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Between food growing and leisure: contemporary allotment gardeners in Western Germany and Poland

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Abstract

Allotment gardens have existed in Europe for 170 years and have changed their functions over time. While the scholarly literature emphasizes the economic, social and ecological benefits of allotment gardens, little is known about today's allotment gardeners, especially in different geopolitical environments. This paper describes allotment gardeners' profiles based on empirical data obtained from surveys conducted in two countries with, on the one hand, a long tradition of allotment gardens and, on the other hand, a recent history of belonging to two different geopolitical regions: Poland and West Germany. Inspired by the cultural-geographical approach that acknowledges that the gardening practice is influenced by culture and based on the method of non-hierarchical "k-means" clustering, this paper identifies characteristics of today's allotment gardeners from the region of Westphalia-Lippe in Germany and of Wielkopolska in Poland. Significant differences in profiles were factored together in the statistical analysis based on garden practices and the meanings attributed to these practices as reported by the gardeners in the survey. As a result, German gardeners can be described first and foremost as urban farmers and ecologists, while Polish allotmenteers seem to prefer using their gardens for leisure (as well as a holiday retreat) and for ornamental purposes. Results can inform municipalities, stakeholders and garden organizations who are interested in adjusting existing allotment garden areas to meet future needs. However, in both countries the community of gardeners cannot be conclusively defined, as it is subject to further development, triggered by a generational change in many allotment gardens. For instance, in the context of the recent COVID-19 crisis, a significant increase in demand for allotment plots has been reported in both countries, which again confirms their role in times of crisis.

Zusammenfassung

Kleingärten existieren in Europa seit 170 Jahren und haben ihre Funktionen im Laufe der Zeit verändert. Während die wissenschaftliche Literatur die wirtschaftlichen, sozialen und ökologischen Vorteile von Kleingärten betont, ist wenig über die heutigen Kleingärtner-/innen bekannt, insbesondere in unterschiedlichen geopolitischen Umgebungen. Dieser Beitrag beschreibt das Profil der Kleingärtner/-innen auf der Grundlage empirischer Daten, die aus Umfragen in zwei Ländern gewonnen wurden, die einerseits eine lange Kleingartentradition und andererseits eine jüngere Geschichte der Zugehörigkeit zu zwei unterschiedlichen geopolitischen Regionen aufweisen: Polen und Westdeutschland. Inspiriert durch einen kulturgeographischen Ansatz, der anerkennt, dass

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die gärtnerische Praxis von der Kultur beeinflusst wird, und basierend auf der Methode des nicht-hierarchischen „k-means"-Clusterns, identifiziert der Beitrag Charakteristika der heutigen Kleingärtner/-innen aus der Region Westfalen-Lippe in Deutschland und Wielkopolska in Polen. Signifikante Unterschiede in den Profilen wurden in der statistischen Analyse auf der Basis von Gartenpraktiken und den diesen Praktiken zugeschriebenen Bedeutungen, wie sie von den Gärtner/-innen in der Umfrage berichtet wurden, zusammengefügt. Als Ergebnis können die deutschen Gärtner/-innen in erster Linie als urbane Landwirt/-innen und Ökolog/-innen beschrieben werden, während die polnischen Kleingärtner/-innen ihre Gärten eher für die Freizeit (sowie als Urlaubsort) und zur Zierde zu nutzen scheinen. Die Ergebnisse können Kommunen, Interessenvertretungen und Gartenorganisationen informieren, die daran interessiert sind, bestehende Kleingartenanlagen an zukünftige Bedürfnisse anzupassen. In beiden Ländern kann die Gemeinschaft der Kleingärtner/-innen jedoch nicht abschließend definiert werden, da sie einer stetigen Weiterentwicklung unterliegt, ausgelöst durch einen Generationswechsel in vielen Kleingärten. So wurde z. B. im Zusammenhang mit der jüngsten COVID-19-Krise in beiden Ländern ein signifikanter Anstieg der Nachfrage nach Kleingartenparzellen festgestellt, was wiederum ihre Rolle in Krisenzeiten bestätigt.

Keywords urban greening, allotment gardens, plot holders, allotment gardener's profile, Westphalia-Lippe, Wielkopolska

1. Introduction

Allotment gardens have existed in Europe for 170 years and have changed their functions over time. Founded for economic reasons during the industrialization era, allotment gardens proved their economic value during times of food crisis, such as World War I and World War II, while this function decreased, especially in Western countries, after World War II with well-stocked supermarkets (*Poole* 2006; *McKay* 2011; *Keshavarz* and *Bell* 2016). The literature on allotment gardening focuses predominantly on the historical aspects of such gardens, their origins and traditions (*Keshavarz* and *Bell* 2016; *Crouch* and *Ward* 1988; *Nilsen* 2014; *Poole* 2006), or their role in times of crisis and food insecurity (*Holmer* and *Drescher* 2005; *Barthel* and *Isendahl* 2013; *Espinosa Seguí* et al. 2017; *Calvet-Mir* and *March* 2019). Other publications have analysed the distribution and development of allotment gardens and their influence on the landscape (*Bonny* 2010; *Giedych* and *Latkowska* 2015; *Szczepańska* 2017), while some have described their functions in the urban space (*Costa* et al. 2016; *Spilková* and *Vágner* 2016; *Poniży* and *Stachura* 2017). Furthermore, numerous scholarly works have discussed allotment gardens' importance for the natural environment (*Breuste* 2010; *Speak* et al. 2015; *Klepacki* and *Kujawska* 2018) and the benefits, including those related to health and well-being, deriving from their use (*Hawkins* et al. 2013; *Fox-Kämper* 2015; *Genter* et al. 2015; *Soga* et al. 2017). Publications describing the functions of allotment gardens from local perspectives are crucial (*Sidblad* 2000; *Guanzon* and *Holmer* 2003). The social benefits of urban gardening have been widely acknowledged (*Armstrong* 2000; *Guitart* et al. 2012), as gardens provide space for community building and social interactions.

While the scholarly literature emphasizes the economic, social and ecological benefits of allotment gardens, little is known about today's allotment gardeners, especially in different geopolitical environments. The literature to date has focused on issues such as demographic characteristics (*Buckingham* 2005; *Langemeyer* et al. 2018), the motivation for owning a garden plot (*Acton* 2011; *da Silva* et al. 2016), economic dimensions (e.g., *Camps-Calvet* et al. 2016) and the environmental behaviours of garden users (e.g., *Voigt* et al. 2015) in the Global North or Global South. Studies that have compared the impact of two political systems during the East-West divide in Europe on gardening practices or analysed the impact of the collapse of the Eastern European communist regimes in the early 1990s are scarce. *Sovová* and *Veen* (2020) examined self-provisioning for allotment gardens in Czechia and the Netherlands and concluded that a more systematic comparison is required for studies from Central and East Europe and Western Europe. Nevertheless, little is known about the characteristics and attitudes of allotment garden users. Comprehensive publications that describe allotment gardeners, especially from international and comparative perspectives, are scarce (*da Silva* et al. 2016). However, the profile of the allotment gardener is known to be

changing – these are no longer just food producers (*Allaert* et al. 2007; *van den Berg* et al. 2010; *Ferres* and *Townshend* 2012).

This paper aims to contribute to closing this research gap. Its research objective is to describe allotment gardeners' profiles based on empirical data obtained from surveys conducted in two countries with, on the one hand, a long tradition of allotment gardens and, on the other hand, a recent history of belonging to two different geopolitical regions: Poland and West Germany. Differences and similarities are compared in light of earlier research on allotment gardener profiles (e.g., *Barthel* et al. 2010; *Kettle* 2014; *Langemeyer* et al. 2018). Germany (DE) and Poland (PL) are regarded as pioneers in allotment gardening, including both its spatial and legal aspects. The 19th century's intensive industrialization saw the emergence of allotment gardens, which since then have constituted an integral part of urban areas in these countries (*Crouch* and *Ward* 1988; *Bellows* 2004; *Keshavarz* and *Bell* 2016). However, despite these common beginnings and initially similar approaches to the development of allotment gardening, which has led to "rather similar practices" (*Sovová* and *Veen* 2020: 15), modern-day allotment gardens in Germany and Poland seem to differ.

2. Theoretical approach and historical overview of the allotment garden movement

This research was inspired by the cultural-geographical approach that acknowledges that gardening practices are influenced by culture. The practice theory of *Schatzki* and colleagues (*Schatzki* et al. 2001) describes the social world as a network of complexly interwoven practices and corresponding material arrangements; in other words, "humans build their cultural environments and organized space in ways that help declare their identities" (*Uwajeh* and *Ezennia* 2018: 81). It has been applied in several studies on social innovations to describe how practices emerge and change over time (e.g., *Seyfang* et al. 2010). To study changes in allotment gardeners' profiles over time and in different geopolitical environments, we examine the way in which people practice gardening, including the meanings that gardeners attribute to their practice, and include the historical environment of the garden in our analysis. The key research questions we want to answer are as follows: Which characteristics describe allotment gardeners in Poland and West Germany? Are they similar despite their geopolitical divide over the decades, or do they have different preferences?

Allotment gardens in Germany date back to 1814 (*Keshavarz* and *Bell* 2016). Between 1830 and 1840, "gardens for the poor" were founded in Cologne, Leipzig, Berlin, Frankfurt and Wrocław (*Weckwerth* 1999: 90), the latter belonging at that time to the Prussian Partition. Establishing a two-hectare *Schrebergarten* (allotment garden) in Leipzig in 1864 marked a turning point in the development of German allotment gardens. This was the first garden for use by all social classes for cultivation and outdoor recreational purposes. Following World War I, allotment garden areas spread all over German cities to provide food for the suffering population. In 1919, the first allotment garden law was passed, and the German Allotment Gardens Association was founded in 1921. Today, approximately 1.2 million such garden plots exist, totalling 50,000 hectares (*BBSR* 2019). Typical users are flat dwellers without private gardens. Therefore, allotment sites are found throughout cities and mostly close to densely populated residential areas (*BMVBS/BBR* 2008).

In Poland, there are approximately 0.9 million garden plots with a total area of almost 32,000 hectares (*GUS* 2018). The first allotment garden was established in 1824 in Koźmin Wielkopolski. However, because it did not trigger the development of further gardens, the first garden is assumed to have been set up in 1897 in Grudziądz (*Weckwerth* 1999; *Duś* 2014). Almost until the mid-20th century, allotment gardens developed in line with the German model. As in Germany, Poland's allotment gardens were not only allotted to blue-collar workers but were also used by clerks (*Ballesteros* et al. 1984). They were treated in a multipurpose manner, with the focus placed on fresh food access, education and recreation but also on promoting healthy lifestyles, physical activity and culture. In times of war and economic crisis, producing greater amounts of food became a priority (*Pawlikowska-Piechotka* 2010).

After World War II, allotment gardens in Poland and the eastern German states (German Democratic Republic/GDR) were part of the social objectives pursued by the socialist authorities, which treated them as a simple method for replenishing chronic shortages of food. Urban agriculture was included in official food programmes, and campaigns promoted the

growing of food in allotment and collective gardens (*Keshavarz* and *Bell* 2016). Most of these gardens were established under the auspices of workplaces, with blue-collar workers being the preferred users. In time, other social classes more easily gained access. The socioeconomic transformation following the fall of the Iron Curtain engendered considerable changes in allotment gardening, in the social functions they served and in the structure of their users in both countries. There was a decrease in the number of allotment gardens, a relocation of gardens situated in city centres and on the outskirts, and declining interest in having allotment gardens, combined with a surplus of gardens in regions with shrinking populations, a preference for recreational functions and the development of the accompanying infrastructure (*BMVBS* 2013; *Pawlikowska-Piechotka* 2010). Currently, however, allotment gardening is back in fashion, appreciated especially for how it improves quality of life in ageing urban societies (*Fox-Kämper* 2015) and for its positive impact on the urban natural system (*Giedych* and *Poniży* 2013). In Germany, allotment gardens also play a significant role in integrating migrants and act as catalysts for social processes (*BMVBS/BBR* 2008).

Legal regulations have influenced the development and function of allotment gardening. In Germany, the legal aspects of allotment gardens on the national level are regulated by an act passed in 1983 and amended in 2006 (*Bundeskleingartengesetz* 1983). According to this, protecting the environment, nature and landscape must be considered when using an allotment garden. The surface area of a garden plot should not exceed 400 m^2 and at least one third of its area should be devoted to edible crops; a simple garden house with a maximum surface area of 24 m^2 is allowed but is not to be used for overnight stays. Moreover, most existing allotment areas are protected through building law regulations. In accordance with the act, most allotment gardens are earmarked for non-commercial use and especially for cultivation and recreation.

In Poland, the basic legal act concerning allotment gardens on the national level was passed in 2013 (*Ustawa o rodzinnych ogrodach działkowych* 2013). In addition, some issues are regulated by the Polish Allotment Federation and by allotment garden rules. The act defines allotment gardens as public utility facilities for fulfilling the recreational and other social needs of local communities. This is achieved by granting public access to allotment gardens, which also enables the cultivation of garden crops for citizens' own needs and raises ecological standards in the gardens' immediate vicinity. A garden plot's surface area may not exceed 500 m^2; a garden house may be a hut covering a maximum plot area of 35 m^2, 5 metres high for huts with steep roofs and 4 metres for flat roofs.

The current legal acts concerning how allotment gardens function in the two countries do not exhibit considerable differences, although some are noticeable in their provisions stipulating the permissible surface areas of the plots and houses and in allowing or prohibiting weekend or overnight stays. Nonetheless, German law requires a functional division of plot gardens into farming, recreational and ornamental parts.

3. Case studies

In North-Rhine-Westphalia, over 1,600 allotment garden areas with nearly 120,000 plots cover an area of 5,500 hectares, of which 30-40% is publicly accessible (*BMVBS* 2013). Many gardens are open to schools and kindergartens, which run outdoor classes. Gardeners are organised into two regional federations, the Regional Federation Westphalia (*Landesverband Westfalen/LWL*) and Lippe (*Lippe der Kleingärtner e.V.*). The LWL, founded in 1921, is the largest organization in Germany's hobby gardening sector. As member of the Federal Union of German Garden Friends (*Bundesverband Deutscher Gartenfreunde e.V/BDG*), it comprises 32 regional/urban associations, which cover 750 local allotment garden areas. The LWL has 72,000 members, with 300,000 family members and gardeners' acquaintances using allotment gardens (*LWL* 2008).

The Poznań region forms a regional unit of the Polish Allotment Federation and functions as an association (Allotment Garden Association, Poznań Unit). This comprises Poznań and 16 districts in the Wielkopolska region. Within this area, 291 allotment garden areas are located in cities (243, including 85 in Poznań) and 48 in rural areas, for a total area of 2,509.5 hectares and 52,400 plots. The average plot area is 366 m^2. According to estimates, allotment gardens in this region are used by approximately 155,000 residents (*GUS* 2018).

The regions selected are valuable research areas, as they present representative environments in which allotment gardens developed during industrialization. From the very beginning, these regions were

crucial to the allotment gardening movement in both countries. The choice of these case studies is also motivated by the long-lasting, well-established cooperation between the allotment associations of the two regions dating back to 1987. Since then, the permanent relationship between German gardeners from the Westphalia-Lippe region and Polish gardeners from the Poznań region has enabled them to share their experiences in the functioning of allotment gardens in social, ecological and economic terms.

4. Methods

The study covered allotment gardens in Germany's Westphalia-Lippe region (42 allotment gardens out of 736, i.e., 5.7%) and the Wielkopolska region of Poland (32 allotment gardens out of 513, i.e., 6.2%). The selection of individual allotment gardens was random. The survey was conducted from June 2016 to September 2017. To achieve the formulated objective, both qualitative and quantitative methods were applied. First, based on the authors' own survey questionnaire (Polish- and German-language versions), data were collected concerning allotment gardens and the gardeners themselves. The survey comprised 33 items, including open and closed-ended and multiple-choice items. Participation was voluntary. However, some respondents failed to answer the following questions: 25 (species of plants grown) and 33 (forms of activities carried out); thus, these topics were excluded from further analysis. The questionnaires were distributed by the authors themselves or with the help of the allotment garden managers. In total, 780 paper-based questionnaires were distributed (440 in Westphalia-Lippe and 340 in Wielkopolska). The response rates were 112 (25.4%) and 121 (35.6%), respectively.

Based on the results of the survey, types of plot holders were distinguished using the non-hierarchical k-means clustering method (*Hartigan* 1975; *Hartigan* and *Wong* 1979; *Witten* and *Frank* 2000). The purpose was to detect clusters (types) with respect to the characteristics observed (treated as variables) and to assign plot holders to the different clusters. Generally, the algorithm takes into account a (desired or hypothesized) fixed number of clusters *k* and assigns observations to these clusters so that the means across clusters (for all variables) are as different from each other as possible. In our procedure, three clusters were assumed. Further, to eliminate differences in the observed variables among the adopted scales of their values, the mean values of the variables in the derived clusters were standardized according to the following principle: x_{c1}, x_{c2}, and x_{c3} denote the mean values of variable c, derived in the k-means procedure for three clusters, respectively. Then, for these three values, standardized values (u_{ci}) were calculated:

$$u_{ci} = \frac{x_{ci} - \bar{x}_c}{\bar{x}_{cmax}}, \quad (1)$$

where

$$c = 1, \ldots 22, and\ i = 1,2,3$$

$$\bar{x}_{cmax} = \max\{ x_{c1}, x_{c2}, x_{c3} \}$$

Standardized values u_{ci} describing the rescaled mean values of each variable allow for comparisons of the importance of the observed variable for each of the clusters distinguished. The differences among the three clusters are shown by their standard deviations. Arrangement of these standard deviations in descending order was used to identify the most influential variables in the above clustering process.

The next stage involved emailing a 15-item questionnaire to the managers of the allotment gardens selected for analysis. The key topics were the use of allotment gardens and how allotment user communities operate. The response rate was 9.5% (4 interviews) in Westphalia-Lippe and 15.6% (5 interviews) in Wielkopolska. The responses given were anonymized (e.g., *Manager PL 1-5* or *Manager DE 1-4*). Extensive primary information was collected during in-depth interviews with the presidents of the German Leisure Garden Federation Westphalia-Lippe (*Expert DE*) and the Polish Allotment Federation, Poznań (*Expert PL*). These face-to-face interviews lasted from 30 to 60 minutes.

Some materials, in particular photographs and graphic documentation, were obtained during study visits to both regions, and valuable information was also collected during interactions with allotment gardeners and exploratory walks. The analysis was also based on desk research comprising an analysis of legal acts and regulations on allotment gardens in both countries and of secondary materials obtained from the Federal Statistical Office, Polish Central Statistical Office, and organizations (both national and regional) directly concerned with how allotment gardens function.

5. Results

The survey results reveal differences in the age structure of garden allotment users in West Germany and Poland. In the regions surveyed, allotmenteers are older than the average inhabitant. As many as 84.3% of Polish respondents (44.7% from Wielkopolska) are over 50 years old, whereas for German gardeners, this group constitutes 68.2% (North Rhine-Westphalia 43.1%). In addition, Polish plot-holders are older than their German counterparts; the largest group is aged 51 to 65, constituting 50.4% of all respondents, while in Germany, the ratio is 39.1% (*Table 1*). The next significant group of allotment users are older people, i.e., 66 to 80 years. It should be noted that some respondents were even more advanced in age, but in both cases, these accounted for only a small proportion of the whole group surveyed. Interestingly, significant differences can be found for the younger age categories. In Germany, nearly one in three users surveyed was aged 25 to 50, while in Poland, the share was one in six.

The respondents differ in terms of their education level, professional life and occupation performed. Most allotment gardeners from Westphalia-Lippe and Wielkopolska have secondary or vocational education. Nevertheless, the number of Polish allotment gardeners with secondary education (*Table 1*) is greater than that in Germany, where over half of all allotment gar-

Characteristic	Germany n	Germany %	Poland n	Poland %
Age structure				
25–35	8	7.3	5	4.1
36–50	27	24.5	14	11.6
51–65	43	39.1	61	50.4
66–80	30	27.3	40	33.1
>80	2	1.8	1	0.8
	110	**100.0**	**121**	**100.0**
Education structure				
basic	6	5.5	2	1.7
vocational	56	51.4	29	24.2
secondary	34	31.2	67	55.8
higher	13	11.9	22	18.3
	109	**100.0**	**120**	**100.0**
Professional activity				
full-time	52	47.3	43	35.5
part time	8	7.3	3	2.5
pensioner	48	43.6	73	60.3
invalidity pensions	1	0.9	2	1.7
unemployed	1	0.9	0	0.0
maternity/parental leave	0	0.0	0	0.0
	110	**100.0**	**121**	**100.0**
Type of professional work				
blue-collar worker	36	36.0	27	33.3
office worker	28	28.0	31	38.3
employment in trade and services	24	24.0	8	9.9
specialist/freelancer	6	6.0	9	11.1
owner/director/manager	3	3.0	3	3.7
researcher	3	3.0	3	3.7
	100	**100.0**	**81**	**100.0**
Number of people in the household				
1	9	8.4	13	10.8
2	67	62.6	68	56.7
3	10	9.3	20	16.7
4	17	15.9	12	10.0
5	4	3.7	6	5.0
6	0	0.0	1	0.8
	107	**99.9**	**120**	**100.0**

Table 1
Features of allotment gardeners according to case study survey: socio-professional aspects. Source: own compilation on the basis of survey results

deners have vocational education. A total of 5.5% of German allotment gardeners have completed primary education (only 1.7% in Wielkopolska), and higher education is also completed less frequently.

The study demonstrates that the respondents vary considerably with regard to their professional life (*Table 1*). More than half of the German allotment gardeners are employed either full-time or part-time. Other allotment gardeners are retired or unemployed. In Poland, most allotment users are not economically active, including pensioners and people receiving disability pensions. Interestingly, hardly any of the allotment gardeners surveyed are jobless. The respondents also differ in terms of the jobs carried out. In Westphalia-Lippe, the largest group of respondents comprises blue-collar workers, with office employees and service providers also being significant groups. An allotment gardener in Wielkopolska is, in turn, most frequently an office employee or, slightly less frequently, a blue-collar worker only one out of ten respondents is employed in the rest of the services sector.

Furthermore, the survey shows that the largest group of allotment gardeners in Germany declared a monthly net income of between EUR 1,000 and 2,000 (47.8%), and in Poland between PLN 2,000 and 3,000 (49.5%), i.e., between EUR 452 and 678. However, comparing and assessing the financial situation of Polish and German allotment gardeners is difficult because the economic situations of the two countries are significantly different. In 2016, the average salary in Germany was EUR 3,600 and in Poland, it was PLN 4,100, i.e., EUR 927[1]. Earning between 1,000 and 2,000 EUR means that German gardeners earn between 27.7 and 55.5% of the German average, while 2,000 to 3,000 PLN means earning between 48.7% and 73.1% of the Polish average. In this sense, gardeners in Germany are poorer than those in Poland, which might explain why the economic dimensions are much more important for them.

In both regions, allotment gardener households typically consist of two people (*Table 1*). Large families (at least five members) are identified as not being very interested in having a garden plot; only 3.7% of German allotment gardens are used by such families, and in Poland, it is 5.8%. Larger households, with at least three members, make up only 28.9% of all households in Westphalia-Lippe and 32.5% in Wielkopolska. However, regardless of household size, in both regions, only two family members tend to be involved in working in the allotment gardens. Moreover, in Poland, allotment gardens are more often taken care of by only one person. The average duration of garden use also differs. On average, allotment gardeners in Westphalia-Lippe have used their garden plots for 17 years, with those in Wielkopolska doing so for 22 years. The longest garden plot use period was identified as 50 years in Germany and 63 years in Poland.

Regarding their place of residence, Polish allotment gardeners reside in city centres more often than German allotment gardeners (67.3% and 49.5%, respectively). In both cases, however, the majority (more than 85%) of allotment users reside in multiple-occupancy buildings (semi-detached house 7.3% DE, 5.8% PL, detached house 4.6% DE, 9.1% PL). This explains the need for a garden plot as an additional living area and as the equivalent of a home garden. For most respondents, the travel time between home and the allotment garden does not exceed 30 minutes. A total of 83.5% of allotment gardeners in Poland reach their gardens within this time. In Westphalia-Lippe, their proportion is 57.1%, whereas 42.9% estimated their travel time to be between 30 and 60 minutes. This reflects the fact that Polish allotment gardeners usually live closer to their plots, meaning that their journeys require less effort (*Table 2*). This is also confirmed by the preferred modes of travelling to allotment gardens. Although in both countries the most frequently chosen means of transport was the car, German allotment gardeners use cars twice as much as Polish gardeners. Furthermore, nearly 10% of German gardeners use suburban public transport, whereas for Polish gardeners, this option does not exist. German gardeners are significantly less keen on walking, cycling or using urban public transport, while allotment gardeners in Poland walk, cycle or use urban public transport.

The frequency of visits made by German and Polish gardeners to their allotment gardens is similar but differs in some respects. Gardeners visiting their allotments daily (33.9% DE, 29.7% PL) or several times a week (57.8% DE, 54.2% PL) formed the largest group in both Germany and Poland. This is due to many factors, such as working on the allotment, resting after a day's work or willingness to spend leisure time there. The survey demonstrates that few German allotment gardeners spend time in their gardens solely on the weekend (8.3%) and that none spend their holidays there. The situation is different in Poland, where allotment gardeners more frequently visit their allotment gardens on the weekend (approximately 12%) and are more willing to spend their holidays there (4.2%).

Characteristics	Germany n	Germany %	Poland n	Poland %
Key travelling method				
on foot	14	12.6	36	29.8
by bicycle	11	9.9	34	28.1
by scooter/motorcycle	1	0.9	0	0.0
car	72	64.9	39	32.2
urban public transport	2	1.8	12	9.9
suburban public transport	11	9.9	0	0.0
	111	**100.0**	**121**	**100.0**
Travelling time (hr)				
up to 0.5	64	57.1	101	83.5
between 0.5 and 1	48	42.9	19	15.7
between 1 and 1.5	0	0.0	1	0.8
between 1.5 and 2	0	0.0	0	0.0
more than 2	0	0.0	0	0.0
	112	**100.0**	**121**	**100.0**

Table 2
Travelling time and means of transport preferred by allotment gardeners. Source: own compilation on the basis of survey results

This analysis of functions demonstrates that allotment gardens are most frequently used for leisure and cultivation purposes (90.5% in Westphalia-Lippe and 81.8% in Wielkopolska). The second most common function declared by Polish allotment gardeners is solely for leisure purposes (16.5%). This recreation-only function of allotments is also the second most common function for German gardeners (6.7%). In turn, German allotment gardeners use their garden plots for the sole purpose of cultivation (2.9%) more frequently than their Polish counterparts (1.7%). They also regard their cultivated crops as organic more often than Polish gardeners (91.6% versus 71.4%) and, in contrast to their Polish counterparts, are more likely to maintain that their gardens improve biodiversity (86.6% vs. 58.9%).

The survey findings concerning biodiversity were confirmed in interviews. In German AGs, "as part of consultations with experts, actions are taken to promote biodiversity; it is taught and implemented in daily work" (*Expert DE*). "Biodiversity is applied, and group and individual trainings are organized" (*DE 4*). The regional association has a model statute with exemplary provisions for allotment gardens discussing some aspects concerning environmental protection and biodiversity (*DE 5*). In contrast, Polish legal acts currently in force impose no obligation on allotment gardeners related to managing their gardens. "Popularizing the idea of preserving biodiversity is the job of the association's instructor, and it takes place in the form of presentations and lectures" (*Expert PL*). The functional profile of allotment gardens and the crops cultivated are certainly affected by legal regulations on allotment garden activities. German allotment users mention the economic importance to their household budget of produce cultivated on allotment gardens more frequently (55.9%) than do Polish gardeners. Only 33.9% of Polish allotment gardeners state that they can reduce their expenses by cultivating crops in their gardens. This is because Polish gardeners are wealthier than German gardeners relative to their respective national average incomes.

The option of harvesting organic and fresh produce and the opportunity to spend leisure time are other crucial benefits in the eyes of German allotment users (58%). The potential for owning a garden plot to improve living conditions seems to be of significantly higher importance in Germany than in Poland (46.4% to 11.6%). In addition, German gardeners also highlight the therapeutic benefits (38.4%) of an allotment garden and the social integration (37.5%).

According to Polish allotment gardeners, spending leisure time in their gardens (71.1%) is as important as having a healthy and active lifestyle (76.9%). Almost 46% of these gardeners also regard the possibility of obtaining organic and fresh produce as a very important benefit of having a garden plot. Furthermore, respondents from Wielkopolska are twice as likely to perceive the opportunity for cheap holidays as another very significant benefit of their allotment garden (11.6% DE, 28.9% PL). One in three allotment gardeners in Poland believes that an improvement in living conditions is a benefit, albeit not one of great importance to them. In Germany, however, the same number regards compensating for the small size of an apartment to be only a marginal benefit of using an allotment garden.

The results of the surveys were used to distinguish the allotmenteer types using the k-means method. It is built on the assumption of a number of clusters in advance. Based on the research (due to the substantive knowledge, field research, and taking into account results of survey analysis), three types of allotment gardeners (clusters) were assumed. Initial attempts to distinguish a larger number of clusters resulted in an ambiguity of the classification, so that eventually three clusters consisting of n1 = 80, n2 = 74, and n3 = 77, respectively, were confirmed. The mean values of analysed characteristics of the three clusters obtained through the k-means procedure are presented in *Table 3*. This method distinguishes the groups that differ the most from each other, but also the groups that differ least within a given group. The table contains means of quantified values (expressed in numbers), calculated for each variable and cluster.

The result of the standardization process of the mean values obtained with the use of the k-means method after their arrangement (for the most important with respect to decreasing importance of analysed variables) is shown in *Table 4*. It contains (standardized) values U1, U2, and U3, calculated using the formula (1) presented in the methods section. SD means the standard deviation of values U1, U2 and U3, obtained for each of analysed characteristics. The smallest or the largest standardized values of averages for individual characteristics in the distinguished clusters are marked in bold, variables with a standard deviation above 0.05 are marked (in *Table 4*) in grey, underlining their leading role in the consideration of significance of analysed characteristics. The order of analysed features presented in *Table 4* (having explained above reasons) was also used in *Table 3* (to make the tables match).

Table 3 Statistical indicators of variables derived via k-means method Source: own compilation on the basis of survey results

Variable	Cluster 1 (n1=80)	Cluster 2 (n2=74)	Cluster 3 (n3=77)
	Mean values		
Benefits of having plot = improvement in living conditions	2.90	2.31	1.74
Benefits of having plot = compensating for small-sized apartment	4.56	4.46	2.03
Importance of plot crops in household budget	0.33	0.42	0.51
Benefits of having plot = combating stress	2.88	1.70	1.57
Benefits of having plot = opportunity to have cheap holiday	3.96	2.23	2.35
Plot = increase in biodiversity	0.44	0.53	0.61
Plot = participation in events organized in allotment garden	2.23	1.51	2.00
Benefits of having plot = acquisition and expansion of gardening knowledge	2.84	1.91	1.83
Plot = meetings with friends	2.15	1.65	1.90
Plot = sunbathing	3.60	2.74	2.53
Plot = reading/writing	3.94	2.80	2.91
Benefits of having plot = social integration	2.40	1.82	1.77
Plot = meetings with family	2.00	1.51	1.53
Plot = meetings with plot holder's neighbours	2.21	1.81	2.05
Share of recreational area in total plot area	2.33	2.43	1.97
Number of persons in plot holder's household	2.60	2.22	2.48
Organic cultivation on plot	0.68	0.80	0.77
Benefits of having plot = healthy and active lifestyle	1.28	1.12	1.18
Benefits of having plot = leisure time	1.55	1.34	1.31
Plot holder's occupational activity	1.53	1.35	1.49
Plot holder's education	2.70	2.85	2.61
Frequency of staying on plot in season	3.13	3.18	3.22

Table 4 Standardized values of the most important variables. Source: own compilation on the basis of survey results

Variable	Standardized values			Standard deviation
	U1	U2	U3	SD
Benefits of having plot = improvement in living conditions	0.20	**0.00**	0.20	0.11
Benefits of having plot = compensating for small-sized apartment	0.19	0.17	**0.36**	0.11
Importance of plot crops in household budget	0.18	**0.00**	0.18	0.10
Benefits of having plot = combating stress	**0.29**	0.12	0.17	0.09
Benefits of having plot = opportunity to have cheap holiday	**0.28**	0.16	0.13	0.08
Plot = increase in biodiversity	0.14	**0.00**	0.14	0.08
Plot = participation in events organized in allotment garden	0.14	**0.18**	0.04	0.07
Benefits of having plot = acquisition and expansion of gardening knowledge	**0.23**	0.10	0.13	0.07
Plot = meetings with friends	0.12	0.12	**0.00**	0.07
Plot = sunbathing	**0.18**	0.06	0.12	0.06
Plot = reading/writing	0.18	0.11	0.08	0.05
Benefits of having plot = social integration	0.17	0.07	0.10	0.05
Plot = meetings with family	0.16	0.08	0.07	0.05
Plot = meetings with plot holder's neighbours	0.08	0.10	0.01	0.05
Share of recreational area in total plot area	0.03	0.08	0.11	0.04
Number of persons in plot holder's household	0.06	0.08	0.02	0.03
Organic cultivation on plot	0.09	0.06	0.03	0.03
Benefits of having plot = healthy and active lifestyle	0.06	0.06	0.01	0.03
Benefits of having plot = leisure time	0.10	0.04	0.06	0.03
Plot holder's occupational activity	0.04	0.07	0.02	0.02
Plot holder's education	0.01	0.05	0.04	0.02
Frequency of staying on plot in season	0.02	0.00	0.01	0.01

Plot holders representing the first cluster treat their garden mainly as a place of leisure. Thus, they can be called leisure allotmenteers. They think that the greatest benefits stemming from owning a garden plot are improvements in living conditions, compensation for a small flat, stress management, and the possibility of having low-cost holidays. They treat their plot as a place where they can participate in various events organized within the allotment garden. Moreover, they believe that the plot gives them the opportunity to gain and extend horticultural knowledge. This is a place where they can meet with their friends, family and neighbours from the allotment garden – they appreciate the social integration. Spending time in the garden is a form of mainly passive leisure (sunbathing, reading). Food production on the plot is of little importance to them. Over 50% of its area is used for recreation, and the yields obtained are of little significance for their household budget. Among the types distinguished, leisure allotmenteers are those who apply organic cultivation methods and maintain that their plots improve biodiversity the least often.

On the other hand, plot holders from the third cluster can be called urban farmers. In contrast to leisure allotmenteers, they focus on food production. This is reflected in the smallest share of recreation area in the total area of the plot and the highest significance of the yields obtained for their household budget. Moreover, they believe that their plot contributes to an increase in biodiversity, and they cultivate food using mainly organic methods. Among the types distinguished, these are allotmenteers who, to the smallest extent, perceive their plot as a means to improve their living conditions, to compensate for a small flat, to manage stress or to integrate socially. For them, the possibility of spending their leisure time at the garden plot is not a major benefit of its use.

The second cluster comprises representatives of a mid-type. Some of its typical features are similar to those observed in the first cluster, e.g., compensation for a small-sized flat, and some correspond to those seen in the third cluster, e.g., the possibility of having low-cost holidays. Thus, plot holders representing this type display the features of both the food producer

and leisure allotmenteer. On the one hand, they cultivate plants using mainly organic methods, but on the other hand, they have the largest share of recreation area in the total area of their plot.

Some of the variables, including education, professional activity, number of people in the household, or the frequency of staying at the plot during the season, differed significantly between individual types of gardeners. The share of German and Polish allotment gardeners in these types varied greatly (*Fig. 1*). Half of the German gardeners studied were classified in the third cluster distinguished. The first cluster included over one fourth of German allotment garden users, and the second cluster included 23.6%. What was characteristic of Polish gardeners was their low share in the third cluster (only 18.2%) and considerably higher share in the first (42.1%) and second (39.7%) clusters than their German counterparts. In conclusion, German gardeners are mainly food producers, whereas in the community of Polish garden-plot holders leisure allotmenteers have the largest share.

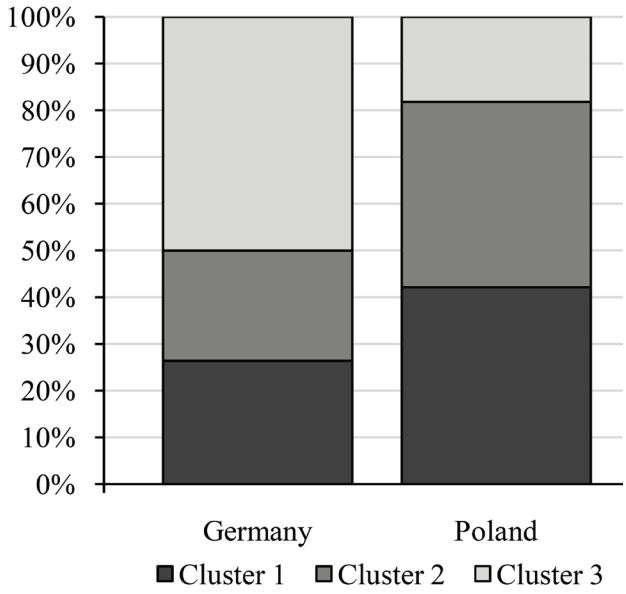

Fig. 1 *Share of German and Polish allotment gardeners in 2016. Source: own compilation on the basis of k-means method*

6. Discussion and findings

The results of the survey allowed us to identify the most important characteristics of plot users in Germany and Poland, and thus, a plot holder profile could be developed (*Fig. 2* and *Fig. 3*).

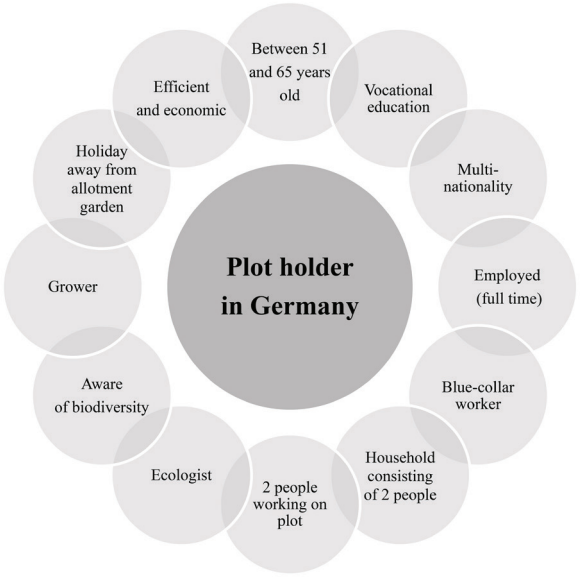

Fig. 2 *Profile of a plot holder in Germany. Source: own drawing*

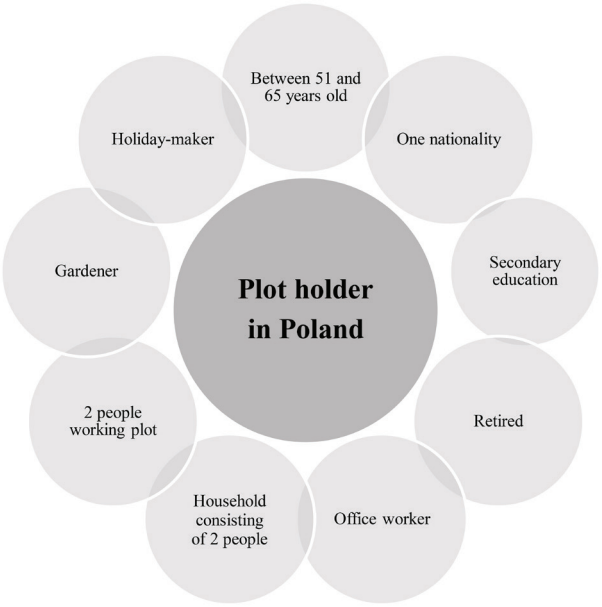

Fig. 3 *Profile of a plot holder in Poland. Source: own drawing*

In Westphalia-Lippe, plot holders are pre-retired or younger people. Relatively young plot users may indicate a generational change. Even up to the late 1990s, pensioners and retirees made up the majority of plot holders in Germany (*BMVBS/BBR* 2008). Additionally, the generational change is confirmed by the duration of plot use, which is on average 17 years. According to one *DE expert*, women's involvement in the Westphalia-Lippe plot-holder community is growing. In 2003 27%

of women took part in training for allotmenteers, but in 2017, it was 45%. This reflects the trend observed elsewhere, e.g., in Great Britain (*Ferres* and *Townshend* 2012; *Kettle* 2014). The gender structure of European plot holders is irregular. A Barcelona study revealed that females were underrepresented in gardening (*Langemeyer* et al. 2018), whereas in Stockholm, females were overrepresented in allotment gardening (*Barthel* et al. 2010). The average allotment gardener has vocational education, is a member of the working population and is employed full-time as a blue-collar worker. This image corresponds to the stereotypical perception of allotmenteers as being from lower socioeconomic groups (*Gaskell* 1980; *Crouch* and *Ward* 1988; *McClintock* 2010).

Multi-nationalism is a characteristic feature of the plot holders described. These observations are consistent with research conducted by the BDG, revealing that migrants make up approximately 7.5% of all gardeners in Germany. They represent 80 different nationalities, most often Russians, Poles, Turks, Serbs, Croats, Bosnians, Slovenians, Romanians, Kazakhs and Hungarians (*Drescher* 2001; *BMVBS/BBR* 2008). Consequently, allotment gardens are a meeting place for people of different heritages or ethnicities who share a common hobby that facilitates integration processes. By tending their gardens and participating in this community's life, gardeners find ways to work alongside each other and learn how to "live with their differences" (*Landesverband Westfalen und Lippe der Kleingärtner e.V.* 2008: n.p.). A similar situation was observed in other countries, e.g., among Dutch allotmenteers (*Allaert* et al. 2007; *van den Berg* et al. 2010).

A typical plot holder from Westphalia-Lippe lives in a multiple-occupancy building located on the outskirts of the city and travels to the allotment garden for no more than an hour, usually by car. These visits to the plot are integrated into their daily routine and are not a substitute for a holiday. The allotment garden is a substitute for the lack of a home garden and allows for the regular enjoyment of nature (*BMVBS/BBR* 2008; *Kettle* 2014; *da Silva* et al. 2016). Since the late 20th century two third of households with plots consist of two people (*BMVBS/BBR* 2008).

In addition, a German plot holder is environmentally aware and thrifty, which is reflected in using their garden for both leisure and cultivation purposes. In the literature, the pro-ecological attitudes of German allotmenteers were recognized much earlier, as "allotment gardeners consider nature conservation and environmental protection in allotment gardens to be very important. In particular, the use of rainwater and composting in one's own garden is a matter of course" (*BMVBS/BBR* 2008: 9). Using a plot for food production is not only due to good will on the part of an allotmenteer but is also a legal requirement (*Bundeskleingartengesetz* 1983).

In the perception of a German plot holder, the most significant benefits of having a plot are a healthy and active lifestyle and food safety and security. Therefore, allotment gardening is seen as a hobby with benefits (*Acton* 2011; *Breuste* and *Artmann* 2015; *Langemeyer* et al. 2016; *da Silva* et al. 2016). The use of a plot, the choice of crops grown there and their significance for the household budget determine the specific profile of a German allotmenteer – a grower, ecologist and efficient manager. A plot holder from Wielkopolska, in turn, is between 51 and 65 years old (or older). This is typical of allotment gardening in Poland, where over 60% of users are aged over 50 (*KRPZD* 2012). Both the age of allotmenteers and the mean duration of plot exploitation (22 years in Wielkopolska) show that the fashion for keeping a plot has yet to be observed in this region among forward-thinking, young urbanites looking for their own patch of nature. Nevertheless, according to the Polish Allotment Federation, there is increased interest in plots among urban-dwelling families with children (*PZD* 2014). Wielkopolska's allotment gardens have a relatively balanced gender distribution (male 53%; female 47%). An almost identical proportion was observed in Poland as a whole (*KRPZD* 2012) and in Portugal (*da Silva* et al. 2016).

Polish allotmenteers are retired individuals or office employees with a secondary education and do not fit the stereotype of plot holders as poorly educated people and manual workers (*Gaskell* 1980; *Crouch* and *Ward* 1988; *McClintock* 2010). Moreover, crops grown on plots are not treated as an opportunity to supplement the household budget, although the mean income declared by allotmenteers in Wielkopolska is lower than the national average. What is often emphasized in the literature is that for persons with limited purchasing power, the savings and food security derived from cultivating gardens are of primary importance (*Camps-Calvet* et al. 2016; *da Silva* et al. 2016). The Polish plot holder household consists of two people both working actively on the plot, which is used mainly for leisure. This trend was also observed by *Pawlikowska-Piechotka* (2010) and *Szkup* (2013).

Plot holders from Wielkopolska prefer growing ornamental plants and attach greater importance to the health and leisure values of allotment gardens. They also visit the plot on weekends and treat it as a holiday destination. In Poland, this way of spending holidays has been ironically dubbed a "RODOS holiday". This refers both to the popular Greek tourist destination and the official name for allotment gardens in Poland, i.e., *Rodzinne Ogrody Działkowe* (ROD). Here, the RODOS abbreviation means *Rodzinne Ogrody Działkowe Ogrodzone Siatką* (literally, Fenced-off Family Allotment Gardens), which alludes humorously, and derogatorily, to the 'false' attractiveness of such holidays. Plots are increasingly perceived as a place for leisure and an escape from mundane urban reality (*Szkup* 2013). This is due to the typical Polish allotmenteer living in a multiple-occupancy building in the city centre with an allotment garden located less than 30 minutes away on foot.

Polish plot holders consider environmental issues (including biodiversity) to be important but tend to focus on the decorative aspects of their plots. This is related to the lack of guidelines on maintaining biodiversity, applying environmentally friendly solutions or participating in garden training (*Ustawa o rodzinnych ogrodach działkowych* 2013). The importance of decoration is strengthened by numerous competitions for the "most beautiful plot" (*Worytkiewicz* 2012: 133).

Overall, a Polish plot user's profile is that of a gardener who focuses on leisure and uses their allotment garden as a holiday destination. The types of allotment gardeners identified are in line with current trends in allotment gardening approaches (see, e.g., *Breuste* and *Artmann* 2015; *Keshavarz* and *Bell* 2016). In Germany, more affluent people have been able to afford a house with a private garden for decades, while allotments are typically for people living in flats. In the 1970s, when a household could cheaply buy all its vegetables in supermarkets, allotment gardens were regarded as something outdated, and there was no need to cultivate them anymore. However, since the ecological movement emerged in the 1980s, awareness of the sustainability of the environment has increased, and people are becoming increasingly interested in knowing where their food comes from. This has changed allotment gardens, and the people renting them, as they want to contribute to the sustainability of their environment and grow their own food. In Poland, this trend is still not clearly visible; hence, the majority of plot holders are engaged in recreation (see, e.g., *Bellows* 2004; *Duś* 2014; *Pawlikowska-Piechotka* 2010).

In this context, the profiles of a German and Polish plot holder could be related to *Kettle's* typological continuum. An analysis conducted by *Kettle* (2014) on the motivation for engaging in allotment gardening in Dublin distinguished five types of plot holders: 1) practical gardener (21%), 2) idealist/ecowarrior (14%), 3) socio-organic gardener (51%), 4) Gucci gardener (8%), and 5) non-gardening gardener (6%). This categorization suggests that an urban gardener can be located along a continuum (ranging from being primarily concerned with food to being primarily concerned with social needs).

The results obtained permit the conclusion that German and Polish allotmenteers both partly belong to the Socio-Organic Gardener type, which was most common among Dublin plot holders (*Fig. 4*). However, German plot holders are more interested in plot cultivation and organic food production (i.e., Kettle's idealist/ecowarrior and practical gardener), whereas Polish allotmenteers are more often focused on recreation and decoration (i.e., Kettle's Gucci gardener and non-gardening gardener). Among the many aforementioned reasons explaining these differences, legal aspects may play a significant role, as in Germany, the cultivation of 1/3 of the plot is imposed by law (*Kacprzak* et al. 2020).

This study has some limitations, as the research concerns only two regions, one in West Germany and one in Poland. From the very beginning, these regions were a model example of the allotment gardening movement in both countries. However, because of the long-term political division of Germany, the results of our research cannot be applied to the whole of Germany but only to its western part. In addition, some data, i.e., exact incomes and gender, were difficult to obtain using the questionnaire: respondents were unwilling to provide information about their income. It was also not possible to clearly identify the gender of formal plot users. Answers were usually provided by one person, although in many cases, the plot leasing agreement concerned couples. Thus, in those two cases, the information obtained might not represent the actual state of affairs. Undoubtedly, such data would enrich the plot holder characteristics formulated in this study.

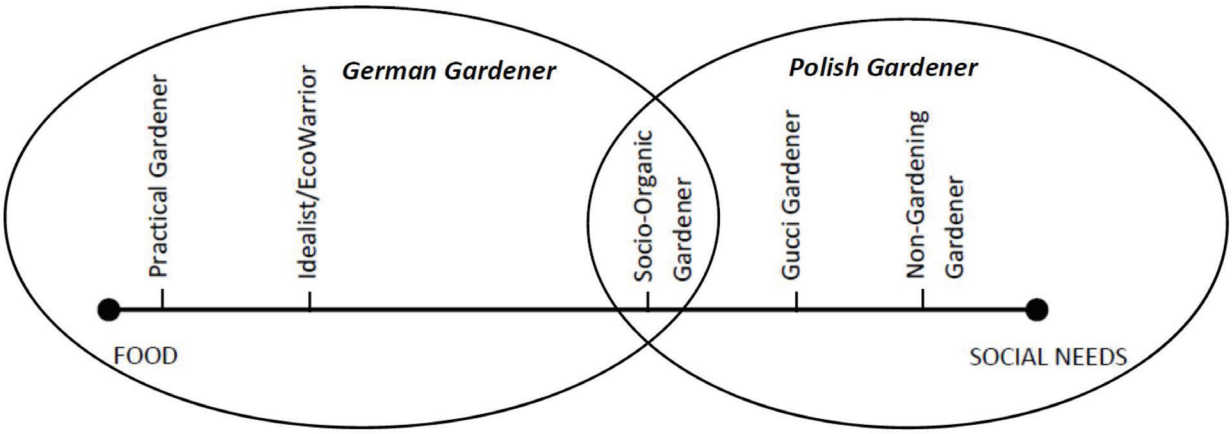

Fig. 4 Profiles of a German and Polish plot holder related to the typological continuum. Source: own study on the basis of Kettle (2014)

7. Conclusions

This comparative study of the Wielkopolska and Westphalia-Lippe regions sheds light on the existing differences and similarities between plot holders across countries and cultural backgrounds. Despite common origins and goals, such as improving living and sanitary standards, contemporary West German and Polish allotment gardeners have different ways of using and enjoying their gardens. Formal, organizational, economic and sociocultural conditions have contributed to the increasing differentiation between the two garden user communities. Accordingly, despite some similarities, the types of allotmenteers are disparate in both countries.

Summarizing the characteristics of both groups of plot holders, one can conclude that the German gardener is first and foremost an urban farmer and ecologist. In contrast, the Polish allotmenteer is a gardener who uses their garden for leisure (as well as a holiday retreat) and ornamental purposes. In both cases, allotmenteers treat their plot as a hobby with benefits, but these benefits are understood differently. While after World War II, economic recovery enabled many Germans to move up the social ladder and purchase their own homes with private gardens and spend leisure time there, the socialist view of life emphasized communal ownership, living in flats and kept alive the desire for a piece of land to grow food and spend leisure time on your own. These sociocultural backgrounds seem to continue to influence the motivations of German and Polish allotment gardeners today, with Polish gardeners preferring leisure and holiday activities in their gardens once fresh and affordable vegetables became available ubiquitously. In contrast, Germans who decide to rent an allotment plot seem to be more interested in growing their own food than in using the garden for leisure time. Perhaps due to the long-lasting environmental movement in Germany, they are also motivated by a wish for a sustainable lifestyle.

These significant differences in profiles as factored together in the statistical analysis are based on garden practices and the meanings attributed to these practices as reported by the gardeners in the survey. Future research could contribute to verifying these self-estimations by assessing quantitative data about the role of food production and sustainable garden practices such as resource use and hours spent actively gardening or as leisure time. Additionally, future research on the role of gender in allotment gardens could support an exploration of the reasons behind the results found.

It seems that present-day allotment gardens in Germany and Poland are undergoing a significant transition due to a generational change that is more advanced in Germany. The community of gardeners is neither conclusively depicted nor shaped: it will continue to evolve together with socioeconomic transformations. For instance, in the context of the recent COVID-19 crisis, a significant increase in demand for allotment plots has been reported in both countries, which again confirms their role in times of crisis. The long-

term impact of the pandemic on changes in allotment gardener profiles may be worthy of future research. This could inform municipalities, stakeholders and garden organizations who are interested in adjusting existing allotment garden areas to meet future needs. The future of allotment gardens largely hinges on the profile and attitudes of their users. It seems that only if allotment gardens provide all ecosystem services and enable social cohesion will the legitimacy of their further existence be beyond the slightest doubt.

Notes

[1]According to the average 2016 exchange rate of EUR 1 = PLN 4.424.

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References

Acton, L. 2011: Allotment gardens: A reflection of history, heritage, community and self. – Papers from the Institute of Archaeology **21**: 46-58, doi:10.5334/pia.379

Allaert, G., H. Leinfelder and *D. Verhoestraete* (eds.) 2007: Description of allotment sites in Flanders from a sociological and spatial perspective. – Brussels

Armstrong, D. 2000: A survey of community gardens in upstate New York: Implications for health promotion and community development. – Health & Place **6** (4): 319-327, doi:10.1016/s1353-8292(00)00013-7

Ballesteros, G., E. Domingo, F. González, B. Berlín, A. Baigorri and *M. Gaviria* (eds.) 1984: Agricultura periurbana. – Madrid

Barthel, S., C. Folke and *J. Colding* 2010: Social-ecological memory in urban gardens. Retaining the capacity for management of ecosystem services. – Global Environmental Change **20** (2): 255-265, doi:10.1016/j.gloenvcha.2010.01.001

Barthel, S. and *C. Isendahl* 2013: Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. – Ecological Economics **86**: 224-234, doi:10.1016/j.ecolecon.2012.06.018

Bellows, A.C. 2004: One hundred years of allotment gardens in Poland. – Food & Foodways **12** (4): 247-276, doi:10.1080/07409710490893793

BBSR (Bundesinstitut für Bau-, Stadt- und Raumforschung) 2019: Kleingärten im Wandel. Innovationen für verdichtete Räume. – Online available at: https://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2019/kleingaerten-im-wandel-dl.pdf?__blob=publicationFile&v=2, accessed 5/9/2019

BMVBS (Bundesministeriums für Verkehr, Bau und Stadtentwicklung) 2013: Bewältigung der Leerstandsproblematik in Kleingartenanlagen in strukturschwachen Regionen. – Online available at: https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/ministerien/bmvbs/forschungen/2013/Heft158.html, accessed 15/9/2019

BMVBS/BBR (Bundesministeriums für Verkehr, Bau und Stadtentwicklung/Bundesamt für Bauwesen und Raumordnung) 2008: Städtebauliche, ökologische und soziale Bedeutung des Kleingartenwesens. – Online available at: https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/ministerien/bmvbs/forschungen/2008/Heft133.html, accessed 4/11/2019

Bonny, E. 2010: The landscape and culture of allotments: a study in Hornchurch, Essex. – Nottingham

Breuste, J. 2010: Allotment gardens as part of urban green infrastructure: actual trends and perspectives in Central Europe. – In: *Müller N., P. Werner* and *J. G. Kelcey* (eds.): Urban Biodiversity and Design. – Oxford: 463-475

Breuste, J.H. and *M. Artmann* 2015: Allotment gardens contribute to urban ecosystem service: case study Salzburg, Austria. – Journal of Urban Planning and Development **141** (3): A5014005, doi:10.1061/(ASCE)UP.1943-5444.0000264

Buckingham, S. 2005: Women (re) construct the plot: the regen(d)eration of urban food growing. – Area **37** (2):

171-179, doi:10.1111/j.1475-4762.2005.00619.x

Bundeskleingartengesetz vom 28. Februar 1983 (BGBl. I S.210), zuletzt geändert durch Artikel 11 des Gesetzes vom 19.9.2006, (BGBl. I S.2146)

Calvet-Mir, L. and *H. March* 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, doi:10.1177/0969776417736098

Camps-Calvet, M., J. Langemeyer, L. Calvet-Mir and *E. Gómez-Baggethun* 2016: Ecosystem services provided by urban gardens in Barcelona, Spain: Insights for policy and planning. – Environmental Science & Policy **62**: 14-23, doi:10.1016/j.envsci.2016.01.007

Costa, S., R. Fox-Kämper, R. Good and *I. Sentić* 2016: The position of urban allotment gardens within the urban fabric. – In: *Bell S., R. Fox-Kämper, N. Keshavarz, M. Benson, S. Caputo, S. Noori* and *A. Voigt* (eds.): Urban allotment gardens in Europe. – London/New York: 223-250

Crouch, D. and *C. Ward* 1988: The allotment: its landscape and culture. – London

da Silva, I.M., C.O. Fernandes, B. Castiglione and *L. Costa* 2016: Characteristics and motivations of potential users of urban allotment gardens: The case of Vila Nova de Gaia municipal network of urban allotment gardens. – Urban forestry & urban greening **20**: 56-64, doi:10.1016/j.ufug.2016.07.014

Drescher, A.W. 2001: The German allotment gardens-a model for poverty alleviation and food security in Southern African Cities. – Online available at: https://www.cityfarmer.org/germanAllot.html, accessed 22/9/2019

Duś, E. 2014: Recreational use and health functions of allotments gardens in the Katowice conurbation, Poland. – Environmental & Socio-economic Studies **2** (2): 16-25, doi:10.1515/environ-2015-0034

Espinosa Seguí, A., B. Maćkiewicz and *M. Rosol* 2017: From Leisure to Necessity: Urban Allotments in Alicante Province, Spain, in Times of Crisis. – ACME: An International Journal for Critical Geographies **16** (2): 276-304

Ferres, M. and *T.G. Townshend* 2012: The social, health and wellbeing benefits of allotments: Five societies in Newcastle. Global Urban Research Unit. Electronic Working Paper 47. – Online available at: https://www.ncl.ac.uk/media/wwwnclacuk/globalurbanresearchunit/files/electronicworkingpapers/ewp47.pdf, accessed 2/10/2019

Fox-Kämper, R. 2015: The Role of Urban Gardening for European's Ageing Societies. In: *REAL CORP (Competence Center of Urban and Regional Planning)*: Plan Together – Right Now – Overall. From Vision to Reality for Vibrant Cities and Regions. Proceedings of 20th International Conference on Urban Planning, Regional Development and Information Society. CORP – Competence Center of Urban and Regional Planning. – Ghent: 599-607

Gaskell, M. 1980: Gardens for the working class: Victorian practical pleasure. – Victorian Studies **23** (4): 479-501

Genter, C., A. Roberts, J. Richardson and *M. Sheaff* 2015: The contribution of allotment gardening to health and wellbeing: a systematic review of the literature. – British Journal of Occupational Therapy **78** (10): 593-605, doi:10.1177/0308022615599408

Giedych, R. and *L. Poniży* 2013: Ogrody działkowe jako przedmiot polityki przestrzennej i ekologicznej miast na przykładzie Warszawy i Poznania. – Przegląd komunalny **8**: 48-53

Giedych, R. and *M. Latkowska* 2015. Miejskie ogrody działkowe – przedmiot polskich badań naukowych w odniesieniu do programu COST TU 1201. – In: *Gawryszewska, B.* (ed.): Ogród za oknem. Przyszłość ogrodów działkowych w miastach. – Warsaw: 71-88

Guanzon, Y.B. and *R.J. Holmer* 2003: Basic cultural management practices for vegetable production in urban areas of the Philippines. – Urban Agriculture Magazine **10**: 14-15

Guitart, D., C. Pickering and *J. Byrne* 2012: Past results and future directions in urban community gardens research. – Urban Forestry and Urban Greening **11** (4): 364-373, doi:10.1016/j.ufug.2012.06.007

GUS (Główny Urząd Statystyczny, Statistics Poland) 2018: Ochrona środowiska. – Warszawa

Hartigan, J.A. 1975: Clustering algorithms. – New York

Hartigan, J.A. and *M.A. Wong* 1979: Algorithm AS 136: A k-means clustering algorithm. – Journal of the Royal Statistical Society. Series c (Applied Statistics) **28** (1): 100-108, doi:10.2307/234683

Hawkins, J.L., J. Mercer, K.J. Thirlaway and *D.A. Clayton* 2013: "Doing" gardening and "being" at the allotment site: exploring the benefits of allotment gardening for stress reduction and healthy aging. – Ecopsychology **5** (2): 110-125, doi:10.1089/eco.2012.0084

Holmer, R.J. and *A.W. Drescher* 2005: Building food secure neighbourhoods: The role of allotment gardens. – Urban Agriculture Magazine **15**: 19-20

Kacprzak, E., B. Maćkiewicz, M. Szczepańska 2020: Legal regulations and the development of German and Polish allotment gardens in the context of the production function. – Ruch Prawniczy, Ekonomiczny i Socjologiczny **82** (3): 197-215, doi:10.14746/rpeis.2020.82.3.14

Keshavarz, N. and *S. Bell* 2016: A history of urban gardens in Europe. – In: *Bell S., R. Fox-Kämper, N. Keshavarz, M. Benson, S. Caputo, S. Noori* and *A. Voigt* (eds.): Urban allotment gardens in Europe. – London, New York: 8-32

Kettle, P. 2014: Motivations for investing in allotment gardening in Dublin: a sociological analysis. – Irish Journal of Sociology **22** (2): 30-63, doi:10.7227/IJS.22.2.3

Klepacki, P. and *M. Kujawska* 2018: Urban Allotment Gar-

dens in Poland: Implications for Botanical and Landscape Diversity. – Journal of Ethnobiology **38** (1): 123-137, doi:10.2993/0278-0771-38.1.123

Krasny, M.E., P. Silva, C. Barr, Z. Golshani, E. Lee, R. Ligas, E. Mosher and *A. Reynosa* 2015: Civic ecology practices: insights from practice theory. – Ecology and Society **20** (2): 12, doi:10.5751/ES-07345-200212

KRPZD (Krajowa Rada Polskiego Związku Działkowców) 2012: Kim są polscy działkowcy? – Warszawa

Langemeyer, J., M. Camps-Calvet, L. Calvet-Mir, S. Barthel and *E. Gómez-Baggethun* 2018: Stewardship of urban ecosystem services: understanding the value (s) of urban gardens in Barcelona. – Landscape and Urban Planning **170**: 79-89, doi:10.1016/j.landurbplan.2017.09.013

Langemeyer, J., M.J. Latkowska and *E. Gómez-Baggethun* 2016: Ecosystem services from urban gardens. – In: *Bell S., R. Fox-Kämper, N. Keshavarz, M. Benson, S. Caputo, S. Noori* and *A. Voigt* (eds.): Urban allotment gardens in Europe. – London, New York: 115-141

LWL (Landesverband Westfalen und Lippe der Kleingärtner e.V.) 2008: Bunter als gedacht: Kleingärten als Orte für Bürgerengagement und Integration: Mitgliederversammlung. LWL. – Online available at: https://www.kleingarten.de/downloads/4/geschaeftsbericht-2008.pdf?1463991301, accessed 19/9/2019

McClintock, N. 2010: Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. – Cambridge Journal of Regions. Economy and Society **3**: 191-207, doi:10.1093/cjres/rsq005

McKay, G.A. 2011: Radical gardening: politics, idealism & rebellion in the garden. – London

Nilsen, M. 2014: The Working Man's Green Space: Allotment Gardens in England, France and Germany, 1870-1919. – Charlottesville, London

Pawlikowska-Piechotka, A. 2010: Tradycja ogrodów działkowych w Polsce. – Gdynia

Pickering and *J. Byrne* 2012: Past results and future directions in urban community gardens research. – Urban Forestry and Urban Greening **11** (4): 364-373, doi:10.1016/j.ufug.2012.06.007

Poniży, L. and *K. Stachura* 2017: Future of allotment gardens in the context of city spatial policy. A Case Study of Poznań. – Quaestiones Geographicae **36** (1): 121-127, doi:10.1515/quageo-2017-0009

Poole, S. 2006: The Allotment Chronicles: A social history of allotment gardening. – Kettering

PZD (Polski Związek Działkowców) 2014: Allotment gardens in the cities nowadays and in the future – challenges and functions. – Online available at: http://pzd.pl/artykuly/13173/168/Allotment-gardens-in-the-cities-nowadays-and-in-the-future-challenges-and-functions.html, accessed 5/10/2019

Schatzki, T.R., K.K. Cetina and *E. von Savigny* (eds.) 2001: The practice turn in contemporary theory. – London

Seyfang, G., A. Haxeltine, T. Hargreaves and *N. Longhurst* 2010: Energy and communities in transition – towards a new research agenda on agency and civil society in sustainability transitions. CSERGE Working Paper EDM, No. 10-13. CSERGE. Norwich. – Online available at: https://www.econstor.eu/handle/10419/48803, accessed 2/12/2019

Sidblad, S. 2000: Swedish Perspectives of Allotment and Community Gardening. – Acta Hort **523**: 151-160, doi:10.17660/ActaHortic.2000.523.20

Soga, M., D.T. Cox, Y. Yamaura, K.J. Gaston, K. Kurisu and *K. Hanaki* 2017: Health benefits of urban allotment gardening: improved physical and psychological well-being and social integration. – International Journal of Environmental Research and Public Health **14** (1): 71, doi:10.3390/ijerph14010071

Sovová, L. and *E.J. Veen* 2020: Neither Poor nor Cool: Practising Food Self-Provisioning in Allotment Gardens in the Netherlands and Czechia. – Sustainability **12** (12): 5134, doi:10.3390/su12125134

Speak, A., A. Mizgajski and *J. Borysiak* 2015: Allotment gardens and parks: Provision of ecosystem services with an emphasis on biodiversity. – Urban Forestry and Urban Greening **15**: 772-78, doi:10.1016/j.ufug.2015.07.007

Spilková, J. and *J. Vágner* 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, doi:10.1016/j.landusepol.2015.12.031

Szczepańska, M. 2017: Family allotment gardens. The case of the Poznań agglomeration. – EUROPA XXI **32**: 71-88, doi:10.7163/Eu21.2017.32.5

Szkup, R. 2013: Użytkowanie rodzinnych ogrodów działkowych (ROD) przez społeczność wielkomiejską: Przykład Łodzi. – Łódź

Ustawa o rodzinnych ogrodach działkowych 2013: Dz. U. z 2017 r. poz. 2176. (Act on family allotments. 2013. Journal of Laws of 2017, item 2176). – Online available at: http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20140000040, assessed 7/9/2019

Uwajeh, P.C. and *I.S. Ezennia* 2018: The Socio-cultural and ecological perspectives on landscape and gardening in Urban Environment: A narrative review. – Journal of Contemporary Urban Affairs **2** (2): 78-89, doi:10.25034/ijcua.2018.4673

Weckwerth, H. 1999: Znaczenie i korzyści ogrodów działkowych dla miasta i jego mieszkańców. – In: *Gospodarczyk F., J. Weber* and *M. Siewniak* (eds.): Kształtowanie, pielęgnacja i ochrona zieleni miejskiej. – Wrocław: 90

Witten, I.H. and *E. Frank* 2000: Data Mining: Practical Ma-

chine Learning Tools and Techniques. – New York

Worytkiewicz, P. 2012: Armaty w cieniu pomidorów. – In: *Szczurek M.* and *M. Zych* (eds.): Dzieło-działka. – Kraków: 130-153

Van den Berg, A.E., M. van Winsum-Westra, S. de Vries and *S. M. van Dillen* 2010: Allotment gardening and health: a comparative survey among allotment gardeners and their neighbors without an allotment. – Environmental Health **9** (1): 74, doi:10.1186/1476-069X-9-74

Voigt, A., M.J. Latkowska, A. Rutecka, L. Poniży, A. Mizgajski, J. Breuste, K. Haas, M. Artmann, A. Hursthouse, A.J. Agboola, M. Külvik, A. Olonen, T. Leitão and *H. Costa* 2015: Environmental behaviour of urban allotment gardeners in Europe. – In: *Niin G.* and *H.S. Mishra* (eds.): Landscapes in Flux. – Tartu: 38-38