): Landesverband – Über uns [online]. [cit. 19.11.2019]. Available at: <https://www.kleingarten.de/de/landesverband/ueber-uns/>
- LWLK – Landesverband Westfalen und Lippe der Kleingärtner e.V. (2013): Richtlinien für Wertermittlung von Aufwuchs, Gartenlauben und sonstigen Einrichtungen in Kleingärten [online]. Available at: <https://www.kleingarten.de/de/publikationen-und-angebote/landesverband/wertermittlung/>
- MAĆKIEWICZ, B., ANDRZEJEWSKI, A., KACPRZAK, E. (2018): Koszty bezładu przestrzennego dla rynku nieruchomości. *Studia KPZK PAN*, 182(2): 280–312.
- MAĆKIEWICZ, B., SZCZEPAŃSKA, M., KACPRZAK, E., FOX-KÄMPER, R. (2021): Between food growing and leisure: contemporary allotment gardeners in Western Germany and Poland. *DIE ERDE – Journal of the Geographical Society of Berlin*, 152(1): 33–50.
- MELL, I. C. (2008). Green infrastructure: concepts and planning. *FORUM Ejournal*, 8(1): 69–80.
- Milan urban food policy pact (2015): [online]. [cit. 20.12.2020]. Available at: <https://www.milanurbanfoodpolicypact.org/>
- Millennium Ecosystem Assessment (2005) [online]. [cit. 18.12.2020]. Available at: <https://www.millenniumassessment.org/en/index.html>
- Mitgliedsbuch Satzung Gartenordnung 2010 (2010): Stadtverband Dortmunder Gartenvereine e.V. [online]. [cit. 10.10.2019]. Available at: https://gartenvereine-dortmund.de/images/Satzung_Stadtverband-Stand_04-2013.pdf
- MOKRAS-GRABOWSKA, J. (2020): Allotment gardening in Poland—new practices and changes in recreational space. *Miscellanea Geographica*, 24(4): 245–252.
- MOSKALONEK, Ż., POŁOM, M., PUZDRAKIEWICZ, K. (2020): Changes in the Function of Allotment Gardens in an Attractive Location Based on the Example of Tri-City in Poland. *Land*, 9(11): 464.
- MORGAN, K. (2014): The new urban foodscape: planning, politics and power. In: Viljoen, A. et al. [eds.]: *Second nature urban agriculture: Designing productive cities* (pp. 18–23). Abingdon, Routledge.
- MOUGEOT, L. (2006): *Growing Better Cities: Urban Agriculture for Sustainable Development*. Ottawa, International Development Research Centre.
- MULNV – The Ministry for Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia (2009): *Zukunft*

- des Kleingartenwesens in Nordrhein-Westfalen. Forschungsbericht zur Kleingartensituation in Nordrhein-Westfalen [online]. [cit. 20.02.2021]. The Ministry for Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia website. Available at: <https://www.umwelt.nrw.de/fileadmin/redaktion/PDFs/landwirtschaft/Kleingartenstudie.pdf>
- NEWMAN, O. (1996): Creating Defensible Space. U.S. Department of Housing and Urban Development. Washington, Office of Policy Development and Research.
- OLDENGOTT, M. (2007): Kleingärten im Ruhrgebiet: Facetten – Trends – Tendenzen u. a. in Essen, Dortmund, Castrop-Rauxel. In: Kleingärten mit Zukunft – Lebenswerte Stadt. Dokumentation Kongress. Hamburg, Natur & Stadtgrün. Available at: <http://www.hamburg.de/contentblob/134998/data/dokumentation-kleingartenkongressdruckversion.pdf>
- ORZECZOWSKA-SZAJDA, I., PODOLSKA, A. (2013): Estetyka zagospodarowania ogrodów działkowych w Polsce i Niemczech – studium porównawcze dwóch ogrodów. In: Kosmala, M. [ed.]: Ogrody Działkowe a Miastach – Bariery Czy Wartość? (pp. 81–96). Toruń, PZITS.
- PAWLIKOWSKA-PIECHOTKA, A. (2010): Tradycja Ogrodów Działkowych w Polsce. Gdynia, Novae Res – Innowacyjne Wydawnictwo.
- PAWLIKOWSKA-PIECHOTKA, A. (2012): Active recreation space 'for all': family gardens in Poland. *Studies in Physical Culture & Tourism*, 18(4): 351–360.
- PONIŻY, L., STACHURA, K. (2017): Future of Allotment Gardens in the Context of City Spatial Policy – A Case Study of Poznań. *Quaestiones Geographicae*, 36(1): 121–127.
- PORT, C., MOOS M. (2014): Growing food in the suburbs: estimating the land potential for sub-urban agriculture in Waterloo, Ontario Planning Practice and Research, 29(2): 152–170.
- PZD – Polish Allotment Federation (2016): Open Program Social Development of the Allotment Gardens. Polish Allotment Federation website [online]. [cit. 12.03.2021]. Available at: http://pzd.pl/uploads/cgblog/id22850/Otwarty_program....pdf
- PZD – Polish Allotment Federation (2019): Open Program of Modern Development and Use Tailored to Needs of Modern Families. Polish Allotment Federation website [online]. [cit. 12.03.2021]. Available at: http://pzd.pl/uploads/cgblog/id22850/Otwarty_program....pdf
- PZD – Polish Allotment Federation in Poznań (2019): Nasze ogrody [online]. [cit. 07.09.2019]. Available at: <http://www.poznan.pzd.pl/ogrody.php?body=page&name=ogrody>
- Regulamin rodzinnego ogrodu działkowego (2015): Warszawa, PZD [online]. [cit. 07.09.2019]. Available at: [http://pzd.pl/uploads/1aga/Regulamin%20ROD%20\(uchwalony%202015\)%20...pdf](http://pzd.pl/uploads/1aga/Regulamin%20ROD%20(uchwalony%202015)%20...pdf)
- ROMANOWSKI, H. (2012): Uwagi o architekturze ogrodów działkowych. *Czasopismo Techniczne Architektura*, 109(6A): 277–282.
- ROSTKOWSKA, K. (2017): Ceny ogródków działkowych w ROD-ach szycją w górę [online]. [cit. 01.03.2021]. Available at: <https://www.bankier.pl/wiadomosc/Ceny-ogrodow-dzialkowych-w-ROD-ach-szybcją-w-gore-7509808.html>
- SCHEROMM, P. (2015): Motivations and practices of gardeners in urban collective gardens: The case of Montpellier. *Urban Forestry and Urban Greening*, 14(3): 735–742.
- SEIDMAN, I. (2013): Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences. New York, Teachers College Press.
- SEVILLE CITY COUNCIL (AYUNTAMIENTO DE SEVILLA) (2017): RUHS Red de huertos urbanos de la ciudad de Sevilla. Bases y estrategias para la creación de la red de huertos urbanos en Sevilla [online]. [cit. 10.10.2020]. Available at: <https://www.urbanismosevilla.org/areas/planeamiento-desa-urb/huertos-urbanos-de-Sevilla>
- SIMON-ROJO, M., RECASENS, X., CALLAU, S., DUŽÍ, B., EITER, S., HERNANDEZ-JIMENEZ, V., LAVISCIO, R., LOHRBERG, F., PICKARD, D., SCAZZOSI, L., VEJRE, H. (2016): From urban Food Gardening to Urban Farming. In: Lohrberg, F. et al. [eds.]: *Urban Agriculture Europe* (pp. 24–31). Berlin, Jovis.
- SOVOVÁ, L. (2015): Self-provisioning, sustainability and environmental consciousness in Brno allotment gardens. *Sociální studia*, 12(3): 11–26.
- SOVOVÁ, L., KRYLOVÁ, R. (2019): The countryside in the city? Rural-urban dynamics in allotment gardens in Brno, Czech Republic. *Moravian Geographical Reports*, 27(2): 108–121.
- SPEAK, A. F., MIZGAJSKI, A., BORYSIK, J. (2015): Allotment gardens and parks: Provision of ecosystem services with an emphasis on biodiversity. *Urban Forestry & Urban Greening*, 14(4): 772–781.
- SPIPKOVÁ, J., VÁGNER, J. (2016): The loss of land devoted to allotment gardening: The context of the contrasting pressures of urban planning, public and private interests in Prague, Czechia. *Land Use Policy*, 52: 232–239.
- SPIPKOVÁ, J., VÁGNER, J. (2018): Food gardens as important elements of urban agriculture: Spatio-developmental trends and future prospects for urban gardening in Czechia. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, 72(1): 1–12.
- SULIMA, R. (1990): Między rajem a śmietnikiem. *Ikonosfera warzywnych ogródków*. *Konteksty*, 4: 47–56.
- SZCZEPAŃSKA, M., KRZYŻANIAK, M., ŚWIERK, D., URBAŃSKI, P. (2016): Rodzinne ogrody działkowe jako element zielonej infrastruktury na terenie aglomeracji. *Studia Miejskie*, 22: 129–143.
- SZKUP, R. (2013): Użytkowanie Rodzinnych Ogrodów Działkowych (ROD) przez społeczność wielkomiejską: przykład Łodzi. *Łódź*, Wydawnictwo UŁ.
- SZKUP, R., PYTEL, S. (2016): Ogrody Działkowe (ROD) w przestrzeni dużego miasta. *Prace Komisji Krajobrazu Kulturowego*, 32: 109–124.
- TÓTH, A., DUŽÍ, B., VÁVRA, J., SUPUKA, J., BIHUŇOVÁ, M., HALÁJOVÁ, D., MARTINÁT S., NOVÁKOVÁ, E. (2018): Changing Patterns of Allotment Gardening in the Czech Republic and Slovakia. *Nature and Culture*, 13(1): 161–188.
- TREMBECKA, A., KWARTNIK-PRUC, A. (2018): An Analysis of the Changes in the Structure of Allotment Gardens in Poland and of the Process of Regulating Legal Status. *Sustainability*, 10(11): 3829.

- TREIJA, S., KOROLOVA, A., LATKOWSKA, M. (2016): Environmental Design Solutions to Promote Safety in Urban Gardens. In: Tappert, S. [ed.]: *Growing in cities. Interdisciplinary perspectives on urban gardening* (pp. 180–197). Conference proceedings. Basel, University of Applied Sciences.
- TSCHUPPIK, W.M. (2001): *Wege zur Architektur im Kleingarten; Strategien der Gestaltung baulicher Strukturen im Wiener Widmungsgebiet Eklw* (Doctoral dissertation). Wien, Technische Universität Wien.
- TZOULAS, K., KORPELA, K., VENN, S., YLIPELKONEN, V., KAŹMIERCZAK, A., NIEMELA, J., JAMES, P. (2007): Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. *Landscape and Urban Planning*, 81(3): 167–178.
- Ustawa o rodzinnych ogrodach działkowych z dnia 13 grudnia 2013 r. Dz. U. z 2017 r. poz. 2176 [online]. [cit. 17.09.2019]. Available at: <http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20140000040>
- VAN DEN BERG, A. E., VAN WINSUM-WESTRA, M., DE VRIES, S., VAN DILLEN, S. M. (2010): Allotment gardening and health: a comparative survey among allotment gardeners and their neighbors without an allotment. *Environmental Health*, 9(1): 74.
- Verfassung für das Land Nordrhein-Westfalen (1950): Artikel 29 [online]. [cit. 18.10.2019]. Available at: https://recht.nrw.de/lmi/owa/br_bes_detail?sg=0&menu=1&bes_id=3321&anw_nr=2&aufgehoben=N&det_id=426910
- VGRdL. (2019): Einwohner 1991–2018 [online]. [cit. 07.05.2020]. Available at: <https://www.statistik-bw.de/VGRdL/tbls/tab.jsp?rev=RV2014&tbl=tab20&lang=de-DE>
- VILJOEN, A., BOHN K. [eds.] (2014): *Second nature urban agriculture: Designing productive cities*. Abingdon, Routledge.
- WECKWERTH, H. (1999): *Znaczenie i korzyści ogrodów działkowych dla miasta i jego mieszkańców*. Wrocław, TARAGRA'99.
- WEIRICH, M. (2007): *Kleingärten in Europa: Überblick, in: Kleingärten mit Zukunft – Lebenswerte Stadt*. In: *Kleingärten mit Zukunft – Lebenswerte Stadt. Dokumentation Kongress*. Hamburg, Natur & Stadtgrün [online]. [cit. 07.05.2020]: Available at: <http://www.hamburg.de/contentblob/134998/data/dokumentation-kleingartenkongressdruckversion.pdf>
- YANG, F., IGNATIEVA, M., LARSSON, A., XIU, N., ZHANG, S. (2019): Historical development and practices of lawns in China. *Environment and History*, 25(1): 23–54.
- YEO, A., LEGARD, R., KEEGAN, J., WARD, K., MCNAUGHTON NICHOLLS C., LEWIS, J. (2013): *In-depth Interviews*. In: Ritchie, J. et al. [eds.]: *Qualitative Research Practice: A Guide for Social Science Students and Researcher* (pp. 177–208). London, Sage.
- YIN, R. K. (2009): *Case study research design and methods* (4th ed.). Applied Social Research Method Series, Vol. 5. Thousand Oaks, CA, Sage.
- ZAMMIT, A., ERJAVEC, I. Š., MAKSYMIOUK, G., THEOCHARI, D., FOX-KÄMPER, R., GOOD, R., SOMMARIVA, E. (2016): Allotment gardens as a challenge for an urban designer. In: Bell, S. et al. [eds.]: *Urban Allotment Gardens in Europe* (pp. 254–287). London/New York, Routledge.

Please cite this article as:

SZCZEPAŃSKA, M., KACPRZAK, E., MAĆKIEWICZ, B., PONIŹY, L. (2021): How are allotment gardens managed? A comparative study of usage and development in contemporary urban space in Germany and Poland. *Moravian Geographical Reports*, 29(3): 231–250. doi: <https://doi.org/10.2478/mgr-2021-0017>



Fig. 10: Former man-made pond near the village of Šebestěnice (Czech Republic). The pond was part of a cascade of eight fishponds to the turn of the 18th century when six ponds were drained and turned to the meadows and fields. Part of a former pond dam still exists, covered by woody vegetation on the left (Photo: J. Frajer, 2012)



Fig. 11: Newly restored man-made pond for water retention in the landscape. It was built on the location of the drained historical pond in Šebestěnice (Czech Republic) (Photo: J. Frajer, 2021)



Fig. 7: Divided suburbia? Mixed everyday practices in neighbouring old and new housing areas in Ahronomichne (suburb of Vinnytsia, Ukraine) (Photo: O. Gnatiuk)



Fig. 8: Old part of Ahronomichne: everyday housing practices (Photo: O. Gnatiuk)