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The Rich Diversity of Urban Allotment Gardens in Europe: Contemporary Trends in the Context of Historical, Socio-Economic and Legal Conditions

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Abstract: Urban allotment gardens (AGs) provide a unique combination of productive and recreational spaces for the inhabitants of European cities. Although the reasons behind the decision to have a plot, as well as the mode of use and gardening practices, are well recognised in the literature, these issues are mainly considered in relation to particular case studies within a single country. The regional diversity of European allotment gardens is still poorly understood, however. This knowledge gap became an incentive for us to carry out the present study. The research was conducted in seven countries: Austria, Estonia, Germany, France, Portugal, Poland and the UK. Surveys were used to assess the motivations of users regarding plot uses and gardening practices. Information was also collected during desk research and study visits, making use of available statistical data. Allotment gardens in Europe are currently very diverse, and vary depending on the historical, legal, economic and social conditions of a given country, and also as determined by geographical location. Three main types of plots were distinguished, for: cultivation, recreation–cultivation, and cultivation–recreation. The recreational use of AGs has replaced their use for food production in countries with a long history of urban gardening. The only exception is the UK. In some countries, the production of food on an AG plot is still its main function; however, the motivations for this are related to better quality and taste (the UK), as well as the economic benefits of self-grown fruits and vegetables (Portugal, Estonia). Among the wide range of motivations for urban gardening in Europe, there is increasing emphasis on active recreation, contact with nature and quality food supply.

Keywords: allotment gardening; functions of allotment gardens; plot holders; use of plot; food production

1. Introduction

Various elements of green urban infrastructure are of growing interest to researchers due to the benefits they offer city dwellers. Allotment gardens (AGs) are a special part of urban landscape, due to the bundle of ecosystem services provided—which encompass economic, social and environmental functions, providing a unique combination of productive and recreational space, and thus a wide range of benefits to their users [1–4]. AGs not only have direct benefits for their users, but they have a broader impact on the environment, for example, in the context of biodiversity [5,6], local climate regulations [7], pollination [8,9], and in terms of recreation and leisure, as they also serve as places of relaxation for neighbourhood dwellers [10]. These numerous functions and benefits coexist and are intermingled within AGs as multifunctional parts of urban green infrastructure [11–13] and are specific socio-ecological systems (SES) that include humans as an integrated and interacting part of the AG ecosystem [14,15]. Plot holders themselves see allotment gardening as a hobby with benefits [16,17]. The benefits that users expect from their gardens highlight their motivations for having a plot and are manifested in the way gardens are used and in individual gardening practices.

The first AGs were mainly important as a source of fresh food. Their primary origin was as a response to food shortages [15], and in providing an opportunity for the urban poor to produce fruit and vegetables for personal consumption [18]. The development of allotment gardening became significant during economic and political crises across Europe, especially during the First and Second World Wars, and the crisis of the 1930s [19]. They were also important in southern Europe during the last economic crisis, which started in 2008 [2,20,21]. AG users once again could appreciate their value during the COVID-19 lockdown in 2020. For many of them, an allotment plot was the only safe outdoor area to visit [22,23] and gardening has become an important instrument for contrasting the negative psychopathological consequences of measures such as isolation and home confinement [24]. Additionally, the produce delivered by urban agriculture sites has helped to alleviate turbulence in the food supply chains caused by the pandemic [25].

The motivations behind growing vegetables and fruits are related to better food quality and taste, as well as the economic benefits of self-grown food [2,26]. A number of studies note the significance of allotment plots as places for recreation, physical activity, interaction with nature and social cohesion [11,16,27]. One of the important benefits of urban gardening is seen in the intentional contact with nature [28,29], which manifests in many different ways [2,3,30–32], such as doing exercises, or simply being in fresh air, and experiencing living and non-living natural sensory environments. This contact with nature also has positive emotional aspects [33–35]. The benefits of having contact with nature in a garden vary across different types of gardens, depending on the management practices of individual plot holders [36], and on individual perceptions and values [37]. Gardening offers the experience of nature-embedded opportunities for environmental learning [28], promises societal transformation [38] and fosters experiential learning about local ecosystems and adaptive gardening skills. Urban allotments provide a link between theoretical knowledge and practice through contact with plants and animals, and engagement in gardening activities, which increases a user's awareness of socio-ecological interrelations.

The aim of this study was to verify the hypothesis that the use and functions of contemporary European allotment gardens differ depending on the geographical, historical, legal and socio-economic conditions in a given country, and are expressed in the allotment holder's approach to using the garden. Particular attention was also paid to identifying the differences and similarities in the motivations of plot holders, their use of plots and gardens, and gardening practices in European countries before the outbreak of the COVID-19 pandemic. On this basis, an attempt was made to identify the main types of plots in contemporary allotment gardens in Europe.

Although the motivations behind the decision to have a plot, as well as modes of use and gardening practices, are well recognised in the literature, these issues are mainly considered in relation to particular case studies within a single city within a country, such as

Dublin, Ireland [39], Ljubljana, Slovenia [12], Salzburg, Austria and some German cities [11], the United Kingdom [16], Paris, France [40], Łódź, Poland [27,41], Lisbon, Portugal [42] and urban regions [43]. The regional diversity of European allotment gardens, however, is still poorly understood. This knowledge gap was the incentive for us to conduct this study.

2. Materials and Methods

2.1. Participant Selection and Survey Design

A literature review was performed in order to gather information on the historical, socio-political and economic backgrounds of the countries presented in the study. As part of the desk research, we acquired information on motivations, gardening practices and the detailed land use of allotment gardens in different parts of Europe. The survey carried out among allotment holders in eleven cities of seven European countries, representing eastern (Poland), western (Austria, Germany, France), northern (Estonia, UK) and southern Europe (Portugal) during 2012–2015, was of particular importance (Table 1, Figure 1). We used the division of geographical regions adopted by the UN [44].

Table 1. Details of case study sites for AG user assessment.

Country	Town	Code of Town	Population	No. of AGs Studied	No. of Completed Questionnaires	Year of Surveys
Austria	Salzburg	Sa	150,900	4	156	2012
Estonia	Paide	Pa	9000	1	15	2014
France	Marseille	Ma	850,600	10	36	2012
	Grand Nancy	Gn	434,000	6	27	2012
Germany	Nantes	Na	283,000	10	33	2012
	Kassel	Ka	200,507	5	25	2015
Poland	Poznań	Po	552,393	21	100	2013
	Warsaw	Wa	1,700,000	3	90	2013
Portugal	Lisbon	Li	552,700	6	20	2015
United Kingdom	Ayr	Ay	46,050	1	12	2014
	Greenock	Gr	44,248	1	18	2014

Source: own compilation.

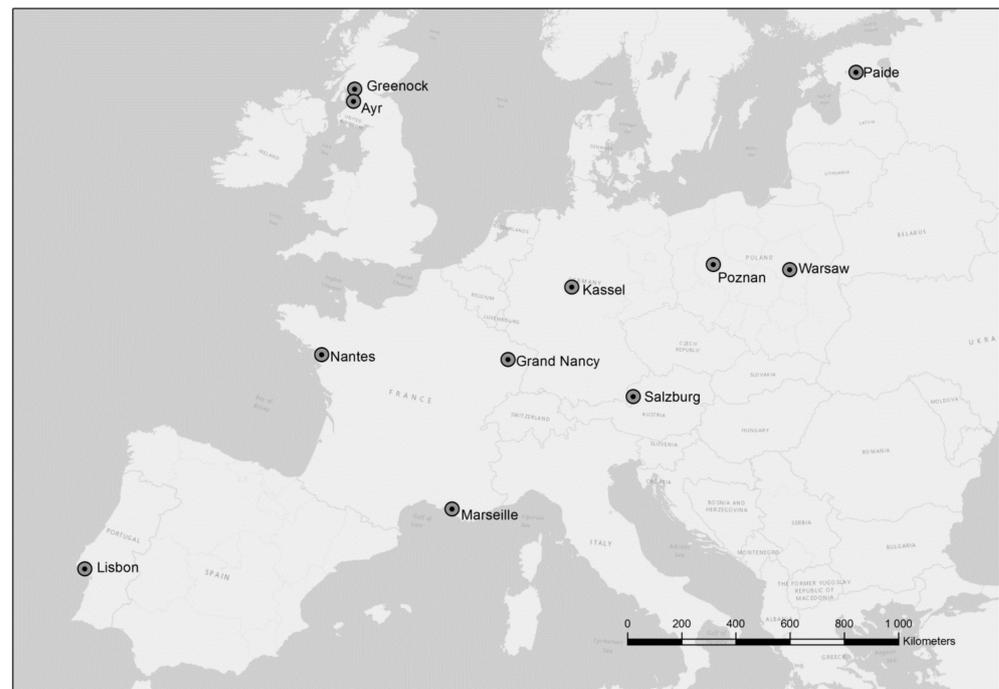


Figure 1. Location of case study cities. Source: Own compilation.

We selected a number of European cities in order to provide geographical as well as cultural contrasts. We used studies conducted by participants of COST Action TU

1201 “Urban Allotment Gardens in European Cities”. The questionnaire was modified for national contexts and languages, and therefore differed slightly between countries (some questions were not used in all studies). The majority of questions were comparable, however, and the detailed responses used in the comprehensive assessment of issues are reported here. The survey was undertaken with plot holders and conducted directly at the AGs in all national case studies. Surveys were conducted either as face-to-face interviews or by distributing paper copies of the questionnaire amongst plot holders who had agreed to participate. Local research ethics approval was obtained for each of the participating teams and the anonymity of respondents was explained individually (Estonia). In all cases, direct contact with the respondents gave the local interviewer the opportunity to explain the questions and clarify any concerns. The conditions for data collection were, therefore, similar in all case studies. A total of 532 completed questionnaires were collected (Table 1). In some cases, multiple answers were possible.

In addition to the personal data of plot users (age, sex, employment status), the questionnaire covered basic issues such as: (1) motivations for having a plot; (2) plot development and equipment, sources of knowledge about gardening; (3) plot usage and frequency of visits; (4) practices of environmentally friendly gardening; and (5) motivations for growing vegetables and fruits.

We are aware that the method of recruiting study participants on the basis of the voluntary completion of a questionnaire does not guarantee the representativeness of the sample. Therefore, empirical generalisation to allotment gardening in the analysed countries, or even cities, was not the intention of this study. Instead, as is the case in many case study research efforts, we seek theoretical generalizability [45,46]. In other words, we do not seek to argue that certain characteristics of our sample are “typical of a population”; rather, the presented case studies are samples of opinion they allowed for comparisons to be made but were not used as a representation of all gardeners in particular countries.

A comparative field study conducted in 2016 in the Westphalia–Lippe region of Germany, as well as in the Wielkopolska region of Poland, were additional sources of information. Exploratory walks were undertaken as part of the research, which made it possible to gather a great deal of additional information on, for example, the practical application of legal solutions regarding allotment gardening in these countries. In order to accurately identify the investigated issue, in-depth interviews (IDIs) with presidents of the of allotment gardeners’ associations were conducted. The interviews were in the form of conversations (30–60 min), during which, substantial and valuable primary information was collected.

As well as primary data, the secondary materials were also of great importance for our research. They were obtained from organisations connected with the functioning of allotment gardens in individual countries, as well as from institutions which have statistical data at their disposal (e.g., [47–49]). These concerned, among other things, legal regulations, the area and number of allotment gardens and plots, the ownership of land designated for gardens, the technical equipment used in allotment garden complexes and plots, as well as the functions of the plots.

2.2. Historical Background of Allotment Gardening in the Analysed Countries

Historical, socio-economic and legal conditions, which change over time, are of significant importance in the context of garden-use patterns in the research on allotment gardening [50–56]. The historical conditions presented by Keshavarz and Bell [56], as well as legal, socio-political and economic conditions, presented in numerous publications (e.g., [57–64]), affected the emergence and existence of AGs.

The first allotment gardens were established in the UK in the 18th century, in Germany, France and Poland in the 19th century, and in Austria by the turn of the 20th century. In Estonia, the first AGs appeared during World War II, but most were established in the post-war period. In Portugal, some informal allotment gardens started appearing in the

1980s, but the development of formal AGs only began in the 21st century during the last economic crisis, which began in 2008 [56,58].

Initially, allotment gardens were established in rapidly growing industrial cities to enable people with low incomes to cultivate their own food, and also to improve the living conditions in unhygienic and polluted cities. The main ideas behind the creation of AGs thus embrace similar aims: food production and recreation in the natural settings of a garden [10,11,65–70].

Food production in AGs was important, especially in periods of economic hardship (e.g., during wars, economic crisis). As a reaction to the severe food shortages during and shortly after WW-I, as well as during the economic crisis of the 1930s and WW-II, AGs played an important role, and their numbers increased [56].

A reverse trend—a decline in the number of gardens—was seen in the UK, France, Germany and Austria a few years after the end of WW-II, with the emergence of economic stabilisation as well as increased living standards [71,72]. This decline in western countries contrasts with the rise of allotment gardens in the former communist regions of eastern Europe, including Estonia, Poland and eastern Germany [56].

Estonia is an interesting case in point, where the first allotment gardens were created during WW-II for food production. Most were established in the period of early post-war Soviet occupation to help people at risk of starvation. Later on, during the communist era, the idea of AGs was to enrich everyday life by “... horticulture and beekeeping for the recreation of workers ...” [73], but they were used mainly as a source of edible plants to cope with chronic food shortages [56]. The late development of allotment gardening is characteristic for Portugal, where the idea of growing food within the city was not relevant until the 20th century, and informal allotment gardens started appearing in Lisbon in the 1980s [58,74,75]. Interest in allotment gardening in Portugal was boosted by the economic crisis in 2008, when they were created to provide food products. Thus, although Portuguese AGs are the youngest, their main purpose—producing food for self-consumption—is in agreement with the original idea of AG creation in all countries.

3. Results and Discussion

3.1. Legal and Policy Determinants of the Plot Use

There are currently differences between the legal acts which regulate the functioning of allotment gardening in different countries (Table 2). Allotment gardens in Austria, Germany, Poland and the United Kingdom are legally protected by specialised legislation (with varying levels of detail). In France, Portugal and Estonia, allotment gardening is regulated by legal acts in various fields. Individual countries are strongly differentiated in terms of the level of development of allotment gardening (e.g., the number of allotments and plots). Germany and Poland are the leaders in European allotment gardening, and both have around one million plots [47]. Different countries have different regulations regarding the obligatory cultivation of plots (see, e.g., [58,76]). In the UK and Portugal, plots must legally be used exclusively for food production purposes. In Austria and France, two-thirds of the area of a plot should be used for cultivation, and in Germany, one-third. In Poland and Estonia, there are no specific regulations in this respect. Each country has a different approach to equipping garden space and plots with technical infrastructure (e.g., access to electricity, water and sewage systems, the admissibility or lack of a hut, as well as its parameters). A common feature is the predominantly communal character of land designated for allotment gardens, although their ownership structure varies in different countries. According to national regulations in the UK, France, Austria, Germany and Poland, AGs still serve mainly for non-commercial horticultural use (including food production) and healthy recreation [58]. Field research carried out in the Westphalia-Lippe region in Germany and in the Wielkopolska region in Poland, as well as a review of the literature on the subject, showed that the regulations are not always fully complied with; for example, overly large huts may be built [77,78], food production is disappearing and the scale of permanent residence on plots is increasing [78,79].

In the second half of the 20th century, however, there was a change in the approach to allotment gardening in these countries. In recent decades, Austrian AGs changed from having a productive function to being more recreational. The gardeners themselves are predominantly elderly and retired persons who use their plots very frequently and intensively [1,11]. Similarly, in Germany, AGs are used mainly for recreational purposes, in addition to food production [56]. In France, interest in AGs has increased since the 1980s, in favour of healthy eating, enjoying a natural environment and developing social interactions in cities [80]. Polish contemporary AGs are seen, according to legal acts, as healthy places for rest and recreation, plant cultivation for individual needs, and for the protection of the natural environment. There has been a clear increase in the importance of the recreational function of gardens in recent decades, especially in large cities [10,27,81]. Estonian AGs, although currently not formally regulated, address poverty issues and the shortage of good, fresh food, as well as relaxation [82,83]. A desire for more space to grow food locally and experience life's simple pleasures has reignited the call for more allotments in the UK. In Portugal, food production is the essential function of allotment gardens, and the recent 21st century economic crisis prompted an expansion of allotment gardening [74]. In 2007, Lisbon City Hall began to develop a strategy for urban agriculture, having created several 'horticultural parks' in gardens and urban parks in 2011, with limited areas for the practice of agriculture. It is also important in Portuguese cities that AGs are simultaneously perceived as a way to produce food, integrate different green spaces and promote urban regeneration. The spaces are seen as a way to reinforce social relations between users, promote a healthy lifestyle and develop environmental awareness, as an alternative leisure activity that can stimulate well-being [74,75].

Table 2. Characteristics of allotment gardens in the context of the law.

Country	Specialised Legislation on Allotment Horticulture	Number of Plots	Average Plot Area (m ²)	Allotment Gardens' Ownership Structure	Selected Aspects of Garden Management Arising from Legal Acts
Austria	1958—legislation. In Vienna and Lower Austria, there are additional state regulations.	39,234	350	75% commune, 17% private owners, 8% central association.	Two-thirds of the plot must be used for self-supply horticulture. Each plot can be equipped with technical infrastructure (electricity, water, sewage or septic tank) and a hut.
Estonia	No special law. The functioning of allotment gardens is regulated by other legal acts.	No data available	No data available	No data available.	No data available.
France	No special law. The functioning of allotment gardens is regulated by other legal acts.	17,100	160	65% commune, 20% regional associations, 10% local associations, 5% private owners.	Two-thirds of the plot must be used for self-supply horticulture. Plots do not always have their own connection to the basic technical infrastructure (e.g., electricity, water supply)—then, they benefit from access to a common "garden" connection. One-third of the plot must be used for growing horticultural crops for own use. A simple hut with a maximum area of 24 m ² is permitted. Equipping the plot with technical infrastructure is regulated by the association's regulations.
Germany	1983—The Bundeskleingartengesetz Act	911,900	370	77% commune, 23% private owners ¹ .	Equipping the plot with technical infrastructure is regulated by the association's regulations.
Poland	2013—Legislation on Family Allotment Gardens	911,200	351	22% owned by the State Treasury, 75% by commune ² .	No requirements—potential to grow horticultural crops for own use. A hut with a maximum area of 35 m ² is permitted. Each plot may be equipped with technical infrastructure.
Portugal	No special law—local regulations (at municipal level).	No data available	No data available	100% commune.	No regulations at the national level. Plots for production purposes only. Prohibited to build huts or plant trees ³ .

Table 2. Cont.

Country	Specialised Legislation on Allotment Horticulture	Number of Plots	Average Plot Area (m ²)	Allotment Gardens' Ownership Structure	Selected Aspects of Garden Management Arising from Legal Acts
UK	1908—Small Holdings and Allotments Act (with later amendments)	350,000	250	89% communes, 11% private landowners.	Plots intended exclusively for horticultural cultivation. Some plots have a water connection. A hut is permitted.

¹ Lease only. ² Polish Allotment Gardeners Federation (PZD) has the right of perpetual usufruct to nearly 63% of land. Regarding the remaining area (37%), PZD holds the right of usufruct. ³ Results of field studies. Source: Own compilation based on data from [84–86].

Research showed that conditions vary in different European countries and influence the motivations and practices of urban allotment gardeners, and thus the way in which the allotment gardens and plots are developed.

3.2. Users of Allotment Gardens

In most of the cities and towns studied, plot users who were over 51 years old dominated the respondents, and those 40 years old or younger were in the minority. Elderly users (≥ 6 years old) dominated in Salzburg and French cities (Table 3). These were also the biggest group in the AGs studied in Warsaw, Kassel and Ayr and Greenock, whereas in Lisbon and Paide, slightly younger people (51–60 years old) dominated the respondents. In all the cities studied, with the exception of Poznań (26%), users under 41 years of age were in the minority, and in Marseille, they were entirely absent.

Table 3. Characteristics of the interviewed plot holders (% of respondents; the hyphen (-) means 'question not asked').

	Sa	Po	Wa	Li	Pa	Ka	Gn	Na	Ma	Gr	Ay
Age (%)											
≤ 40 years	1.3	26.0	11.0	11.8	8.8	16.0	3.7	6.0	0	5.7	8.3
41–50	7.3	23.0	13.3	29.4	20.0	20.0	22.2	15.2	13.9	22.2	16.7
51–60	19.9	22.0	32.3	41.2	42.2	20.0	11.1	15.2	5.6	33.3	25
≥ 61	71.5	29.0	43.4	17.6	28.8	44.0	63.0	63.6	80.5	38.8	50
N=	151	100	90	17	15	25	27	33	36	18	12
Employment Status (%)											
Employed	24.0	59.3	50.0	56.3	66.6	-	29.6	30.3	19.4	33.3	33.3
Retired/pensioner	75.3	39.5	47.7	18.8	33.3	-	63.0	66.7	77.8	61.1	66.7
Unemployed	0.7	0.9	2.3	25.0	0	-	7.4	3.0	2.8	5.6	0
No. of respondents	150	91	90	16	15	-	27	33	36	18	12

Source: Own compilation based on survey research.

Our findings are in line with information collected from national surveys in Germany and Poland. According to the study carried out in Germany (2006–2007), the biggest group of active allotment gardeners were 65–74 years old, and the average age of AG users was around 60 years. The biggest group of new gardeners (on lease since 2000) was in the 45–55 age group (28%) and only 13% were younger than 35 [87]. Younger people interested in urban gardening might encounter barriers to having an allotment such as long waiting lists, financial issues and their own precarious and mobile situations. They more commonly decide to join an urban community garden initiative, rather than lease a plot. Studies carried out in Warsaw (2008–2010) also revealed that senior adults were the main group of allotment gardeners [88]. Similarly, according to the results of a study carried out in Poland in 2011, people 51 years old and older dominated the plot holder population, whereas those <35 years were the smallest group [83]. In the 21st century, however, young and middle-aged people are increasingly interested in allotment gardening [88]. In France, national surveys on living conditions in households have made the same observations regarding gardening, an activity conducted mainly (78%) by people aged above 50 years.

Looking at the age structure of plot holders, it is not surprising that a high proportion of retired people and pensioners were observed in most of the cities studied. Retired people often have more time to do gardening, but their high number in allotment gardening could also be due to the social status given to gardeners. Gardening often becomes an occupation and also a social identity for retired people: “he/she is a gardener” [69]. In two Polish cities, Paide Greenock and Kassel, as well as in Lisbon, professionally active users were predominant over other groups (Table 3). An earlier and broader study (from 2011), however, reported that retired people and pensioners made up over 50% of AG users interviewed in Poland, and 42% of them were still professionally active [89]. In our study in Lisbon, unemployed people (25%) dominated over retired people and pensioners. This may be explained by the large number of people registered in the city as unemployed (in 2015, around 13 % of the national total) (<https://ec.europa.eu> 25 September 2021), as well as by the low cost of gardening in Lisbon. In Germany and Austria, gardeners pay a moderate yearly lease, and often a high transfer fee for the plot, which is a financial barrier for disadvantaged people who are otherwise interested in having a garden. This transfer fee leads to social selection [90]. The yearly costs in Lisbon are much lower, and there is no transfer fee.

French cities definitely stood out from other cities in the study due to the high proportion of men with AGs. This could be due to the tradition in France which portrays gardening and feeding the family as a man’s activity. The first creation of allotment gardens was for “family fathers”. Women were, until now, less present in French allotments; however, women are beginning to get more involved in gardening in both new and old allotment gardens. Male users also dominated in Salzburg and Paide, but in all other cases, the majority of respondents were women.

3.3. Motivations for Having an Allotment and Plot Development

Motivation for having a garden, as well as the benefits of gardening, have been well documented in the literature. The main motivations are well-being, physical exercise and outdoor recreation, food production, feelings of connection to nature, creative personal expression, social benefits such as community building, place attachment and empowerment, skill-building and knowledge enhancement (e.g., [26,29,91–95]).

Research has shown that the vast majority of responses (over 80%) reported motivation related to recreation and active relaxation in the Polish cities and Salzburg (Table 4). This was also important for over 50% of users in Kassel. Studies have confirmed the tendencies observed recently in the use of European AGs [56]. Similarly, studies carried out in the Polish city of Łódź (2008–2010) revealed that AGs very often serve as places for rest and recreation. The most common reason for acquiring a plot was no longer a desire to cultivate the land, but the need for rest and leisure in natural green surroundings [27]. The majority of plot holders taking part in the national survey in Poland in 2011 reported using their plots for rest and recreation, as well as for plant cultivation (58.7%). Recreation and food production were reported by 21.2% and 20.1% of respondents, respectively [83]. This relaxing effect is more accentuated in allotment gardens which provide social interactions [96]. Gardening becomes an excuse to meet and exchange experiences with others [69].

Food production was the most popular reason for allotment gardening in Lisbon, Paide and Nantes (Table 4). The primary reasons for the creation and use of AGs in Estonia and Portugal, presented above [56,75,82,83], are still important to their users. Cultivating edible plants was also an important aspect of plot use by gardeners in Nantes, Grand Nancy, Scottish towns, and Kassel. Motivations for having a plot for one’s own food production in Lisbon and Paide, as well as in Scotland, were strictly related to plot development schemes (Table 4). In Lisbon, the whole plot area was used for the cultivation of edible plants; in Paide and the two Scottish towns, food crops comprised the main part of the garden area. The main motivation for allotment gardening in Scotland was to enjoy it as a hobby, but this could also obscure the true nature of food production. It can be assumed that plots in Lisbon, Paide and Scotland (with no garden huts nor lawns) played a mainly productive

role and were intensively used for edible plant cultivation. They also enabled their users to practice a hobby and take part in active recreation. Food production was also practiced in other cities studied, including Salzburg, Kassel and Warsaw. Patches with edible plants often covered slightly bigger areas than beds with ornamental plants but were usually smaller than lawns (Table 5). In France, gardeners mostly attend to taste and quality rather than productivity [97]. Gardening gives a sense of food security by being able to choose both the type of practice as well as the kinds of vegetables grown.

Table 4. User motivations for having a plot (% of respondents; multiple answers possible).

Motivation	Sa	Po	Wa	Li	Pa	Ka	Gn	Na	Ma	Gr	Ay
Recreation and active relaxation	80.3	80.0	82.3	35.0	6.7	52.0	17.9	9.1	38.9	11.1	16.7
Rest outdoors, in a quiet place	57.3	64.0	60.0	25.0	6.7	40.0	10.7	24.2	8.3	5.6	8.3
Contact with nature	65.0	58.0	68.5	0	40.0	32.0	35.7	51.5	35.7	22.2	16.7
Gardening as a hobby	64.3	26.0	51.3	55.0	20.0	68.0	64.3	57.6	66.7	61.1	83.3
Social contacts	22.9	21.0	40.0	20.0	13.3	28.0	14.3	27.3	2.8	5.6	8.3
Playground for children	18.5	23.0	24.3	0	0	20.0	3.6	3.0	11.1	5.6	8.3
Food production	45.9	30.0	24.7	85.0	86.7	40.0	35.7	60.6	30.6	33.3	33.4
Compensation for a balcony/garden	32.5	21.0	10.0	10.0	53.3	16.0	3.6	0	0	0	0
<i>No. of respondents</i>	<i>156</i>	<i>100</i>	<i>90</i>	<i>20</i>	<i>15</i>	<i>25</i>	<i>27</i>	<i>33</i>	<i>36</i>	<i>18</i>	<i>12</i>

Source: own compilation based on survey research.

Table 5. Plot development (% of plot area).

Plot Development	Sa	Wa	Li	Pa	Ka	Gr	Ayr
Edible plants	21.1	25.7	100	85.3	33.0	90.0	83.3
Ornamental plants	15.6	25.6	0	13.6	23.0	10.0	16.7
Lawn	53.2	38.0	0	0	33.0	0	0
Garden hut	10.1	10.7	0	1.1	10.0	0	0
<i>No. of respondents</i>	<i>148</i>	<i>90</i>	<i>20</i>	<i>15</i>	<i>25</i>	<i>18</i>	<i>12</i>

Source: own compilation based on survey research.

Practicing gardening as a hobby was the most important motivation for having a garden for the majority of plot users in Kassel, Grand Nancy and Marseille, as well as in the two Scottish towns (Table 4). It was also often indicated by the users from Lisbon and Nantes. In the case of the French cities, Scottish towns and Kassel, this reason for using the allotment coincides with the advanced age of the gardeners. Gardening was the second favourite form of leisure in Poland, highly valued as a form of active recreation, especially by elderly people (over 65 years old) [98]. Similar results were obtained in the USA, where gardening was the most often practiced form of physical activity for 69% of men and 75% of women over 65 years of age [99]. This leisure aspect of gardens is more common in allotment gardens with huts, which are seen as second homes [97].

Contact with nature was one of the most frequently chosen motivations in the cities and towns studied in our survey. It was an important reason for having a plot for the users from Salzburg, Paide, Kassel, Polish and French cities, as well as the two Scottish towns (Table 4). These findings are supported by other studies in the literature: AGs can serve as restorative environments, providing a place for rest and relaxation in natural settings, different from an urban area, free from artificial stimulus and polluted air [100]. For elderly allotment users in Wales, spending time outdoors, in the natural environment and in the open air were important aspects of plot use, leading to restoration and recovery [101]. Social contacts and using plots as a playground for children, as well as compensation for the lack of a balcony or garden at home, were less important motivations for the respondents in all the cities studied. The latter was, however, important for over 53% of users in Paide,

and 32% in Salzburg, which may be related to their strong need for contact with plants and their care as part of practicing a hobby.

Plot development varied between the cities studied (Table 5) and was strictly related to the motivations of the users, as already mentioned. In Lisbon, the entire area of the plot was dedicated to the cultivation of edible plants (mostly vegetables and herbs). In Paide, this usage was practiced on the main part of the plot area (85.3%). Edible plants also occupied the main part of plots in Scottish towns (over 83% of the plot area). Plots in Salzburg, Kassel and Warsaw were used for both production and relaxation, and were equipped with huts, not only enabling the storage of garden tools and clothes, but also serving as shelters and garden kitchens for their users. In Germany, garden divisions were previously determined by the complete use of the area for food production. Today, according to the federal law for allotment gardening, at least 1/3 of the area has to be used for the cultivation of garden produce for the gardener's own use [71]. According to the findings from a study from 2006–2007, 36% of the plot area was dedicated to fruit and vegetable production, 24% to lawn, and 22% to ornamental flower beds [87].

As food production was still an important motivation for the users of AGs in the cities studied (Table 4), although there were differing degrees of priority, it was interesting to assess the reasons for the cultivation and use of edible crops. The reasons for the cultivation and consumption of edible crops varied. The main reason given by plot holders from Scotland, Polish cities, Paide and Salzburg for the consumption of their own grown fruits and vegetables was the belief that they were healthier than store-purchased products (Table 6). The better quality and taste of self-grown food was the most important motivation for gardeners from Kassel, where the healthy properties of food were placed in second place. Similarly, Duchemin et al., [102], and Pourias et al. [95] found that the quality of garden produce was the main advantage mentioned by the gardeners. Saving money through their own food production was the main motivation for growing food for the big group of gardeners in Paide, whereas in Poznań and Kassel, it was of little importance—only 2% and 4.2% respondents, respectively, highlighted it as a reason (Table 6).

Table 6. Reasons for consumption of self-grown crops (% of respondents; multiple answers possible, except Salzburg, Kassel and Poznań, where only one answer was possible; (the hyphen (-) means 'not asked').

Reasons for Usage of Self-Grown Products	Sa	Po	Wa	Pa	Ka	Gr	Ay
They are healthier	47.5	37.0	96.7	86.7	18.8	61.1	75
They have better quality/taste	31.3	18.0	50.0	20.0	35.4	33.3	33.3
I can save money	-	2.0	28.7	66.7	4.2	11.1	16.7
They cannot be wasted	11.1	19.0	12.3	0	8.3	5.6	8.3
<i>No. of respondents</i>	99	100	90	15	25	18	12

Source: Own compilation based on survey research.

A literature analysis and research in Lisbon and in French cities show that food production on the plot is economically significant. In Lisbon, where unemployed people were a large group of plot users, and in the French cities where retired people and pensioners dominate, food production in the AGs was an important support for home budgets, and a source of fresh, good quality plant products. In Marseille, Consalès [97] noted that there were contradictions between the disinterested speech of gardeners about the economical functions of gardens and the reality, where food production supported home budgets.

3.4. Use of the Allotment Garden

The cities in which the research was carried out differed in terms of their geographical location, and, as a result, in terms of climate conditions; however, periods of intensive (high season) and rare (low season) use of plots could be distinguished in each case. Analysis of the frequency of visits to the plots in high seasons revealed that their users visited them very often in the period from spring to early autumn—a time suitable for both outdoor

recreation and plant cultivation. In all cases, most of the users reported that they visited their plots every day or a few times a week (Table 7). Everyday visits dominated in Lisbon, Scotland, Grand Nancy and Marseille. In the first two cases, this corresponded to the use of the plots, as the cultivation of edible plants requires intensive maintenance, especially watering during the summer season. There were also some users who visited their gardens every weekend, or a few times a month. None of the plot holders interviewed reported seldom/never visiting their AGs (data not included in the table).

Table 7. Frequency of the plot visits in the high season (% of respondents).

Visits-High Season	Sa	Po	Wa	Li	Pa	Gn	Na	Ma	Gr	Ay
Every day	35.9	39.0	46.7	66.7	33.3	51.8	39.4	61.1	44.4	50.0
Few times a week	59.0	44.0	35.7	22.2	66.7	40.7	48.5	36.1	33.3	25.0
Few times a month	1.9	5.0	2.3	0	0	0	0	0	5.6	8.3
Every weekend	3.2	12.0	15.3	11.1	0	7.5	7.1	2.8	16.7	16.7
No. of respondents	156	100	90	18	15	27	33	36	18	12

Source: own compilation based on survey research.

The data available from some of the sites studied showed that users also visited their plots in the low season (late autumn–winter), and some even visited every day or a few times a week (except in Paide) (Table 8). The most frequent visits were reported by users from Lisbon, which is understandable due to the year-round cultivation season (harvests are obtained there twice a year). Frequent daily visits were also typical for both Scottish cities and can be explained by the temperate maritime climate and the effect of the Gulf Stream, which allows a winter harvest of, for example, winter cabbage, Brussel sprouts, leeks and parsnips. Polish plot users indicated walking and feeding birds, as well as cats living wild in AGs, as the main reasons for their relatively frequent visits in the low season.

Table 8. Frequency of visits to plots in the low season (% of respondents).

Visits-low season	Sa	Po	Wa	Li	Pa	Gr	Ay
Everyday	7.1	7.0	8.7	38.9	0	16.7	16.7
Few times a week	22.5	15.0	15.7	33.3	0	11.1	16.7
Few times a month	25.0	19.0	19.7	0	6.7	27.7	25.0
Every weekend	10.9	14.0	10.0	27.8	0	11.1	16.6
Seldom	29.5	45.0	44.3	0	93.3	27.8	25.0
Never	0	0	1.6	0	0	5.6	0
No. of respondents	156	100	90	18	15	18	12

Source: own compilation based on survey research.

The importance of recreation as a motivation for having an AG was confirmed in the answer to the question about spending summer holidays on the plot. The vast majority of respondents in Poznań, and over half in the case of Warsaw, Paide and Salzburg, often spent their holidays visiting their gardens instead of leaving the city (without spending nights there, which is forbidden) (Table 9). This finding may be connected, in the case of Polish cities and Salzburg, to the full equipment allowed on the plots, including garden huts, and electricity and water supplies, as well as the large plot size (area of ca. 300 m²) providing space for both recreation and plant cultivation. In Paide, smaller plots of ca. 100 m² only had patches with plants, and sometimes a tool shed and plastic tunnel, but they also served as a holiday location for the users cultivating plants and enjoying contact with nature. The plot users interviewed in Lisbon and Scotland never used their allotments as places for holidays.

Table 9. Spending holidays on the plot (% of respondents).

Holidays in AG	Sa	Po	Wa	Li	Pa	Gr	Ay
Almost every summer	31.4	32.0	42.3	0	13.3	0	0
Usually/often	19.6	47.0	13.0	0	40.0	0	0
Seldom	35.9	11.0	30.0	0	26.7	0	0
Never	13.1	10.0	14.7	100	20.0	100	100
No. of respondents	153	100	90	20	15	18	12

Source: own compilation based on survey research.

3.5. Gardening Practices

Gardeners were asked how they acquired knowledge about plants and cultivation methods. In Warsaw, Salzburg and Scotland, the majority of respondents indicated “learning by doing”, and thus plots served for many of them as places of “green education” (Table 10). In Lisbon, Paide and Poznań, most of the plot holders interviewed gained their knowledge from other family members. Knowledge and experience shared with other plot users was the source of ‘gardening know-how’ for most of the respondents from Kassel, Grand Nancy and Marseille. This way of gaining knowledge about gardening was also popular in Salzburg, Lisbon, Nantes and the Scottish towns. Many plot users from the French and Polish cities indicated books, the press and media as an important didactic source.

Table 10. Ways of obtaining knowledge about gardening and plants (% of respondents; multiple answers possible).

Ways of Learning	Sa	Po	Wa	Li	Pa	Ka	Gn	Na	Ma	Gr	Ay
Learning by doing	60.5	32.0	73.0	20.0	40.0	25.9	7.4	9.0	22.2	66.7	75.0
From other plot holders	47.8	22.0	37.7	35.0	27.0	29.6	39.3	48.5	44.4	38.9	41.7
From family	46.5	39.0	34.3	70.0	67.0	20.4	25.0	15.2	27.8	11.1	16.7
Books, press, TV, internet	37.6	37.0	38.8	20.0	33.0	14.8	35.9	59.5	38.9	20.4	16.7
No. of respondents	157	100	90	20	15	25	27	33	36	18	12

Source: own compilation based on survey research.

Plot users were asked about methods of plant fertilisation and protection against pests and diseases. Most of the AG users in Salzburg (87%), Poznań (72%), Warsaw (100%), Paide (93.3%) and Lisbon (90%) used organic fertilisers to improve plant growth and yields (they usually produced compost from organic garden waste) (data not shown). They also used mineral fertilisers (Table 11), although a high percentage of users did not use chemicals. In Paide, none of the plot holders interviewed applied mineral fertilisers.

Table 11. Usage of mineral fertilisers and chemical pesticides (% of respondents).

Cultivation Support	Sa	Po	Wa	Pa	Ka	Na	Gn	Ma	Gr	Ay
	Mineral Fertilisers									
Used	56.1	92.0	56.3	0	28.0	40.8	63.6	55.6	50.0	50.0
Never	43.9	8.0	43.7	100	72.0	59.2	36.4	44.4	50.0	50.0
	Chemical Pesticides									
Used	56.1	58.0	48.3	7.7	48.0	66.7	63.6	50.0	33.3	25.0
Never	43.9	42.0	51.7	93.3	52.0	33.3	36.4	50.0	66.7	75.0
No. of respondents	155	100	90	15	25	27	33	36	18	12

Source: Own compilation based on survey research.

Although the gardeners produced edible crops, which in their opinion were a healthy alternative to commercial produce, chemical protection against pests and diseases was practiced in all the AGs studied (Table 11). In Estonian and Scottish gardens, however, which were predominantly focused on producing edible plants, chemical use was limited.

In Paide, most of the plot holders reported that they never applied chemicals to their crops, and in Greenock and Ayr, more than half the gardeners avoided the use of pesticides.

The application of chemical pesticides and mineral fertilisers could be explained by disparities in the perceptions or education of the gardeners. The use of pesticides is perceived to be linked to a wide range of health problems and negative environmental impacts, but the gardeners interviewed did not seem to be aware of these risks. It is worth mentioning that in Poland, gardeners are obliged to combat plant diseases and pests through the application of chemical pesticides from a list approved by the Polish Association of Allotment Gardeners. In Scottish and Estonian AGs, pesticide use is allowed, where commercially available. In France, especially in Nantes, a charter for biological practices forbids chemical pesticides, but many people do use chemical pesticides—although most gardeners only use anti-slug products.

3.6. Main Types of Plots

The nature of European allotment gardening is determined by numerous conditions with various effects (cf. 3.1). Plot types thus evolve, and their unambiguous identification is difficult. Surveys, study visits, formal interviews (IDIs) and informal interviews with allotment gardeners (exploratory walks), were used to identify the dominant types of plots in the European cities examined. The focus was mainly on issues related to the age of the allotment gardeners, reasons for owning a plot, the importance of social contacts, ways of using the area of the plot and the role of production. Three main types of plots were distinguished:

- Arable land;
- Land for recreation and cultivation;
- Land for cultivation and recreation.

Cultivated plots, mostly similar to the assumptions about the first allotment gardens from the eighteenth and nineteenth centuries, were found in countries with the shortest histories of allotment gardening, Portugal and Estonia. Plots in these countries were characterised by the fact that the vast majority of their area (in the case of Portugal, 100%) was intended for the cultivation of food crops, and the main motivation for owning a plot was to produce food, which made it possible to save money. The quantity of food produced was important for the allotment gardeners. The majority of plot users were people of working age in both countries. Portugal, with little previous tradition of AGs, has experienced a recent increase in urban gardening. The AGs surveyed emerged spontaneously or were introduced recently due to the Lisbon “Urban Allotments Gardens Programme”, which came into existence to help people with low financial status [74]. It is cheaper for Lisbon gardeners to pay a small fee to the city council than to buy the products. Food security might thus explain why the supply of fruit and vegetables is the most important motivation in the case of Lisbon. This therefore confirms that in times of crisis, food production from AGs is still considered an important economic support for more vulnerable parts of the population, and is seen as a strong link to a more traditional way of life [103]. An additional factor in Portugal, favouring the productive function of plots is undoubtedly connected to the favourable climate, which allows for year-round harvests.

The next type of plot, land for recreation and cultivation, was the most common in four of the countries surveyed. A decrease in the importance of food cultivation is reflected in food comprising a smaller part of the plot, a large area of lawn and areas devoted to ornamental plants, as well as the presence of large huts, all characteristic of allotments in Poland, Austria, Germany and most of the surveyed cities in France. The recreational use of AGs thus replaced food production in countries with long histories of urban gardening [77,104]. For allotment gardeners, who are mainly people in retirement and of pre-retirement age, the greatest importance was attached to the recreational value of the plot, the opportunity for contact with nature, hobby garden maintenance and social contacts. In these countries, the high frequency of plot visits by their users can be clearly

linked to the important role of AGs as places of recreation and contact with nature. These results are consistent with studies conducted in Bordeaux, which showed that growing food is no longer the dominant function of AGs, and that allotment gardeners usually indicate the educational and therapeutic role of the garden and its contribution to the creation of social bonds [105]. There is a similar situation in Poland, where gardening is usually seen as a leisure pursuit, for relaxation and family recreation, whereas food products can be bought cheaply in shops or marketplaces [10,81,106]. In Austria and Germany, the main function of the allotment garden changed from food production to recreation and recovery in the 1950s [104,107].

The third type of plot, a cultivated and recreational plot, was characteristic of the surveyed cities in the UK and Nantes in France, which in 2013 was awarded the title of “European Green Capital” [108]. The Nantes allotment gardeners said that food production was the main reason for leasing a plot of land. The allotment gardens management associations in Nantes have committed themselves to promoting environmentally friendly practices since 2010, including no use of pesticides, the cultivation of crops adapted to soil conditions and rainwater recovery [109].

In both Scottish cities, the vast majority of the plots were used for cultivation; however, the main motivation for this was not, as in the case of the original plots of land, a desire to save money, but the need for healthier and better quality food. The cultivation of such plots was therefore of an ecological nature, and the majority of allotment gardeners did not use chemical plant protection products at all. Treating the cultivation of edible plants as a hobby, the opportunity for contact with nature, as well as an opportunity for recreation and active relaxation were also important, non-production motives for owning an allotment garden. The role of allotment gardens in the UK is therefore seen differently than in other countries with long histories of urban gardening. Their function is perceived as a contribution to the natural environment, and for the production of healthy food, which can be related to establishing a more sustainable way of life [103]. Legislation restricting activity may be the main motivation for producing growth for consumption. According to the UK Allotments Act, an AG must be wholly or mainly cultivated for the production of vegetables or fruit crops for consumption by the tenant or their family. Digging for subsistence is also a powerful cultural tradition in the UK.

4. Conclusions

Our results offer interesting insights into allotment gardening practices across Europe, showing some common aspects of gardeners’ motivations and behaviour, as well as highlighting the differences between the locations under study, despite differences in the numbers of respondents. The creation dates of the first allotment gardens, and their political and social-economic backgrounds, varied in the countries studied, but the driving forces behind them were generally similar. In most countries, urban gardening has a history over a 100 years long. Only Estonia and Portugal have a shorter tradition of allotment gardening, and the first AGs appeared in these countries in the middle of the 20th century. The original ideas behind the creation of AGs included similar aims: food production and recreation in the natural setting of a garden. Our study revealed that urban allotment gardens provide a unique combination of productive and recreational spaces for the inhabitants of European cities. The current allotment gardens in Europe are very diverse. They vary according to the historical, political, economic and social conditions of a given country, as well as being determined by geographical location. There is no doubt that legal regulations have a significant effect on the use and management of allotment gardens and plots of land. Three main types of plots can be distinguished in current European gardens: productive, recreational-productive and productive-recreational. The recreational use of AGs has replaced food production in most countries with a long history of urban gardening. The exception is the UK, where their function is perceived as a contribution to the natural environment and the production of healthy food, which can be related to establishing a more sustainable way of life. In some countries, the production of food on an AG plot is

still its main function; however, the reasons behind this are related to better quality and taste (the UK) and the economic benefits of self-grown fruits and vegetables (Portugal, Estonia). Among the wide range of motivations for urban gardening in Europe, there is an increasing emphasis on active recreation, contact with nature and food supply. The high frequency of plot visits by their users can be clearly linked with the important role of AGs as places of recreation and contact with nature.

Although allotment gardens are common in all European countries, there is no single model for their functioning, nor is there any dominant one. Currently, it is difficult to clearly indicate the direction of the future functioning of plots and gardens; however, certain trends can be identified. It seems that outdoor activity (in the fresh air), as well as food production, using ecological methods, is becoming more and more important. It will undoubtedly affect the development of allotment gardens.

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