

Institutions for collective gardening: A comparative document analysis of 51 urban community gardens in Anglo-Saxon and German-speaking countries

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Abstract

Groups of urban gardeners collectively grow vegetables, fruits and flowers in an increasing number of community gardens all over the world. Despite a growing body of literature on community gardens, there is a particular gap for a bigger N-study on the organisation of community gardening, which we want to fill with a comparative document analysis of 51 urban community gardens in six Anglo-Saxon and German speaking countries. Specifically, we want to understand how community gardens have to be organised as spaces for long-term collective action. We systematically collected and analysed documents such as membership rules, handouts to new members, formal statutes, or blog-entries. A cluster analysis helped to identify four types of collective community garden organisations, which vary in terms of organisational form, membership regulations, cultivation of the garden area, and the availability of rules, fees, and waitlists. Our findings show, that there is not one single blueprint for long-term community garden organisation, but that self-organisation or nested forms of organisation and more or less open social boundaries result in distinct places of collective gardening. Comparing types of organisation across geographical contexts, the division of European and Northern American gardens becomes evident.

1. Introduction

1.1 Knowledge gap on the self-organisation of community gardens and research questions

Starting from the community garden movement in the 1970s in New York, community gardens also developed in many European cities. These differ in characteristics like organisation, history, the modes for participation and the legal status. One can find numerous examples of longstanding community gardens, which have enjoyed popularity over many years. This paper explores how community gardens are organised as spaces for collective action. More precisely, we want to provide answers to the following research questions:

- How are community gardens organised as spaces for long-term collective action? Is it possible to identify consistent principles, or are there several approaches for the long-term organisation of collectively used gardens?
- How does the different political and sociocultural context reflect in the organisation of community gardens?

Considering the rising number of scientific publications on community gardens, Guitart et al. (2012) analysed the English language literature with the following outcome: Most research on community gardens has been carried out on sociopolitical themes like social capital, gender roles and quality of life (52.0%) combined with cultural themes like cultural heritage and food citizenship (7.0%). Community gardens and health (25.3%), environment and planning (31.0%), economics (16.1%), education (12.6%) as well as community gardens and politics have been further areas of research. Usually qualitative data or a combination of qualitative and quantitative data was analysed. Only very few pure quantitative approaches could be found (Guitart et al. 2012, 366). As most scientific research relies on US community gardens, Guitart et al. (2012, 369) recommended to geographically enlarge the geographical research area in order to be able to contrast different conditions, challenges and potentials of the gardens elsewhere with the ones in the USA.

Our literature research on the organisation of community gardens revealed that publications are often about planning processes (e.g. Lawson 2004, Rosol 2006), design (e.g. Hou et al., 2009) and political conditions (e.g. Cohen and Reynolds, 2014); and less about self-organisational structures in the garden group. Jamison's „The Joys of Gardening: Collectivist and Bureaucratic Cultures in Conflict“ (1985) represents an early work on the organisation of community gardens which deals with community gardens in the USA in the 1970s. Jamison explored the differences between gardens with a bureaucratic organisational culture and self-organised gardens, which he considered as quite different (Jamison 1985, 484).

The American Community Gardening Association has been conducting studies on community gardens in the USA and in Canada at regular intervals and analysed data on the number of community gardens in selected cities as well as further characteristics of the gardens (ACGA 1998). A study carried out in 1996 and published in 1998 (ACGA 1998) revealed the need to deepen the knowledge on community gardens and their organisations, as very little information was available in this field. Resulting from diagnosis, the latest study was undertaken and the outcomes were published in the article „Results of a US and Canada community garden survey: shared challenges in garden management amid diverse geographical and organisational contexts“ (Drake and Lawson 2015). For the first time, the authors made an extensive research on US and Canadian community gardens and their organisations. However, they concentrated especially on the garden management by community garden organisations and less on organisational structures and processes within the garden group (Drake and Lawson 2015, 244).

Most English literature on community gardens relies on US community gardens (Guitart et al. 2012, 369). Literature on community gardens has also been rising in the German-speaking area; but cross-country and comparative studies are rather scarce. Exceptions are e.g. Jackisch (2012), Mok et al. (2014) and Larson (2006), who however did not explore the organisation of community gardens in diverse countries representing different political and historical contexts.

Collective gardening has only been little researched under the aspect of „collective social action“ (Nettle 2014, 8). In her work „Community gardening as social action“, Nettle analysed collective action of gardeners in more than 60 Australian community gardens based on the social movement theory. Currently, scientific research has increasingly focused on community gardens as new forms of the commons. Eizenberg (2012) considered community gardens in New York City as counter-hegemonic spaces in a neoliberal city. Follmann and Viehoff (2015) following Eizenberg (2012) designated a community garden in Cologne (Germany) as „unperfected common in the making“ (p. 1159), where gardeners fight challenges like land speculation and the amalgamation of private and public in order to stand up for a more social and more sustainable city (ibid., p. 1168).

The topicality of community gardens and collective action can also be derived from a yet unpublished work „Categorizing Urban Commons – Collective Action in Urban Gardens“ (Rogge et al. 2015) which was presented at the 1st IASC Thematic Conference on Urban Commons in Autumn 2015. The authors emphasised the necessity to analyse community gardens as spaces for collective action more precisely and defined classification criteria for urban gardens as commons.

We analysed community gardens in urban areas. The investigation was oriented on the definition of „communal urban gardening“ (Birky and Strom 2013), i.e. gardens in urban areas with a form of collective organisation. Core criterion for the case selection was a certain degree of collective organisation, which differentiates community gardens from private gardens but also from allotments, where the aim is individual gardening even if paths and other facilities are used collectively.

1.2 The community garden movement and hypotheses on geographical contexts and political places

As regards the history of community gardens, a wave-like development can be observed in the USA and in Canada (Cosgrove 1998, Lawson 2004). In former times, community gardens were founded to react to economic crises and to provide people with the opportunity to grow their own food. Today, the foundation of many community gardens is based on other motives and purposes. In Europe, the existence of gardens has been rather steady. Even though functions changed, many allotment gardens still exist and were complemented with community gardens. In countries, like the UK, Germany or Austria, there are community gardens as well as allotments. More generally, the two language contexts are characterised by two different law systems. Whereas the German speaking countries are governed by a civil law system and more specifically by German law, Anglo-Saxon countries, such as the US, Canada or the United Kingdom are dominated by common law. Whereas in German speaking countries we still find several examples of traditional common land with elaborate institutions for collective action (e.g., Alpine pastures), traditional commons and commoners disappeared from England in the 18th century (Neeson 1993). We assume that history matters and plays a role for organisation of community gardens and that the Anglo-Saxon context will have generated other organisational forms of community gardens than to be found in German speaking countries.

Follmann and Viehoff (2015) described the emergence of many new community gardens as a political movement, which has started in the last three decades in industrialised Western countries. On the one hand, participating in a community garden may represent a form of grassroots democratic self-organisation to influence the local environment and even the political communal system (Rosol 2010). Werner (2011) described community gardens in Germany as political scenes. With public relations campaigns, garden projects try to mobilise against capitalistic globalisation. Many garden groups address the issue of sustainable consumption by trying to produce things themselves in a creative manner and to find alternative solutions for expensive equipment. Through barter and “prosumption” (subsistence production) many garden groups try to become less dependant from the neoliberal system (von der Haide et al. 2011, 270). Schmelzkopf (1995, 2002) described community gardens in New York City as “contested space”. She raises the question of who has the right to space and which price is the society willing to pay for the preservation of open spaces (Schmelzkopf 1995, 380). Therefore, we assume that the community gardens, defined as being different from the allotment gardens, are political places.

1.3 Collective action theory and hypotheses on design principles, group size and group heterogeneity

Interest in a theory of collective action developed in the middle of the 20th century, when Garrett Hardin’s (1968) „The Tragedy of the Commons“ or Mancur Olson’s (1965) „The Logic of Collective Action: Public Goods and the Theory of Groups“ came to the same conclusion that collectively used goods would lead to the exploitation. Empirical research on collective action, however, have showed that users of the commons are quite capable of making organisational agreements and of equitably sharing benefits among each other (Agrawal 2001, 1649f). The IAD Framework (Ostrom 2005) and the Social-ecological system framework (SES framework, Ostrom 2009) provide a conceptual language for the comparative analysis of the action situation, where individuals interact and where they exchange goods and services.

Ostrom (1990), jointly with her colleagues, investigated numerous Common Pool Resource case studies of successful and even failed cases of collective organisation. She tried to reveal patterns and similarities to figure out how such systems work. This resulted in the design principles, a list of eight formal rules, which characterise all successful examples of collectively managed CPRs (Ostrom 1990, Cox and Arnold 2010):

1. clearly defined boundaries,

2. congruence between appropriation and provision rules and local conditions,
3. collective-choice arrangements,
4. monitoring,
5. graduated sanctions,
6. conflict-resolution mechanisms,
7. minimal recognition of rights to organise,
8. nested enterprises.

We assume that these design principles, although formulated for Common Pool Resources, will also apply for community gardens, which provide different types of goods: common pool resources (produce extracted from collectively managed plots), but also public (recreational amenities for members and non-members) or private goods (harvest from individually used plots).

Despite numerous research on collective action incidents, there is no final agreement on those variables that may affect or encourage collective action. According to Poteete and Ostrom (2004a, 216f) collective action might depend on the situation of collective action, group characteristics (e.g., size or heterogeneity), organisational agreements, the technology, and on actions of external actors, e.g. state regulation. The literature on collective action often considers smaller group size and group homogeneity as an advantage for the management of a common resource, as common features of a group may enhance mutual trust and represent common interests (Poteete and Ostrom 2004b). We assume that a smaller group size and a lower group heterogeneity can support collective gardening, although being aware of contrasting empirical evidence on group size and group heterogeneity and their interplay with organisational forms, which enable an equitable and legitimate distribution of benefits and costs of a resource (Poteete and Ostrom 2004a).

2. Comparative case study and mixed-methods approach

2.1 Selection of cases

In order to understand communalities and differences between German and English speaking contexts, we selected community gardens in the US, Canada, UK, Germany, Switzerland and Austria. The aim was to choose a variety of different community gardens to be able to display the diverse forms of self-organisation. We largely identified gardens based on an internet research. In Germany the database of the foundation „anstiftung & ertomis“, where 598 community garden initiatives are listed (April 17, 2017), served as selection catalogue. The Austrian community gardens were selected from the website of the association „gartenpolylog“. As there is no cross-municipal register of community gardens in Switzerland, cases were chosen based on an internet research. We identified community gardens in the USA and Canada based on the website of the ACGA (American Community Gardening Association), and additional internet research. Due to the great number of gardens in the USA, the selection was oriented on the 15 cities with the largest number of gardens according to an ACGA study (ACGA 1998, 9). For selecting gardens in the UK, the website „Federation of City Farms and Community Gardens“ was used, as well as internet research. For better comparability, we chose only community gardens in the urban space and in towns and cities in the mentioned research areas. The following criteria helped to select suitable cases:

- The garden is located in a city with a minimum number of inhabitants of 40,000.
- Information on the garden is easy available.
- The garden has been existing for at least 3 years.
- A certain kind of a common organisation is available.

The data presented in this paper largely comes from the self-presentation of the community gardens on their websites (e.g., published guidelines, protocols and statutes of the gardens). Further information was gained from blogs, articles and self-published books. Despite a wide range of

information, in some cases where data was uncertain, we contacted the gardens by email to clear specific questions.

Finally, 51 gardens were selected and analysed; 27 gardens are located in the German-speaking and 24 in the English-speaking countries (see Table 1).

Tab. 1. Selected gardens by country

Austria		Germany		Switzerland	
Gemeinschaftsgarten Norwegerviertel	Vienna	Interkultureller Permakulturgarten Hamburg-Altona	Hamburg	Quartiergarten Hard	Zurich
Nachbarschaftsgarten Donaacity-Kaisermühlen	Vienna	ZAK-Bewohnergärten Neuperlach	Munich	Stadiongarten	Zurich
Längenfeldgarten	Vienna	o'pflanz is!	Munich	SeedCity	Zurich
Grätzigarten 9	Vienna	Neuland	Cologne	Gemeinschaftsgarten Aarefeld	Thun
NaHe – Nachbarschaftsgarten Hetzendorf	Vienna	Gemeinschaftsgarten Johannstadt	Dresden	Merkurgarten	Zurich
Die LoBauerInnen	Vienna	Internationaler Garten Walle	Bremen	Gemeinschaftsgarten Landhof	Basel
Garten für Alle – Donaugarten Alt-Urfahr	Linz	Gärten der Begegnung	Bayreuth	Neugarten	Luzern
Stadtteilgarten Itzling	Salzburg	Prinzessinnengarten	Berlin	Garten am Grenzsteig	Zurich
innsGartl	Innsbruck	Internationale Gärten Dresden	Dresden		
		Stadtacker Wagenhallen	Stuttgart		
USA		Canada		UK	
Interbay P-Patch Garden	Seattle	Brewer Park Community Garden	Ottawa	The Grove Fountainbridge Community Garden	Edinburgh
The Spring Gardens	Philadelphia	Abbotsford Community Garden	Abbotsford	Culpeper Community Garden	London
Berkeley Community Garden	Boston	Strathcona Community Gardens	Vancouver	Blaise Community Garden	Bristol
Potrero Hill Community Garden	San Francisco	Golden Meadow Park	Barrie	Golden Hill Community Garden	Bristol
Dowling Community Garden	Minneapolis	Inglewood Community Garden	Calgary	Grapes Hill Community Garden	Norwich
Newark Street Community Garden	Washington	Willow Park Community Garden	Hamilton	Abbey Gardens	London
Clinton Community Garden	New York	Hill Street Community Garden	Kelowna		
Westbury Community Garden	Houston	Pine Street Community Gardens	Vancouver		
Roger's Community Garden	San Diego				
Ute Trail Community Garden	Lakewood				

2.2 Mixed methods

The document analysis of websites, journal articles, blogs, protocols and statutes yielded a large amount of data on the selected community gardens. For a comparative analysis of this data across countries, we opted for a mixed methods approach. We analysed the 51 gardens with a hierarchical cluster analysis to identify distant types of community gardens. Differences between the two language areas were analysed with t tests and cross tabulations. Table 2 shows the variables for the quantitative analysis.

In order to get a closer look into the self-organisation of community gardens, we added a qualitative examination. Based on Elinor Ostrom's design principles, we coded the documents to identify the principles of the organisation of community gardens and possibly influencing factors like group size and heterogeneity.

Tab. 2. Variables of the quantitative analysis

selection categories	options			
years of existence until 2017	note: only used for t-test			
area size in m ²	note: only used for t-test			
garden group	up to 40 members	41-80 members	over 80 members	no fixed number of members
form of organisation	garden organised as non-profit organisation	superordinate organisation or association existing	public organisation	no official structure
garden area	mostly common area	individual plots and common areas	mostly individual plots	
entrance to garden	garden separated from the surrounding area	open access to garden		
options for participation	membership agreement (for own plot) necessary	participation possible without own plot or membership		
Fees	yes	no		
Waitlist	yes	no		
Rules	clear regulations	only few guidelines		

Core characteristics of institutions for collective action in community gardens are the mode of self-organisation of the garden group. Is there a nested organisational form or is the group organised as an independent association? Is there a municipal-communal organisation behind the garden project or is the group just a loose network of interested persons where no official structure is required? For this question, four categories were developed to be able to assign each garden project appropriately:

1. garden organised as (non-profit) organisation,
2. non-governmental multi-level organisation,
3. public multi-level organisation,
4. no official structure.

The first category comprises numerous possible organisational forms. They all share in common that the garden group is governed by a single organisation which was established for the community garden and does not support any other projects besides the garden and also no other gardens. This group includes associations, non-profit organisations and charities but also non-profit limited companies. In addition, one has also to distinguish, *inter alia*, between charitable incorporated organisations, registered charities and unincorporated organisations. Multi-level organisations may also take various forms, however are always responsible for several community gardens simultaneously. The public organisation is another specific form of nested organisations where several gardens are maintained by a mostly municipal administrative unit, e.g. by a municipal department, or in the USA respectively in Canada by the Parks and Recreation Department. The fourth mode is a loose network of people without any formal organisation.

Regarding the size of the garden group, 4 categories have been developed based on the selected data to be able to classify the gardens appropriately. Besides the categories, up to 40 members, 41 to 80 members, more than 80 members, the category "no fixed number of members" was used for gardens with many volunteers.

The majority of community gardens analysed does not split the garden area in single, private plots but jointly plants the entire or parts of the garden. Many community gardens have privately used plots and common areas, which are collectively maintained. Even the entrance to the garden can be regulated in different ways, e.g. gardens separated from the surrounding area by fences or walls and gardens with open access. Furthermore, many gardens control access with membership agreements. Others however offer (in some cases additionally) the possibility to assist at the garden without having to sign a membership agreement. A further distinguishing feature were membership fees and the existence of a waiting list. Whereas many gardens publish clear rules, others emphasise the elimination of rules and the freedom of gardening. Two categories were measured in discrete numbers, the number of years since the establishment of the community gardens and the area size in square metres.

3. Results

3.1 Classification of four garden organisations through a cluster analysis

One aim of the quantitative analysis was to identify differences and similarities in the institutions of the selected community gardens. In order to classify different types of community gardens, variables presented in Table 2 were analysed in a hierarchical cluster analysis using the Ward method and the Euclidean distance measure. Figure 1 illustrates the clusters formation.

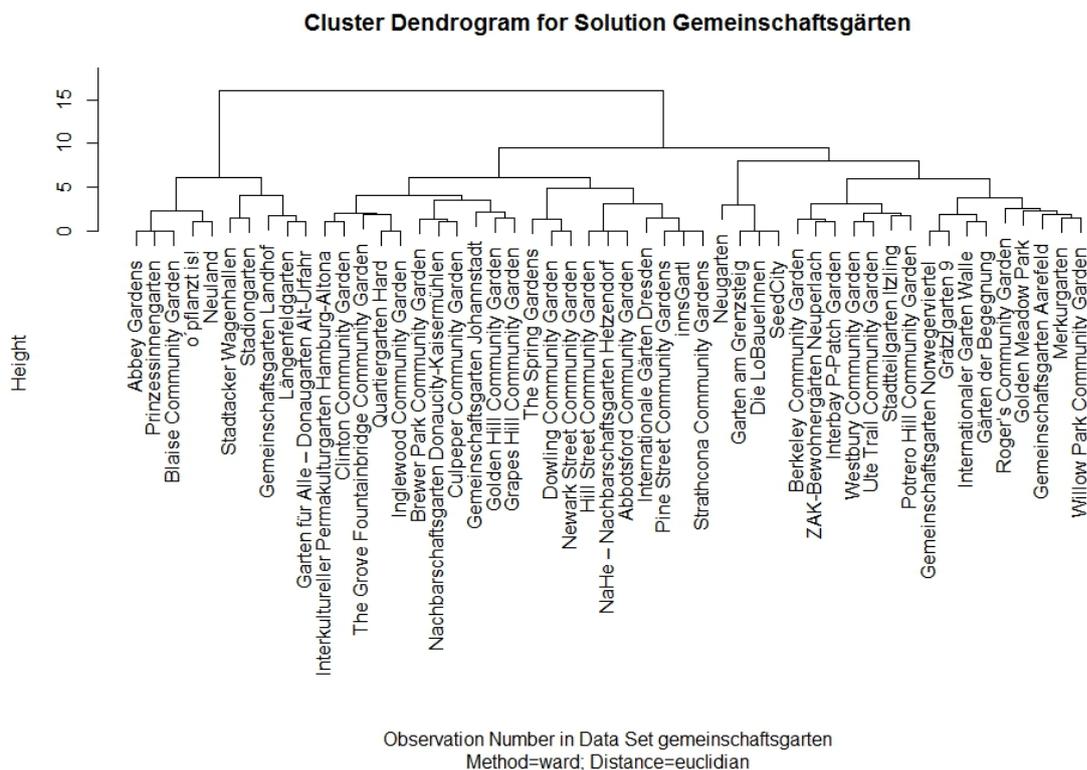


Figure 1: Cluser analysis outcome

Based on the cluster analysis, we identified four types of community gardens:

- cluster 1: “participation gardens”,
- cluster 2: “self-organised community gardens with volunteer options”,
- cluster 3: “collectively organised garden projects”,
- cluster 4: “closed, smaller garden groups with a predominantly superordinate organisation”.

The first group of community gardens can easily be interpreted and is called “participation gardens”. A very low participation threshold is typical for this group of gardens. Interested persons do not have

to sign a membership agreement or to join an association at any of these gardens; they can garden according to their individual desire and mood, more or less regularly. Although some of these gardens also have an option for a membership, it is no prerequisite for a participation in the garden. None of the gardens in this cluster 1 consist of only privately used plots most focus on commonly used areas. Due to the free access there are no waiting lists and the number of gardeners varies. Thus, for instance, the Abbey Gardens in London state on their website: „Welcome to a garden where anyone may learn about, grow and harvest organic vegetables, fruit and flowers. You can give as much or as little time and energy as you can spare or just come and visit. There are plenty of events“ (Friends of Abbey Gardens, s.a.). The invitation for simple participation is also published on the website of NeuLand in Cologne: “Participate at NeuLand? Anybody who wants to can do that. We are looking forward to welcoming you! Preferably, you come to one of our community days (see events), there someone can explain how everything works and you can directly pitch in” (Kölner NeuLand e.V., 2017).

About half of the gardens in cluster 1 have only few guidelines and principles for the common handling. The majority of the gardens in this cluster is accessible free of charge, some gardens ask for voluntary donations. Half of the gardens in the cluster 1 “participation gardens” has open access, i.e. the public cannot be excluded from the garden. The other half is fenced and can be locked to control the access to the garden. It is striking that all gardens in cluster 1 are located in Europe (two in the UK, Switzerland, and Austria respectively, four in Germany). A closer look on the duration of the gardens (an information that was not used in the cluster analysis) reveals that these gardens have been founded in the last eight years. Therefore, this cluster describes young European garden projects.

Cluster 3 „collectively organised garden projects“ is very similar to the cluster 1. Here, there are no individual plots – the whole area is managed collectively. The distinguishing feature to cluster 1 is an obligatory membership. Certainly, there is the possibility to participate rather sporadically, but even members who rarely pass by have to sign a membership agreement. The clear regulation of collective action is remarkable. Thus, e.g. „Die LoBauerInnen“ (Vienna, Austria) or the „Garten am Grenzsteig“ (Zurich, Switzerland) precisely defines participation opportunities. There is a staggered membership model. Harvesting rights are shared based on the efforts made and responsibilities taken by the members. All gardens of cluster 3 are single stranded associations based on membership fees.

The largest clusters 2 and 4 are not as precisely characterised as clusters 1 and 3 and hold all US and Canadian gardens. However, a closer look reveals similarities and differences. In cluster 2 “self-organised community gardens with volunteer options” all community gardens – except for two – are structured by a single stranded organisation, which might be an association or another form of non-profit organisation. Only the „Gemeinschaftsgarten Johannstadt“ (Germany) and „The Grove Fountainbridge Community Garden“ (UK) have superordinate organisations. One distinctive feature to cluster 4 is the group size of the garden members. Cluster 2 comprises – with a few exceptions – rather large garden groups with more than 80 members. Three gardens have a medium number of members (41 to 80), for three gardens the precise number of members cannot be specified but no garden has less than 40 members.

For most gardens in this cluster 2 some kind of membership agreement is required if someone would like to cultivate an individual plot. 11 gardens in cluster 2 offer an option to participate without membership and without individual plots. This however is restricted to special volunteer days or joint working sessions. Thus, this group of gardens differs from gardens in cluster 4 where participation without own plot or membership is only possible in exceptional cases. With regard to the garden area, most gardens in cluster 2 have both private plots and common areas. Three gardens have only private plots. Except for one garden, the membership is associated with costs. 16 out of 21 gardens have a waiting list. All gardens in this cluster have documented rules.

Cluster 4 “closed, smaller garden groups with a predominantly superordinate organisation” is characterised by a rather closed organisation. Some kind of membership agreement is necessary. As concerns the number of gardeners, we observed a clear tendency for smaller garden groups. 9 out of 16 community gardens have up to 40, four gardens between 41 and 80, and only three gardens more than 80 members. A further distinguishing criterion between cluster 4 and 2 is the organisational form of the garden group. The majority of the described gardens has a multi-level organisational form, i.e. either a non-governmental or a governmental organisation organises several gardens. Membership is always related with costs and only four gardens do not have a waiting list. It is interesting that a closed garden group is not necessarily accompanied by an inaccessible community garden. Half of the gardens are fenced and can be locked. Just as for gardens in cluster 2, most gardens in cluster 4 have documented rules.

A closer look at the geographical allocation of the community gardens reveals that US and Canadian community gardens can be found exclusively in clusters 2 and 4, which share several characteristics. Indeed, these community gardens have commonly used areas but are dominated by privately used plots. Both clusters, where collectively used area dominated comprise gardens located in European countries only. Therefore, we reject the hypothesis that there is a difference between the Anglo-Saxon and the German-speaking area. This distinction rather arises between Europe and North America. The selected Austrian gardens represent all four clusters. The same applies to the Swiss cases. Selected community gardens in Germany and in the UK represent three clusters respectively.

3.2 Comparison of geographical contexts based on cross tabulations and t tests

The tests and the cross tabulations show more detailed insights on the differences and communalities between geographical contexts. Regarding area size, no significant difference can be observed in the two language areas. The mean value in the German-speaking area is 4,497.037 sqm per community garden and in the Anglo-Saxon area 7,847.750 sqm. One distinction can be made regarding the years of existence of the gardens. With a mean value of more than 19 years, the selected gardens in the Anglo-Saxon area – particularly those in North America - have been existing significantly longer than the ones in the German-speaking area with a bit more than 6.5 years.

The cross tabulations show significant differences for two attributes of community gardens in the two language areas. These concern the categories “waiting list existing” and “mainly community plots”. In the German-speaking area, there are considerably more community gardens where the whole area is collectively used (11 out of 16) whereas the frequency for Anglo-Saxon area makes up 2 out of 24 gardens. The gardens analysed in the Anglo-Saxon context have significantly more often waiting list (only 5 out of 24 gardens do not have such a list). By contrast, the majority of community gardens in German speaking countries, i.e. 19 out of 27, do not have a waiting list. There are no significant differences regarding the categories “fees”, “superordinate organisation or association”, “public organisation”, “number of members and participation opportunities without own plots and membership”.

3.3 Ostroms design principles and community gardens

The use and review of Ostrom’s design principles on the selected community gardens showed an overall high accordance. Many principles for the long-term management of collective goods seem also applicable for the organisation of community gardens. Nevertheless, community gardens cannot be seen as consistent resources as such. Whereas some principles apply for most community gardens, others require a more differentiated consideration (see Table 3).

Tab. 3. Ostrom’s design principles in community gardens

design principles	implementation in community gardens	accordance for community gardens
1a) Clearly defined boundaries: resource access	<u>types for access regulation</u> 1. membership agreement necessary for gardeners 2. membership agreement necessary for own plot, but additional opportunities for volunteers 3. no membership necessary, open boundaries	high accordance for type 1, middle accordance for type 2, low accordance for type 3
	fees	accordance in parts
	waitlist when all plots are taken	
	regulations concerning residency for gardeners	
	<u>harvesting regulations in case of open access:</u> 1. everybody may harvest (with consideration of others) 2. collectively organised harvest 3. produce is sold, even to gardeners	
1b) Clearly defined boundaries: garden entrance	garden boundaries: fences, walls, locks	accordance in about 50 % of selected community gardens
2) Congruence between appropriation and provision rules and local conditions	strict rules in case of high demand for plots	accordance is assumed
	harvesting rights depending on amount of work more rights for official garden members	accordance is assumed
3. Collective-choice arrangements	<u>level of collective choice arrangements:</u> 1. few collective choice arrangements due to externally prescribed regulations 2. elected garden members responsible for decision making 3. collective choices in garden group	low accordance for level 1 gardens, middle accordance for level 2 gardens, high accordance for level 3 gardens
4. Monitoring	<u>forms of monitoring:</u> 1. monitoring through selected members of the garden group 2. monitoring through external person 3. collective monitoring in garden group	high accordance is assumed, but cannot be sufficiently verified
5. Graduated sanctions	warning	high accordance for most community gardens
	plot subtraction	
	exclusion from garden	
6. Conflict-resolution mechanisms	regular meetings with options for discussion of problems	high accordance
	contact persons responsible in case of conflict	
	codes of conduct, guiding principles	
	formalised arbitration	
	targeted communication and mediation in garden group	
7. Minimal recognition of rights to organize	land use agreement on public land	high accordance
	public subsidisation	
	tolerance from public agencies	
8. Nested Enterprises	subordinate gardens within a bigger nested organisation (diverse forms, but no public organisation)	accordance for some community gardens, the majority of gardens is fully self-organised and not part of a nested organisation
	public organisation overseeing several gardens	

The first principle is certainly one of the more complex ones, concerning community gardens. While some gardens clearly distinguish between users and non-users of the resource, garden boundaries seem to be a lot more open in other cases. In these cases, we find different mechanisms for regulating harvest and access to the garden. While some gardens have open access, and no strict rules concerning the harvest, others might not set boundaries when it comes to garden access, but have strict regulations when it comes to harvesting. For the second principle, we can find accordance in a lot of community gardens. The multitude of our cases has defined rules, only some community gardens emphasise the lack of rules and stress the benefits that occur with this increased freedom. Where there are rules, they often occur in a stricter way, when the demand for plots in the garden is high, and waitlists exist.

Monitoring mechanisms in community gardens are not always as clearly described as other aspects of organisation. While many gardens document rules and sanctions for disregarding these rules, they don't always mention their monitoring. Through analysing the selected community gardens, we found different forms of monitoring mechanisms. While it is often carried out by selected garden members, we also found forms of monitoring through external persons, or more informal collective monitoring within the garden group. In the case of misconduct, we identified sanctions as warnings, plot abstractions and suspensions. These sanctions would vary depending on the severity of the misconduct in certain community gardens. As far as conflict resolution mechanisms are concerned, we found different approaches in the community gardens. These mechanisms varied from informal communication arrangements to highly formal arbitrations.

The level of collective choice opportunities varied also among the cases. While many gardens are part of multi-level organisations and have to follow regulations prescribed by higher-level organisations, which apply for all supported gardens, some gardens highlight the importance of collective decision-making. In the group of fully self-organised gardens that are not part of a nested organisation, we find grassroots direct democratic decision making as well as groups that elect decision making garden members. State authorities accept – often also support – the community gardens we analysed. Out of 51 community gardens, 42 are located on public land, with user agreements between the garden group and the associated city government. Besides supplying the garden area, public agencies also support numerous community gardens with grants and often assist in the initiation phase. Sometimes leasing the garden area from public agencies is attached to certain conditions and rules. As already presented in the quantitative analysis, the majority of community gardens is fully self-organised, so the 8th principle “Nested enterprises” only applies for a minority of the 51 gardens analysed.

3.4 Group size and heterogeneity in community gardens

Concerning the hypothesised positive effect of small group size and low group heterogeneity on garden organisation we identified both smaller and larger garden groups. Ten community gardens consist of up to 40 members each respectively between 41 and 80 members. Most community gardens (19) have more than 80 members. For 12 gardens, no fixed number of participants could be evaluated as they are accessible for everybody. Hence, garden groups with both a smaller and a larger number of participants seem to work.

Nearly all analysed community gardens are characterised by heterogeneous groups, as either concerns the age of participants or their background. Many community gardens consciously point out the mix of the garden group. The garden group of the community garden “Stadtacker Wagenhallen” (Germany) describes itself as follows: “We are a colourful mix of students, young families, immigrants and workers with different background like China, Turkey, Italy and various other parts of Germany” (Stadtacker Wagenhallen, 2017, s.p.). Thereby, community gardens often aim at promoting the exchange between generations and cultures. The „Stadtteilgarten Itzling“ group (Austria) aims at a diversity of age groups, gender, cultures of origin and life styles and allocates available plots according to a “diversity principle”.

Some community gardens, especially cases from Canada and the US, are only accessible for direct residents. You must live in a certain residential area to get a chance to rent a plot. However, even these gardens aim at bringing together all age groups and cultural backgrounds. A homogeneous garden group is to be expected in the „Roger’s Community Garden“ in San Diego (USA). The community garden is located on the campus of the University of California, San Diego. In order to get an own plot in the community garden you must be a student, graduate or employee of the university. Here, all garden members have a certain connection with the university.

4. Discussion

The institutional analysis of 51 community gardens in Anglo-Saxon and German speaking countries extends the previous knowledge on community gardens organised as spaces of collective action. Whereas we already find research on community gardening organisation, the cross-cultural approach comparing a multitude of gardens in 6 countries is new.

4.1 Types and principles of community garden organisation

Jamison (1985) identifies two different types of organisational structures of community gardens in New York. Community gardens with bureaucratic cultures showed a more individualistic approach in terms of cultivation of the plots, and strict regulations whereas collectivist cultures often collectively cultivated the entire garden. Regulations in collectivist cultures were less formal, and often concerned the broad involvement of all garden members in aspects of the garden (Jamison 1985). While some of the findings correspond with our results, there seems to be the need for a more differentiated classification when including gardens from other geographical contexts. Our analysis of 51 gardens in six North-American and European countries identified four different types of community gardening organisations. The different types vary in terms of forms of organisations (self-organised, subordinate organisation, public organisation, or no official structure), use of garden area (collectively used versus individually or a combination of both), possibilities for participation (with or without membership), and regulations. It becomes evident, that there are more than two types of organisation emerging from the analysis. When examining the first and third cluster of organisation “participation gardens” and „collectively organised garden projects” one might argue, that they can be identified as gardens with a collectivist structure in Jamison’s understanding, since the garden area in both clusters is mostly cultivated collectively. However, there are certain differences when it comes to participating options and garden access, which clearly distinguish these garden types. Whereas “participation gardens” are characterized by low-barrier access, and volunteering opportunities for gardeners without obligatory membership, “collectively organised garden projects” seem to be more structured. Moreover, there is an explicit garden group, where all gardeners are members in the community garden, even if there are also options for more or less time-consuming gardening activities. The second and fourth cluster would correspond in many cases to the more bureaucratic cultures, but even with these community gardens, many differences in organizational structures occur. Organisation varies in terms of self-organised forms, public organization, and subordinate organization. These different forms of organization alone can cause an impact on the possibility for collective-choice arrangements, as seen in the results of analysing Ostrom’s design principles in community gardens. Other distinguishing criteria are once again options for garden access and participation. While some community gardens accept members only, others offer participation opportunities for non-members, so-called volunteering-options.

Based on our definition of community gardens and the associated process of case selection, collective action occurs in all types of organisations. Rogge et al. (2015) differentiate between different elements shared and divided in community gardens: resource system, infrastructure, resource unit, work and social time. This diversity of commons, result in diverse forms of collective action. Collective action is most evident in “participation gardens” and “collectively organised garden projects” with mostly collectively cultivated garden areas, but appears also in other community gardens with mixed individually and collectively cultivated plots. Especially Northern American community gardens regulate collective work in common areas, with a yearly number of obligatory work hours. But not only the allocation of garden area and working hours determines the level of collective action, even common activities, and a practised sense of community can account for collective action of the gardeners. Thereby our results confirm that collective action emerges in common experiences, and in social exchange for the collective development and maintenance of the gardens (Werner 2011, Rogge et al. 2015). Thus in terms of social experience, community gardens can go beyond Pudup’s (2008) criteria for collectively organised community gardens: self-organisation by an organised group of members, self-defined rules and their implementation and the cultivated area is dedicated to the

members (Pudup 2008). The groups analysed in this paper intentionally create opportunities for communication, community and trust building and cohesion.

When looking at the results of the cluster analysis as well as the analysis of Ostrom's design principles, it becomes evident, that Ostrom's first design principle 'clearly defined boundaries' in particular requires a more precise consideration. While it may be suitable for some community gardens, other cases show different approaches. This first principle implies a clear distinction between the users and non-users of a collectively used resource. In the case of community gardens, we have to take a closer look on what defines this resource. It could mean the garden area, which would be in danger of overuse in the case of unlimited access. Another collectively used resource in the garden is the produce. While there were different methods used for distributing and regulating the produce in our cases, many community gardens emphasise the fundamental openness of the garden. This was of course applicable in the "participation gardens". In these gardens, a membership agreement was not necessary for participating. Even a lot of gardens from the second cluster „self-organised community gardens with volunteer options" offered volunteering options for non-members. This openness, when it comes to community gardens, can not only be viewed as deviation from Ostrom's design principles, but also as important additional information to consider in terms of long-term collective organisation in community gardens. It may be an important factor for providing political support and labor for establishing and maintaining these resources as such.

Cultivating a community garden requires a lot of time and engagement from a large number of people. Therefore, it is often crucial for the long-term existence of community gardens, to mobilise enough interested parties, who invest their time and engagement in these kinds of projects. In our analysis, we find numerous examples of community gardens that were established with the help of dozens of residents and neighbours. Examples are the community gardens „Prinzessinnengarten" in Berlin, „NeuLand" in Köln, „Stadtacker Wagenhallen" in Stuttgart, „LoBauerInnen" in Vienna, and „Stadiongarten" in Zurich. They were all established with the help of numerous volunteers, as well as some sort of supporting systems. Opening boundaries can help to mobilise residents as volunteers and helpers.

Another impact of opening boundaries of a community gardens can be the development of networks and neighbourly structures. This corresponds to Werner's (2011) findings. He emphasises the benefits that occur with these networks, and the developing community. When a larger neighbourhood enjoys the amenities of a community garden, there is the chance of much longer survival, due to these networks and structures within the neighbourhood. Ghose and Pettygrove (2014), too, emphasise the relevance of social networks for the development and long-term organisation of community gardens, certainly, as far as groups have to tackle with scarcity of resources. This community support is particularly relevant when long-term existence of community gardens is questionable as only 5.3 % of the reviewed garden areas in North America belonged to the garden group itself or was in possession of a land trust (ACGA 1998). Amongst our cases, we also found gardens organised as intermediate use with mobile plots.

Not only the lack of boundaries in certain cases, but also the various possibilities for participation were noticeable, and have not been reviewed in the same manner before. When participating in community gardens, gardeners often not only join without any membership agreement, but there are also rarely time requirements. Gardeners can often join for as long as they want, and invest as much time as appreciated. Rather flexible possibilities can help mobilising people for a community garden. The question that arises from these findings is how to find organisational structures that work within the garden group, when open access to the garden is practised, and volunteers need to be mobilised. One possible approach could mean to have different kinds of garden members in the community garden. We find these kinds of systems in some of our cases (e.g. o'pflanzt is!, Prinzessinnengarten, NeuLand). Whereas all interested people may enter and join the community garden without any membership,

only official members in the community garden make decisions, and take care of running the community garden. To reward these work efforts, more responsibilities may result in more privileges. This would correspond also with Ostrom's second design principle "Congruence between appropriation and provision rules and local conditions". In any case, the eligibility of chosen access regulations seems relevant. While opening boundaries for community gardens may in some cases be appropriate, in others the opposite can be more relevant. When it comes to keeping people involved in garden projects, also binding effects through membership in community garden groups can be successful. As described in one case with obligatory membership for all gardeners, these binding elements encouraged engagement and contributed to commitment from the gardeners towards the community garden. It also resulted in a more careful handling of collective resources (Internationaler Garten Walle 2013, s.p.). The decision whether to open social boundaries seems to be one that strongly depends on local conditions and circumstances.

One of the selection categories reflected in the different clusters is the form of organisation. While most of the cases were fully self-organised in a one-dimensional form of organisation, most of the community gardens in the fourth cluster are part of a nested organisation. Higher-level organisations are responsible for either a larger number of community gardens or govern garden organisations as well as other projects and purposes besides the community garden. How does this multi-level governance affect collective choice and collective gardening? We already demonstrated community gardens with subordinate or public forms of organisations, where collective-choice arrangements of the individual garden groups were restricted by higher-level regulations and rules that apply for all supervised community gardens. In some cases, multi-level organisations resulted in external monitoring as opposed to monitoring within the garden group. These findings would not comply with Ostrom's design principles that propose collective-choice arrangements and monitoring through members of the garden group. However, these subordinate gardens also benefit from higher-level organisations. Nested forms of organisations can have a positive effect on transaction costs of individual gardens (see also Olson 1965). In providing necessary infrastructure, knowledge and expertise, organisations responsible for more than one community garden can contribute to lower transaction costs for garden groups. Even new community gardens can form more easily when there is already valuable knowledge (e.g. on legal steps, procedures, finances) and templates (e.g. for membership contract) available. However, gardens with superordinate forms of organisation might lack flexibility and autonomy in organising collective action. Whether it is a nested or fully self-organised form - when looking at the cases, it is noticeable, that most community gardens have some sort of official organisational structure. Even those community gardens that communicate loose organisational structures on their website often have some form of formal organisation. Thus, there seems to be a necessity for formal organisational structures for maintaining or establishing community gardens.

4.2 Differences and commonalities in community gardening organisation in German speaking respective Anglo-Saxon contexts

One of the research questions referred to the differences and commonalities of community gardens as collective spaces in German speaking versus Anglo-Saxon area. In selecting cases from Austria, Germany, Switzerland, USA, UK and Canada, we contribute to a better understanding of community garden organisation across different language areas. The wider comparison of community gardens in different countries and continents adds interesting insights to the community garden literature.

One apparent result is the distinction rather between European and northern American community gardens, as opposed to German speaking area and Anglo-Saxon area. Whereas Austrian and Swiss community gardens were found in all 4 types of organisation, and community gardens from Germany and the UK were represented in respectively three types, the American and Canadian gardens were associated with only two types of organisation. Thus the similarities in their organisation becomes

evident. The American cases appeared in two clusters of organisation, with no gardens being allocated to cluster 1 “participation gardens”, and cluster 3 “collectively organised garden projects”. All examined gardens had individual plots and/or common areas, but no garden was fully cultivated collectively. In contrast to the similarities in American garden organisations, our findings show a higher variability of community garden organisation in the German speaking area. Recently established community gardens are often described as „new (urban) gardens“ (Müller 2011, Appel et al. 2011), characterised by less regulations, a focus on local food production, and the presence of political messages. Our findings clearly show that there is not one form of the “new community garden” to be found in German speaking countries. On the contrary - the gardens in Germany, Switzerland and Austria show a variety of different types of organisation. We can find all four types of community gardens in Austria and Switzerland. Some community gardens founded in the last six to seven years however are also very similar to northern American neighbourhood gardens. They are characterised by explicit regulations, and closed garden access, as well as the individual and collective cultivation of garden plots.

Whereas community gardens in the German speaking area show different types of organisation, the selected northern American community gardens didn't demonstrate as much variability. When analysing community gardens in these two speaking areas, the existence of allotments („Kleingärten“ in Germany and Austria; „Familiengärten“ in Switzerland) has to be mentioned. Collectively organised community gardens in German speaking area and the UK are often seen as new forms of gardening opposing the idea of these allotments, where the garden area is strictly divided into individual gardens, and strict rules concerning planting exist (Appel et al. 2011). These forms of “Kleingärten“ usually don't exist in American cities. Another organisational difference in American and European community gardens is their use and perception by local residents. Whereas community gardens in the German speaking area are often discussed as new forms of green spaces, they are considered as substitutes for public parks in American cities. Due to people worrying about park safety, they often use community gardens for recreational purposes (Rosol 2006). Community gardens in the UK appeared to be much more similar to community gardens in the German speaking area, but also show distinct features such as the noticeable focus on including the public. The welcoming atmosphere created for visitors and volunteers once again underlines the concept of opening up social boundaries when it comes to community gardens.

Researching community gardens in different speaking areas also revealed similarities across these areas. Similarities of community gardening organisation become evident in garden size, membership fees, number of members in the garden, and forms of self-organisation respective subordinate organisations. In both speaking areas one-dimensional forms of organisations that served one particular community garden dominated. Comparing these findings with Drake and Lawson's investigation of American and Canadian community garden organisations 2012, we see a certain discrepancy, which however might be explained by a selection bias on our site (small sample without certainty of being representative for all gardens in the six countries). Their results showed a share of 39% of fully self-organized community gardens. While this represents the biggest share of all examined community gardens, Drake and Lawson differentiate between sizes of nested organisations, with medium organisations being responsible for 2-3 gardens (19%), large organisations maintaining 4-30 gardens (30%), and very large organisations more than 31 gardens (12%). This results in a majority of nested organisations for American and Canadian community gardens. Another difference between the two different language areas is the years of existence of the selected community gardens, and the availability of waitlists. Community gardens in North America were on average established earlier and there was a greater demand for plots underlined by waitlists. The longer existence of community gardens can be explained with the historic development of community gardens in northern America. As already discussed, the perception of community gardens as green spaces substituting public parks in Northern American cities can be an explanation for the greater demand and existence of waitlists.

Our findings for community gardens in six countries show that both smaller and bigger garden groups manage to organise community gardens as collective spaces. It was noticeable that almost all community garden groups were characterised by high heterogeneity, which was often a clear objective of the community garden. The connecting link in these heterogeneous groups seems to be the strong gardening interest.

The political aspect of community gardens is not always as evident, as literature supposes. Community gardens are often described as political spaces (e.g. Müller 2011, Rosol 2010, Follmann and Viehoff 2015, von der Haide et al. 2011, Werner 2011, Schmelzkopf 1995, 2002). The political aspect of community gardening becomes evident, when political messages are addressed through community gardening. Gardening can thus become a form of political activity with the aim of creating open spaces of grassroots democracy. While the garden groups analysed often pick up issues such as environmental protection, self-sufficiency, and municipal politics, the political aspect in community gardens varies along the different cases. In some community gardens, there seem to be other predominating motives. These can be related to community building, social engagement, neighbourhood revitalization, food production and education (see also Drake and Lawson 2015).

Conclusions

In this paper, we present a new approach in examining organisation of community gardens as spaces of collective action across six countries representing two different language contexts – German and English speaking countries. Along this examination, we identified different types of community garden organisation, which vary in terms of organisational form, membership regulations, collective cultivation of garden area, and the availability of rules, costs, and waitlists. Our findings help to understand essential organisational structures within the garden group for long-term existence of community gardens. Comparing 51 gardens, we were able to compare very different forms of community garden organisations. Our results indicate that there is no blueprint organisation, but that multiple approaches can sustain community gardens in the long-term.

Fully self-organisation versus nested forms of organisation and the handling of social boundaries of community gardens seemed to be the two most noticeable categories that required a more precise consideration. Our findings suggest that opening up social boundaries can benefit the mobilisation of people and resources for community gardens. Openness can help in creating beneficial networks and supporting structures for sustaining community gardens. A variety of participation opportunities of different intensities can furthermore keep diverse people involved in long-term garden projects. For these open types of community gardens, a differentiation in membership modes with a greater or lesser extent of responsibility and decision rights can be helpful. As far as forms of organisation are concerned, we identified advantages as well as restriction for either types of fully self-organised community gardens and gardens with a nested organisation with higher-level organisations coordinating several subordinated gardens. While fully self-organised gardens might be more flexible in making decisions on and developing their community garden, being part of a nested organisation can result in lower transaction costs for individual community gardens.

When comparing community garden organisation across countries, the multitude of different community gardens in European countries is especially noticeable. Whereas we find all four organisational types in Austria or Switzerland, and three types in Germany and the UK, the North American examples represent only two types. The division between Europe and North America is more evident as that between English and German speaking countries. While the new community gardens are often described as political spaces, these does not apply for all the gardens we analysed. The next

step of our analysis will be to formulate recommendations on how to choose one of the four different organisation forms for new community gardens in view of diverse contexts and circumstances.

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