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Design and Social Factors Affecting the Formation of Social Capital in Chinese Community Garden

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Abstract: In recent years, community gardens are becoming more and more popular in China. However, the role of these community gardens varies significantly: some community gardens serve as an effective means of promoting social capital, while others cause social contradictions and public doubts due to the lack of professional design and management. Therefore, this paper aims to learn and better understand what factors affect the formation of social capital in Chinese community gardens. It screened eleven design factors and seven social factors and made social capital scale through literature review and expert workshop. On this basis, this study selected 35 community gardens in China as sample spaces, and collected 1257 questionnaires about the perception for social capital of gardeners through survey. In the statistical analysis phase, factor analysis and regression analysis were applied to analyze the role and the relative importance of different factors and social capital. Results show that the integration with green infrastructure, accessibility, size, visual openness, planting form, proportion of unproductive landscape, agricultural infrastructure, and smart infrastructure have significant impacts on social capital level. Meanwhile, the types of stakeholders, management rules, supervision system, self-management team, and operational activities have similar impacts on social capital level. This study recommends that planners and designers should adjust the above related factors in community garden design, and local government is urged to integrate community gardens into urban plans and public policies.

Keywords: community garden; social capital; design factor; social factor

1. Introduction

As one of the strategies to respond to the food, social, and environmental problems caused by rapid urbanization, community garden has attracted the attention of more and more scholars and practitioners. According to the definition of American Community Garden Association (ACGA), community garden is any piece of land that is cultivated and managed by a group of people. A community garden may range from an assortment of individual plots with some communal management to a project collectively managed by a neighborhood community [1,2]. In this paper, community gardens consist of both allotment-style and collectively managed gardens following above broad definition.

The prototype of community garden can be traced back to the urban garden in Europe during the industrial revolution [3]. In response to the lack of fresh food during the urban industrialism period, charities and politicians in Europe allotted a parcel piece of land to the urban poor to grow vegetables and fruits. Thus, community gardens first appeared in the 19th century, and they gradually emerged throughout Europe and influenced North America [3]. For example, to prevent social unrest during war periods and the Great Depression, the United States has successively initiated a number of community garden movements, such as Liberty Gardens, Relief Gardens, and Victory Gardens [4].

At present, social, environmental, and food problems caused by urban development are stimulating the worldwide expansion of community gardens. Plenty of community garden-related projects have been launched in many cities in the world, such as the P-Patch program in Seattle [5], the Empty-Spaces Plan in Barcelona [6], the Verge Garden in Australia [7], and the Community in Bloom in Singapore [8].

In China, authorities have shown increasing support to the intensive and ecological use of idle land, which was incorporated into many urban regeneration policies, such as “Stock Regeneration” and “City Betterment and Ecological Restoration”. For community garden, all these policies regard it as an important means to make full use of the idle land and restore the built environment. In this situation, community gardens have developed rapidly in China. As of 2019, the number of community gardens in Shanghai alone has reached more than 300 [9]. Chinese community gardens serve multiple functions. They provide local healthy food, regenerate the public space [10], promote participation in community public affairs, and build community self-governance teams [11]. More importantly, through planting and maintaining activities, community gardens promote neighborhood interaction and cultivate social capital. Research has also confirmed that in high-density settlements with severe social isolation, community gardens established under the different backgrounds of “geographical relationship” and “interest relationship” can form social capital and show broader social value than blood relationship, which is helpful to alleviate the conflicts in the community and establish social relations [12].

In China, most community gardens are built spontaneously by residents or grassroots organizations. Due to the lack of professional guidance, there are defects and problems in spatial design and management of community gardens, making them difficult to play social functions and even triggering public doubts. For example, improper site selection causes neighborhood conflicts and disrupts community life [13,14]. Therefore, exploring the design factors and social factors affecting the formation of social capital in community gardens is a question that deserves further research. From the perspective of community development, guiding residents to build community gardens with the concept of social capital is also of great benefit to rebuild public spirit and create community autonomy.

The paper aims to explore the following aspects: which design factors and social factors affect the formation of social capital; how do the design factors and social factors affect; and what are the possible reasons for this. The structure of this paper is (1) to identify the key factors through literature review in Section 2; (2) to present the research process, and analyze the relative importance of design factors and social factors and their roles on social capital in Sections 3 and 4; (3) to further discuss the possible reasons for the results and provide suggestions on the future research and urban planning in Sections 5 and 6.

2. Literature Review

2.1. Definition of Social Capital in the Context of Community Garden

Social capital is a kind of capital [15]. As there are differences in subject areas and research perspectives, social capital has been described by different schools in various ways. Among them, Putnam’s “trust-network-norm” triad structure has been recognized by most scholars. He believed that social capital includes mutually beneficial norms and civic engagement networks and defined social capital as the features of social organizations, such as trust, networks, and norms that can improve the efficiency of society by promoting cooperative actions [16,17].

This paper applied Putnam’s definition of social capital, because it can explain the social networks and social values formed by gardeners’ long-term participation, and it focuses on different forms of social capital such as bridging social capital and bonding social capital [18,19].

2.2. Study of Social Capital and Design Factors of Community Garden

Design factors refer to tangible environmental factors that designers or gardeners can manipulate [20]. It is established that design factors can influence the formation of social capital [21].

However, there are relatively few studies on the design factors and social capital of community gardens. Existing studies mainly focus on three types of design factors: site selection, spatial character, and infrastructure configuration, and whether these factors contribute to the formation of social capital in community gardens.

Site selection is to explore how community gardens have integrated in the urban fabric, and it discusses community gardens' relation to the urban green infrastructure, their accessibility for gardeners and others, and their size. Spatial character focuses on community gardens' spatial layout, such as their visual openness, the public spaces in community gardens, planting forms, and landscape types. Infrastructure configuration refers to the necessary supporting infrastructures in community gardens.

2.2.1. Site Selection

The integration of community gardens and green infrastructure is closely related to the formation of social capital. Compared with gardens far away from green infrastructure, community gardens located inside parks or near river are more likely to attract potential participants, like people seeking outside recreation who otherwise may not visit traditional parks. Through the participation of these potential groups, community garden can recruit new members and expand social networks [5]. Similarly, Kingsley (2006) confirmed that community gardens located in parks can increase opportunities for gardeners to contact park visitors and facilitate the establishment of diverse social relationships [22]. Middle and others (2014) demonstrated the important role of community gardens in the cultivation of social capital from the perspective of mutual benefit between community gardens and parks. They believed that parks provide stable land source for community gardens, and the social and ecological benefits of community gardens are helpful to establish and strengthen the connection between different participants in the park [23]. According to the research of Drake and Lawson (2015), compared to gardens located next to streams or canals, community gardens lacking a reliable source of water reduce residents' participation [24].

Accessibility is an important consideration for the cultivation of social capital in community gardens. It is established that locating community gardens around the residential areas or within a short walking or bike riding distance can increase convenience for people to participate, thereby increasing social interaction [25]. The optimum distance is within 1/4 to 1/2 mile [26]. Bendt et al. (2013) used four community gardens in Berlin as examples to compare and study the impact of different geographic locations on the social capital of community gardens. Results showed that community gardens located in public spaces such as community centers, main streets, or bars with dense populations attract more participants and stimulates more interaction than gardens located in a remote or hidden position [27].

The size of community gardens plays a key role in the formation of social capital. Community gardens with a certain scale can realize the agglomeration of people and information and promote the establishment of bridging social capital [3]. Silva et al. (2016) pointed out that reasonably controlling the balance between area and quantity of allotments can attract low-income groups and unemployed people to participate and promote interaction between different social groups [28]. Based on the analysis of the relationship between the spatial characteristics and participation rate of 8 community gardens in Texas, Mast (2013) found that large-scale community gardens play a significant role in participation and interaction [29].

2.2.2. Spatial Character

Compared with visually closed gardens, visually open community gardens have stronger connectivity and legibility and provide opportunities for informal visual contacts between gardeners and external residents. This advantage contributes to spatial agglomeration and expands the social network [3]. According to the research of Škamlová (2020), visually closed community gardens reduce residents' familiarity with gardens and hinder public participation, while visually open community gardens are beneficial to a wide range of social interaction and have stronger social influence [30].

Witheridge and Morris (2016) believe that higher visual openness and visibility in community gardens can effectively increase residents' acceptance and enhance their willingness to participate [31].

Public spaces such as clubhouses, communal sheds, and roundhouses are important places where residents can gather to drink, chat, and share vegetables. In the "Guidance for traditional allotments and community led gardening projects," the Welsh Government emphasized that public communication space should be located closer to the disabled growers, and it can be converted from idle houses [32]. Payne and Fryman (2001) supported the above view and they further explained that cultural public spaces can adapt to the needs of diverse ethnic groups, enhance their communication, and cultivate social capital [33].

The different spatial appearances produced by different planting forms have an important influence on the attractiveness of community gardens. Matthies et al. (2016) believed that a vegetable plot with orderly form can increase aesthetic appeal while a homemade growing container has a lower aesthetic value and is less attractive [34]. Contrary to Lindemann's research results, Wang et al. (2017) pointed out that the application of growing containers can increase the cleanliness of the garden environment, and affirmed the positive effect of non-productive landscapes in enhancing the recognition of gardens and ensuring the participation interaction of residents [35]. Moreover, Philips (2013) takes the Edible Garden located in Atlanta Botanical Garden as an example and shows that the combination of productive landscape and non-productive landscape of different colors and textures can provide visually striking and attract more visitors [36].

2.2.3. Infrastructure Configuration

Fully equipped infrastructure can increase participating willingness and the richness of social network. Hadavi et al. (2015) believed that infrastructure configuration should meet the category and quantity requirements and fully consider the perception and adaptability of participants to its layout [37]. Jiang et al. (2019) pointed out both the advantages (practicability, easy to make, etc.) and the disadvantages (poor aesthetics, etc.) of agriculture infrastructure [38]. Karge (2018) points out that community gardens with ecological infrastructure (composting boxes, rainwater collection devices, etc.) are more likely to attract the attention of government departments and environmental protection agencies, which is conducive to increasing cooperation and exchanges between gardeners and the outside groups and helps to build bridging social capital [39]. Meanwhile, Maye (2019) believed that smart irrigation systems and smart cultivation devices can change the negative distressed and dirty image of traditional field agriculture in rural area, and increase acceptance and participation [40]. For example, the smart drip irrigation system can reduce the use of plastic containers or waste buckets, thereby increasing the cleanliness of growing space, while smart cultivation devices can be applied in areas lacking green space, attracting educated young people to participate, and promoting social interaction between them [41].

Some scholars comprehensively consider the design factors that influence the cultivation of social capital in community gardens. For example, Morckel (2015) believed that the configuration of infrastructure, such as pavilions, arches, fences, elevated planting beds, artworks, etc., and non-productive landscapes will affect participants' preference, and in turn affect the construction of social network in community garden [42]. Langemeyer et al. (2018) confirmed that the material environmental factors that affect the participation in Spanish community gardens, including the size of gardens, the main functions of surrounding environment, and man-made objects (compost boxes, benches, and shelters) in gardens [43].

2.3. Study of Social Capital and Social Factors of Community Garden

Social factors are intangible environmental factors formed by the outside world or created through the activities of gardeners [25]. It is demonstrated that social factors have a close link with social capital [25,44]. But there are also relatively few studies on the relationship between social factors and

social capital in community gardens. The social factors mentioned in the literature can be summarized into three aspects: organization, management, and operation.

2.3.1. Organization

In terms of organization, existing research mainly focuses on the impact of the organization structure formed by different participants on social capital.

A qualitative study by Scheromm (2015) shows that shared gardens designed, constructed, and maintained by residents have a greater advantage than family gardens in helping residents create social connections [45]. Bonow et al. (2018) took the allotment garden in Sweden as an example, and discussed the vital role of community organization in ensuring the social sustainability of allotment gardens during the planning and decision-making process [46]. Based on the surveys of Texas community gardens, Lee et al. (2019) confirmed that participation time is a key factor affecting residents' interaction [47].

There are also lots of researches demonstrating that gardens established by government departments or professionals can obtain more land and financial support compared with gardens established by grassroots. But they also pointed out that such gardens are subject to local government control and easy to cause conflicts between different stakeholders [24,48]. Cohen and Reynolds (2015) supported the above view based on interviews with city officials, investors, non-profit organizations, and gardeners. They believe that the wide participation of different stakeholders ensures the supply of resources, which is conducive to the stable development of gardens and the maintenance of social relations. On this basis, they put forward specific suggestions on how to develop a fair and transparent management mechanism to reduce the resource access inequality, such as formulating open and fair management procedures, and setting up a neighborhood representative system [49].

2.3.2. Management

Some scholars compared the impact of different management modes such as individual management, collective management of residents' groups, and management by government or third-party institutions on the cultivation of social capital. Bendt et al. (2013) believed that the collective management mode of "Public Access Community Garden" in Berlin helps participants establish close contact, and he further pointed out that clear management division and management rules can promote all stakeholders to assume responsibility, reduce conflicts, cooperate with each other, and establish social capital [27]. Similarly, Guillermo et al. (2019) demonstrated that collective management activities such as sharing weeding or irrigating tasks can promote mutual assistance and cooperation among residents, and is the key factor in the formation of social capital [50].

Some scholars pay attention to the impact of management rules on social capital. Scott et al. (2018) confirmed that effective rules play an important role in maintaining good relationships among participants, and pointed out that plot application rules, maintaining rules, and infrastructure using rules are conducive to reducing conflicts among participants [51].

2.3.3. Operation

The diverse cultural, educational, and commercial activities carried out during the operation stage of community gardens play a positive role in cultivating social capital. For example, according to Nettle (2016), open working days, art exhibitions, herb selling, farming workshops, and other operational activities increase the participation and vitality of community gardens [52].

Some scholars comprehensively analyzed the influence of different social factors on social capital. Jagt and others (2017) pointed out that the participation of multiple stakeholders (government, third-party organizations, and grassroots) and supporting rules (managing rules and supervision system) are key factors to promote the cultivation of social capital [53]. Based on the results of linear regression analysis model, Rogge et al. (2018) pointed out that the heterogeneity of participants has a strong impact on the social sustainability of community gardens, while the impact of management rules

and supervision mechanism is weak [54]. Langemeyer et al. (2018) summarized the factors that affect the formation of social capital including participating duration, the establishment of self-management group, and management modes [43].

It can be seen that there are still some problems in existing research: (1) Existing research focuses on a certain factor of community garden. Although it provides a groundwork for the related research, there is little research considering the relative importance of different design factors and social factors and their roles on social capital [18]. This lack of comprehensive analysis hinders the understanding of which factor is the most important for the formation of social capital and how the garden design is interconnected with social factors to stimulate the function of community garden to cultivate social capital. (2) Most studies use qualitative research methods [2,44], such as expert interview and participatory observation, and the research results are exploratory and descriptive [44]. Despite its contribution to the research of social capital and community garden, the rigor and validity of social capital measurement methods have yet to be improved, and the quantitative and detailed analysis of the relationship between impact factors and social capital is needed. This is essential as the social function of community gardens is receiving more and more attention.

3. Methodology

3.1. Overview

The research is conducted in three stages (Figure 1). The first stage is to select variables. This includes selecting the spatial and social factors affecting social capital through literature review, and determining the factors and social capital scale through expert workshop. The second stage is case study and data collection. Based on the result of the first stage, this means selecting case study areas, issuing questionnaires and collecting data. The third stage is statistical analysis, which is done by inputting data collected in the second stage into SPSS. Then, the validity and confidence of the scale is tested through factor analysis. On this basis, exploratory analysis is used to assess the social capital of community gardens. Finally, the relationship between different factors and social capital is analyzed through regression analysis.

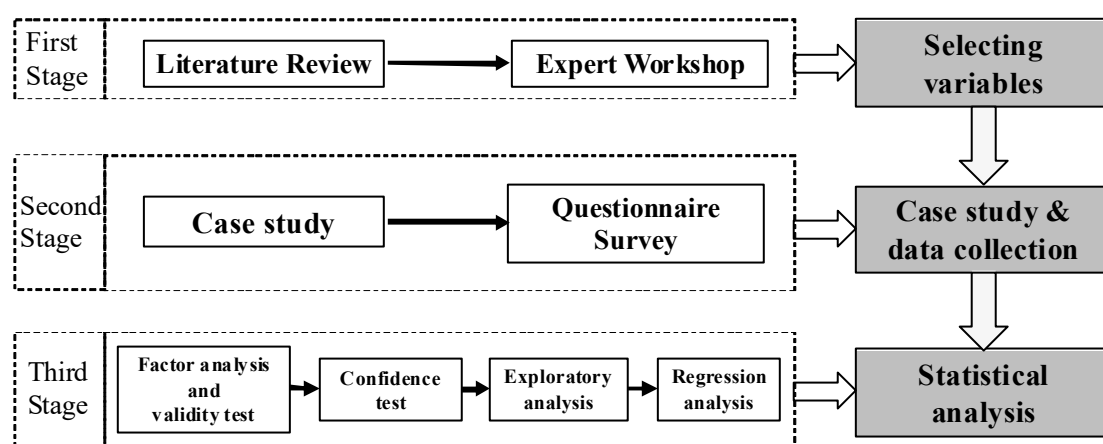


Figure 1. Diagram of the research process.

3.2. Selecting Variables

3.2.1. Analysis of Literature Review

Based on the above research, it can be seen that design factors and social factors are the independent variables of this research. According to the literature review in Section 2, this paper preliminarily divides the design factors into three aspects: site selection factors, spatial character factors, and infrastructure factors. The site selection factors include the integration of community garden and green infrastructure

(parks, rivers, etc.), accessibility, and size; the spatial character factors include: visual openness, public communication space, planting form, and proportion of unproductive landscape; infrastructure factors refer to infrastructure configuration. Social factors are preliminarily divided into organization factors, management factors, and operation factors. Organization factors include the types of stakeholders, gardener participation duration, gardener heterogeneity; management factors include management rules, the establishment of self-management group, supervision mechanism; operational factor refers to operational activities.

Social capital is the dependent variable of this research. Generally, repeatedly used scales have high reliability and validity. This research compiled the social capital scale referring to the previous research of Kleinhans (2007) [55], Walsh (2011) [56], and Christensen (2017) [57]. The scale of Reinout contains three dimensions of social capital, namely trust, social network, and norms. Walsh measured the social capital of American community gardens from the aspects of trust, social network and community participation. As for the scale of Christensen, it discussed the “bonding social capital” generated by gardeners of the same social background and the “bridging social capital” generated by gardeners from different social backgrounds. Combining the development situation of Chinese community gardens, this paper draws on the verified and effective content from the above viewpoints and selects 10 measurement items for social capital (Table 3).

3.2.2. Expert Workshop

To ensure the standardization and accuracy of measurement elements and scales, as well as the legibility and rationality of the subsequent questionnaires, this paper optimized the above results through expert workshop.

The expert workshop is composed of 17 experts from academic and practical fields. The details of experts can be seen in Table A1. During the workshop, every expert received the materials containing the above factors and scale. One facilitator introduced the content and purpose of this research and explained the meaning of different factors and social capital scale. Then, the experts put forward their opinions for the factors and scales and discussed the corresponding items in the questionnaire.

Through the discussion of the expert workshop, 11 design factors were obtained. The infrastructure is further divided into agricultural infrastructure (tool storage, farming signage, etc.), recreational infrastructure (seat, landscape sculpture, etc.), ecological infrastructure (composting boxes, rainwater harvesting devices, etc.), and smart infrastructure. According to the discussion result of experts, the items and values of each design factor are shown in Table 1.

Table 1. Design factors and values.

Variables	Options and Values
D1 Whether the community garden is integrated with green infrastructure (parks, rivers, etc.)	No, 0 Yes, 1
D2 Accessibility (Walking time from residence to community garden)	$h < 5 \text{ min}$, 0 $5 \text{ min} \leq h < 10 \text{ min}$, 1 $10 \text{ min} \leq h < 15 \text{ min}$, 2 $h \geq 15 \text{ min}$, 3
D3 Size of community garden	$S < 100 \text{ m}^2$, 0 $100 \text{ m}^2 \leq S < 500 \text{ m}^2$, 1 $500 \text{ m}^2 \leq S < 1000 \text{ m}^2$, 2 $S \geq 1000 \text{ m}^2$, 3
D4 Visual openness of community garden	Completely closed, 0 Half closed and half open, 1 Completely open, 2
D5 Whether the community garden has set up public communication space	No, 0 Yes, 1

Table 1. Cont.

Variables	Options and Values
D6 Planting form	Natural Style, 0 Regular Style, 1
D7 Whether there is a certain proportion of non-productive landscape in community garden	No, 0 Yes, 1
D8 agricultural infrastructure (tool storage, farming signage, etc.) configuration	Not configured, 0 Configured, and the type of agricultural infrastructure <5, 1 Configured, and the types of agricultural infrastructure ≥5, 2
D9 recreational infrastructure (seat, landscape sculpture, etc.) configuration	Not configured, 0 Configured, and the type of agricultural infrastructure <5, 1 Configured, and the types of agricultural infrastructure ≥5, 2
D10 ecological infrastructure (compost boxes, rainwater harvest devices, etc.) configuration	Not configured, 0 Configured, and the type of agricultural infrastructure <5, 1 Configured, and the types of agricultural infrastructure ≥5, 2
D11 smart infrastructure configuration	Not configured, 0 Configured, and the type of agricultural infrastructure < 5, 1 Configured, and the types of agricultural infrastructure ≥5, 2

Through the discussion of the expert workshop, 7 social factors were obtained. Existing research on the heterogeneity of gardeners mainly includes age, occupation, education level, income level, and lifestyle. Since existing research emphasizes the attractiveness of Chinese community garden to gardeners of different ages and its important role in intergenerational communication and parent-child interaction, this paper mainly evaluates the degree of age heterogeneity of gardeners [9]. The items and values of each social factor are shown in Table 2.

Table 2. Social factors and values.

Variables	Options and Values
X1 Types of stakeholders (government, community, neighborhood committee, and third-party) in community gardens	1 type, 0 2 types, 1 3 types, 2 4 types, 3
X2 Heterogeneity degree of participants in community gardens (Age range covered by participants)	Including participants of 1 age group, 0 Including participants of 2 age groups, 1 Including participants of 3 age groups, 2 Including participants of 4 age groups, 3 Including participants of 5 age groups, 4 Including participants of 6 age groups, 5 Including participants of all age groups, 6
X3 Gardener participation duration (Average daily participation time in community gardens)	h < 1 h, 0 h = 1–3 h, 1 h = 3–6 h, 2 h > 6 h, 3
X4 Whether community garden has established management rules	No, 0 Yes, 1

Table 2. Cont.

Variables	Options and Values
X5 Whether community garden has established supervision mechanism	No, 0 Yes, 1
X6 Whether community garden has established self-management team	No, 0 Yes, 1
X7 Frequency of cultural, educational, and commercial activities related to agriculture in community gardens	Never, 0 1–3 times/year, 1 4–6 times/year, 2 1–3 times/month, 3

The final optimized social capital scale is shown in Table 3. The final social capital scale contains 10 evaluation items. This research used 5-point Likert scales for the answer options and asked the survey respondents to make the only choice.

Table 3. Social capitals and values.

Variables	Options and Values
S1 Generally, the gardeners in the community farm are trustworthy.	Strongly disagree = 1 Disagree = 2 Undecided = 3 Agree = 4 Strongly agree = 5
S2 I share vegetables, tools, and growing skills with other participants every week.	
S3 In the past one month, I have helped others in community garden.	
S4 In the past year, I have cooperated with others to hold garden activities.	
S5 The opportunity of socializing or talking with others is the main reason I participate in community garden.	
S6 In the past two months, I have hung out with others or participated in activities outside of garden.	
S7 Community garden has helped established close contact between gardeners, neighborhood committee leaders, and social organizations.	
S8 I have made 2–5 new friends from different social backgrounds through participating in community gardens.	
S9 Through participating in community gardens, I would rather participate in other community voluntary activities and make contributions.	
S10 Through participating in community gardens, I established a self-management team together with other participants.	

3.3. Case Study and Data Collection

3.3.1. Case Study Areas

This paper selects the typical community gardens in Beijing, Tianjin, Chengdu, Shanghai, Hangzhou, and Guangzhou, Zhongshan, Zhuhai, and Shenzhen in the Pearl River Delta region as samples. These areas were selected according to the following criteria: (1) These cities enacted supporting policies for community gardens, such as the Leaving White And Adding Green ecological restoration project in Beijing, Green Community action plan in Tianjin, Ten Items For Adding Greening in Chengdu, Implementation Measures of Shanghai Urban Regeneration in Shanghai, Development Of Roof Agriculture Memorandum in Hangzhou, and Decision Of Constructing Forest City Group in The Pearl River Delta in Pearl River Delta. Compared with other areas, the number of community gardens in these areas is large, the type of them is rich, and the development degree of them is more mature. (2) Selecting community gardens in the north and south regions in China helps eliminate the influence of regional differences on the results.

After determining the sample cities, this research obtains information on community gardens with great influence in these regions from local public agencies. Finally, 35 representative community gardens were selected through the recommendation of professionals in public institutions and communication with the sub-district offices. The basic information of them is shown in Table A2 and Figure A1.

3.3.2. Data Collection

Data collection includes three aspects: the Gardeners' evaluation on the design factors of community gardens, the Gardeners' evaluation on the social factors of community gardens, as well as the Gardeners' evaluation on the social capital of community gardens.

Data collection is conducted through the survey questionnaire. The questionnaire contains 28 questions made from the above three aspects. Before the formal survey, the research selected gardeners in Tianjin and Beijing as the initial sample group for pre-survey. Then, it optimized the questionnaire items combining the results of the pre-survey.

During September–November 2018, March–June 2019, and December 2019, the research selected gardeners from above 35 representative community gardens as survey objects and collected data through on-site and online questionnaires. The proportion of questionnaires from on-site and online is 7:3.

3.4. Statistical Analysis

Statistical analysis is mainly conducted through SPSS 25 software. The data processing methods include factor analysis, validity test, confidence test, exploratory analysis, and regression analysis.

3.4.1. Factor Analysis and Validity Test

Factor analysis is to rearrange the original variables and form several simplified hypothetical variables according to the correlation of original variables [58]. Exploratory factor analysis can produce the best scale factor structure through multiple factor analysis procedures, which can be used to test the validity of the social capital scale.

This research uses exploratory factor analysis to test the construct validity of the social capital scale. First, judging whether each measurement item of the scale is suitable for factor analysis through the Kaiser-Meyer-Olkin (KMO) (the KMO measure is considered as the best method for testing the suitability of the correlation matrix for factor analysis, and is generally performed before factor analysis; it expresses a measure of sample adequacy between zero and one [58]) value and Bartlett sphere test (used to verify whether the variables correlate in the correlation matrix, and it is generally performed before factor analysis [58]). According to the judgment criteria of existing studies, when the KMO value is greater than 0.80, it indicates that the data is suitable for factor analysis; when the KMO value is greater than 0.70, it is acceptable; when the KMO value is less than 0.50, the data is not suitable for factor analysis [58]. The Bartlett sphericity test value needs to reach the significance level ($p < 0.05$).

When the test results meet the factor analysis requirements, principal component analysis method and maximum variance method is used to extract the common factors. Then, the common factors are selected. The selecting criteria include: (1) the characteristic root is greater than or equal to 1; (2) the absolute value of the factor load is greater than 0.50. In this way, this research can eliminate low factor load and crossover of measurement items.

3.4.2. Confidence Test

Confidence refers to the consistency or stability of the measurement results, and it shows the influence degree of measurement errors on the overall results. As the social capital scale in this research is a Likert-style scale reflecting the attitudes and opinions of gardeners, the research uses the Cronbach α coefficient (is the mean of all split-half reliabilities in the context of multi-items measurement scale, and is the most commonly used reliability measurement method [59]) to test its reliability. When the

Cronbach α value is greater than or equal to 0.80, it indicates that the reliability of the scale is ideal; when the Cronbach α value is greater than or equal to 0.70, it indicates that the scale is acceptable.

3.4.3. Exploratory Analysis

Exploratory analysis can not only describe statistics such as the mean value, median value, mode value, and percentile value of all cases, but also generate summary statistics and makes comparative analysis for case groups. This research uses the name of community garden as the case group and compares the mean values of social capital of different community gardens.

3.4.4. Regression Analysis

Regression analysis is a widely used statistical analysis method to determine the relationship between two or more variables. Linear regression analysis is the basic analysis method in regression analysis. According to the number of independent variables, linear regression analysis is divided into unary linear regression analysis and multiple linear regression analysis. Since linear regression analysis can explore the influence of independent variables on dependent variables, compared with correlation analysis, it is more accurate and clear. Therefore, this research selects multiple regression analysis to explore the impacts of different spatial and social factors on the formation of social capital.

4. Results

As of the survey time, the population of community gardens in total is 2124. To ensure the sample is representative, the research used the gardener roster as the sampling frame, and randomly selected 70% gardeners per community garden to participate in the questionnaire survey. Finally, a total of 1500 questionnaires were issued, 1443 questionnaires were returned, of which 1257 questionnaires were valid, and the effective questionnaire recovery rate was 83.8%. The number of questionnaires filled face to face and online was 886 and 371, respectively. Of this sample, 56.2% were female and 43.8% were male. Regarding the age of respondents, most people were over 50 years old. Among them, the proportions of people between 50–59 years old, 60–69 years old, 70–79 years old, and over 80 years old were 21.00%, 26.49%, 21.80%, and 5.01% respectively. The proportion (7.48%) of people between 40–50 years old and the proportion (7.56%) of people between 30–40 years old were roughly the same, which were all slightly lower than that (8.67%) of people between 18–30 years old. Only 1.99% of respondents indicated that they were less than 18 years old.

4.1. Results of Factor Analysis, Validity Test, and Confidence Test

The KMO value obtained through factor analysis is 0.885, which is greater than 0.80. The approximate chi-square value of Bartlett's sphere test is 6639.884, the freedom degree is 45, and the significance p -value is close to 0, indicating that the relationship between variables is good and it is suitable for factor analysis. Through the varimax rotation method of dimension reduction, this research obtained 2 common factors, F1 and F2, whose characteristic roots are greater than 1 (Table 4). The cumulative explained variance reached 69.131%, meeting the requirement of more than 60%. There is no crossover phenomenon between the items, indicating that the scale has good construct validity, and the two common factors extracted are appropriate. The common factor F1 has a large load in the establishment of trust and the establishment of social networks, which reflects the direct social benefits that people obtain through participating in community gardens. The common factor F2 has a larger load in the autonomy of community public affairs and in-depth communication, which reflects the indirect social benefits through participating in community gardens.

The Cronbach α value of the social capital scale is equal to 0.907, indicating that the internal consistency of the social capital scale is very reliable.

Table 4. Rotated factor matrix.

Independent Variables	Rotated Factors	
	F1: Trust and the Establishment of Social Networks	F2: Autonomy of Community Public Affairs and In-Depth Communication
S1 Generally, the gardeners in the community farm are trustworthy.	0.723	
S2 I share vegetables, tools, and growing skills with other participants every week.	0.717	
S3 In the past one month, I have helped others in community garden.	0.829	
S4 In the past year, I have cooperated with others to hold garden activities.		0.713
S5 The opportunity of socializing or talking with others is the main reason I participate in community garden.	0.777	
S6 In the past two months, I have hung out with others or participated in activities outside of garden.		0.840
S7 Community garden has helped established close contact between gardeners, neighborhood committee leaders, and social organizations.	0.689	
S8 I have made 2–5 new friends from different social backgrounds through participating in community gardens.	0.787	
S9 Through participating in community gardens, I would rather participate in other community voluntary activities and make contributions.		0.721
S10 Through participating in community gardens, I established a self-management team together with other participants.		0.914
Characteristic root	3.865	3.048
Variance contribution rate (%)	38.651	30.480
Cumulative variance contribution rate (%)	38.651	69.131

4.2. Comparison of Social Capitals in Different Community Gardens

Before conducting exploratory analysis, this research first calculated the ratio of the variance contribution rate of the above two common factors. After that, the common factor load values are respectively multiplied with the corresponding variance contribution rate ratios to obtain the comprehensive social capital value SC. Finally, the research obtains and compares the mean values of the social capital of 35 community gardens through exploratory analysis. The results are shown in Figure A2.

It can be seen from Figure A2 that the social capital values of different community gardens in China vary significantly. Community gardens with negative mean values generally face the problem of weak social capital, especially those with a value lower than -0.50 . It is showed that most of the community gardens have failed to play the role in promoting the cultivation of social capital and hindered the establishment of trust relationships and social networks to a certain extent.

4.3. The Impact of Different Factors

Since the dependent variable social capital comprehensive value SC is a continuous variable, this research only virtualized the independent variable to make it meet the requirements of regression analysis. This research only uses regression analysis to explain the impact of different independent variables on the dependent variable's social capital and does not perform predictive analysis. When selecting independent variables, the research chose the "input method" in the SPSS 25.0 linear regression, so that all variables can be entered into the model and the significance level of different variables can be seen.

Table 5 lists the analysis results of multiple linear regression models of different design factors and social capital. The coefficient of variance expansion (VIF) corresponding to the independent variables is between 1.576 and 4.844, and the VIF value is less than 10, indicating that there is no serious multicollinearity problem between the independent variables. Results show that the integration with green infrastructure, accessibility, size, visual openness, planting form, the proportion of unproductive landscape, agricultural infrastructure, and smart infrastructure have significant impacts on social capital level ($p < 0.01$).

Table 5. Regression analysis of design factors.

Factors Set	Standardization Coefficient Beta	t	Significance
		−16.718	0.000
D1 Whether the community garden is integrated with green infrastructure (parks, rivers, etc.)	−0.222	−5.396	0.000
D2 Accessibility (walking time from residence to community garden)	−0.233	−7.461	0.000
D3 Size of community garden	0.217	6.247	0.000
D4 Visual openness of community garden	0.525	16.276	0.000
D5 Whether the community garden has set up public communication space	−0.039	−1.401	0.161
D6 Planting form	0.254	7.807	0.000
D7 Whether there is a certain proportion of non-productive landscape in community garden	0.085	3.058	0.002
D8 Agricultural infrastructure (tool storage, farming signage, etc.) configuration	0.114	3.792	0.000
D9 Recreational infrastructure (seat, landscape sculpture, etc.) configuration	0.064	1.782	0.075
D10 Ecological infrastructure (compost boxes, rainwater harvest devices, etc.) configuration	0.000	−0.010	0.992
D11 Smart infrastructure configuration	−0.207	−8.817	0.000

The analysis for social factors still selected the "input method" and all variables are included in the model. Table 6 lists the analysis results of multiple linear regression model of social factors and social capital of community gardens. The coefficient of variance expansion (VIF) corresponding to the independent variables is between 1.473 and 5.337, and the VIF value is less than 10, indicating that there is no serious multicollinearity problem between the independent variables. Results show that the types of stakeholders, management rules, supervision system, self-management team, and operational activities have significant impacts on social capital level ($p < 0.01$).

Table 6. Regression analysis of social factors.

Factors Set	Standardization Coefficient Beta	t	Significance
		−11.658	0.000
X1 Types of stakeholders (government, community, neighborhood committee, and third-party) in community gardens	0.154	3.620	0.000
X2 Heterogeneity degree of participants in community gardens (Age range covered by participants)	0.107	2.455	0.014
X3 Gardener participation duration (average daily participation time in community gardens)	−0.034	−1.506	0.132
X4 Whether community garden has established management rules	0.308	10.548	0.000
X5 Whether community garden has established supervision mechanism	0.112	2.743	0.006
X6 Whether community garden has established self-management team	0.170	6.037	0.000
X7 Frequency of cultural, educational, and commercial activities related to agriculture in community gardens	0.115	3.140	0.002

5. Discussion

5.1. Analysis of the Impact of Design Factors

5.1.1. The Relationship between Social Capital and Site Selection Factors

As the results have shown, the integration between community gardens and green infrastructure has a negative correlation with social capital. It is worth noting that this result contrasts with existing literature that demonstrates that integrating with green infrastructure promotes social interaction and is more helpful to the establishment of social capital [5,23]. The reasons may be as follows: (1) Most of the community gardens integrated with green infrastructure in this survey were established through the illegal occupation of green spaces along rivers or in parks. Such behavior can easily lead to disputes about the private use of public land resources and opposition from city administrators and residents. (2) Generally, there is a large flow of people around the green infrastructure. The damage and theft of agricultural products are prone to occur, which triggers conflicts between management and maintenance, and makes it difficult to establish social capital.

The beta value of accessibility is negative, which means that the social capital of community gardens with short walking distance or easy access to the wheelchairs is higher. This supports the claim by Caneva and colleagues (2020) that high accessibility creates social links [60]. Compared with the gardens within the 10–15 min living circle, community gardens in the 5-min living circle provide convenience for gardeners and have higher residents' participation in China. Similarly, rooftop community gardens without stairs or elevators often have low levels of social capital [61].

The impact of size on the level of social capital is positive. There was evidence that the demand for community gardens exceeds the supply in China [14], community gardens with a larger area can provide more planting plots, attract more participants and expand the social network of gardens.

5.1.2. The Relationship between Social Capital and Spatial Character Factors

Visually open community gardens without walls, railings, or other enclosed structures are more attractive than semi-open and completely enclosed community gardens. This supports the assertion that visually open community gardens can break the sense of domain and ownership generated by closed gardens, stimulate the participation consciousness, and attract potential participating groups [3].

On the other hand, visually open community gardens can produce an incentive effect and form a continuous driving force. Many gardeners said that open gardens make it easier to gain praise and recognition from surrounding residents, thus encouraging them to devote energy to the garden. This long-term participation provides a time basis for the cultivation of stable social relations.

In this study, the allocation of public communication space has little influence on the formation of social capital, which contrasts with the research of Liu (2019) [9]. The reason may be that the social function of public communication space shows the opposite results due to the different locations of community gardens. Taking the Knowledge and Innovation Community Garden (KIC garden) in Shanghai and Knowledge garden in Chengdu as examples, because KIC garden is located in a high-density residential area where public space resources are relatively scarce, public spaces such as square and cafe in KIC garden play an important role as “urban living rooms”, which has a positive impact on the interaction between different participants. While for Knowledge garden, because the community center adjacent to it provides a similar public service function, the public communication space in this garden has low using frequency and fails to promote the cultivation of social capital.

Regular planting form and appropriate proportion of non-productive landscape contribute to the formation of social capital. These results support the findings of previous literature [3,34]. According to Voigt and Leitão (2016), expression forms and landscape changes in community gardens can influence visual effect and affects visual comfort. Thus, it could be inferred that regular planting form makes community gardens present a clean and tidy external image, and non-productive landscape can beautify the environment, which improves the acceptance and participation of community gardens and cultivates social capital.

5.1.3. The Relationship between Social Capital and Infrastructure Configuration Factors

The significant positive correlation relationship between agricultural infrastructure and social capital is consistent with the conclusion of Jiang (2019) [38]. Since most participants do not have the agricultural growing experience, the well-equipped agricultural infrastructures can lower the “threshold” of residents’ participation and ensure the operation of gardens, which contributes to the establishment of social capital. For example, growing containers and tools meet the basic growing demand, agricultural technology explanation cards provide necessary growing knowledge, and garden signs identify and protect private growing areas, which helps to reduce conflicts. Different from the recent research results [32,39], the impacts of both recreational infrastructure and ecological infrastructure are small. Similar to the role of public communication space, in suburban areas where there is a strong demand for growing vegetables, recreational infrastructures take up lots of spaces and were unpopular. For ecological infrastructures, because they could be made by gardeners themselves and fail to provide opportunities to establish cooperation with the outside [39], which led to low significance. It is interesting to note that smart infrastructure shows a negative correlation, which contrasts with some literature arguing that smart infrastructure links more to social capital [40]. The reason may be that low acceptance from the elderly and the high management and maintenance costs reduce participation.

5.2. Analysis of the Impact of Social Factors

5.2.1. The Relationship between Social Capital and Organization Factors

Consistent with previous research [48,62,63], multiple stakeholders participating in community gardens can bring different resources, ensuring the operation of a community garden. Meanwhile, different stakeholders construct horizontal social networks and provide basic conditions for the cultivation of social capital among different groups. Moreover, as the self-management system within the garden has not yet been established and the participation awareness of residents is still weak [11], most stakeholders lack a clear understanding about “who can participate in community gardens”, “how to construct community gardens”, and “the construction purpose of community garden”. In this

case, the government policy encouragement and the reasonable guidance of third-parties play an important role in changing residents' awareness and clarifying the development direction of community gardens to promote social capital cultivation.

The heterogeneity degree of participants also has a significant positive impact on the establishment of social capital. The existing literature showed that young people and children seldom participated in the daily maintenance and management activities due to time, energy, interest, and other factors [64]. If things go on like this, the social capital formed by the elderly will have structural imbalance and negative impacts. For example, the weak innovation ability of the elderly hinders the sustainable development of gardens. Therefore, mobilizing residents of different ages to participate in community garden management could avoid the problem of duplication of social resources caused by homogeneous interactions, and was important for optimizing the social capital structure. This supports the claim by Hajba (2017) that community gardens helped to achieve inter-generational exchanges and interactions [65].

Contrary to the survey result in Denver [66], the impact of participation duration on social capital is low. Based on field observations, it can be seen that longer participation duration does not mean that gardeners will increase their participation willingness and interaction frequency, especially for gardens managed individually.

5.2.2. The Relationship between Social Capital and Management Factors

According to Rogge's research, the formal management rule in community gardens stabilizes the social network of gardeners [54]. This study finds a similar result: firstly, management rules can satisfy the public interest, provide participants with common standards, and reduce wrong planting behaviors and social conflicts; secondly, the process of co-operationally laying down management rules is conducive to reaching consensus among residents and forming an atmosphere of mutual assistance. Thirdly, the reasonable task division contained in the rules allows gardeners to maintain contact with each other, promote mutual exchanges and mutual assistance, and strengthen the social capital. Moreover, the supervision system ensures the effective implementation of management actions. While this study finds similarities within the community gardens, the results further highlight that establishing a self-management team can cultivate a sense of belonging and attachment to the garden and help form a continuous participation motivation [11], as the main users of community gardens are residents.

5.2.3. The Relationship between Social Capital and Operation Factors

Conducting cultural, educational, and commercial activities related to agriculture is of great significance to the cultivation of social capital of community gardens in the operation stage. This supports the previous research in New York City that the diverse activities can bring more high-quality social resources and provide more opportunities for the establishment of social relationships [67]. Taking the "Star Spark Charity Service Team" of Zuoanyi community in Beijing as an example, based on the garden learning courses, gardeners met many technical experts and learned about the new development concept of community gardens. Meanwhile, through cross-garden agricultural activities, gardeners establish contacts with other participants from different social backgrounds, which enriches the residents' social network. Community gardens without operational activities often reduce residents' participation enthusiasm, leading to the suspension of garden projects and the destruction of social capital.

5.3. Limitation and Future Research

This study selected 35 community gardens located in 9 Chinese typical cities including Beijing, Tianjin, Chengdu, Shanghai, Hangzhou, Guangzhou, Zhongshan, Zhuhai, and Shenzhen. These gardens are representative, as they cover both northern and southern areas in China. The sample of the questionnaire is 1257. Because it is a relatively large survey, this sample could provide detailed

quantitative data for this study [68]. The results of the study are more likely to scientifically explore the impact of different factors on the social capital of community gardens. Considering the impact of garden participation length on the cultivation of social capital, questionnaire respondents all have at least half a year of gardening experience to make the perception social capital data represent the actual situation. In addition, compared with the previous qualitative research on social capital of community gardens, it has made progress in the accuracy and rigor of the research.

However, there are still some limitations. Firstly, since the 11 design factors and 7 social factors proposed in this research are derived from the existing literature and the results of expert workshop, the results are inevitably affected by the research perspective and personal subjective cognition. Secondly, apart from the design and social factors selected in this study, many other factors may also affect the formation of social capital in community gardens, including macro factors such as the policies of different cities and micro factors such as the socio-demographic characteristics of gardeners. Since it is impossible to cover all possible factors in this study, this is an unavoidable limitation. Other possible limitations include the perception differences of social capital level, due to the various understandings of the concept of social capital. And the statistical data may not truly reflect the stock of social capital, because of the lack of considering regional differences.

With the rapid development of Chinese community gardens [9], it is obvious that more reliable and large-scale research is required in the future to comprehensively obtain the social capital outcomes in community gardens to provide a more robust reference for urban policy decision. At the national level, taking into account the influence of different regional policies, geographical characteristics and cultural characteristics, questionnaire surveys and collaborative GIS techniques can be used to obtain macro-environmental data, and analyze the relationship between these macro factors and the social capital of community gardens [69]. At the individual and community levels, questionnaire surveys and collaborative participatory action research can be used to explore the impact of gardeners' socio-demographic characteristics on the level of social capital of community gardens. It could also be used to focus on the relationship between community social benefit and social capital, which may reveal higher social values of community gardens [18].

6. Conclusions

With the rapid urban development in China, community gardens are becoming more and more popular. However, the role of these community gardens varies significantly: some community gardens serve as an effective means of promoting social capital, while others cause social contradictions and public doubts due to the lack of professional design and management. Therefore, this paper examined the influences of different design factors and social factors on the formation of social capital and compared their relative importance. The results indicated that shorter commuting distance, larger planting size, open garden boundary, suitable planting form, appropriate non-productive landscape proportion, and agricultural infrastructure configuration are key design factors for community gardens to attract residents to participate and cultivate social capital. The types of stakeholders, management rules, supervision system, self-management team, and operational activities show significant impacts on the cultivation of social capital than other social factors, which deserves to be noted too.

It is worth noting that the above design factors should be applied in a comprehensive and flexible way. Firstly, due to the restriction of land ownership, it is often difficult to obtain the use right of land that meets the above site selection conditions in practice. Therefore, community gardens can make full use of spaces with easy access to their property rights, such as abandoned corner plots or idle roofs. This kind of space transformation can enhance spatial vitality and provide a platform for the cultivation of social capital. Secondly, public communication space and recreational infrastructure have different effects due to different locations, for high-density residential areas, a certain area is still required to be reserved for public communication space. To avoid the occupation of planting space, participants can integrate it with the external space of community centers, community schools, and other public buildings. Thirdly, agricultural and recreational infrastructure can also reduce the

occupation of planting space through compound planning and design. For example, the containers can serve as a chair, the vegetable climbing frame can be used as a shelter, and the tool shed is also a meeting room.

The establishment of a fair and transparent management mechanism is of great significance to reducing resource inequality and cultivating social capital. This point speaks to the research by Cohen and Reynolds (2015) which suggests better engagement by stakeholders in different development stages of community garden [49]. To do this, this paper proposes the following recommendations: (1) establishing governmental departments or national community garden associations responsible for the management and operation of community gardens. The department or association are able to understand the land supply needs, formulate special budgets to support garden activities, and regularly carry out supervision work. (2) Besides public assistance, establishing a cooperative management network between gardeners and professionals to spread agricultural knowledge and meet technique resource and human resource supply needs. (3) Moreover, grassroots groups should participate in garden management, learn about resource allocation, and receive training in resource management such as project evaluation, business practices, and fundraising.

This study helps people better understand the relationship between different factors and social capital. Planners and designers should take account of the above-mentioned factors in community garden design rather than based on subjective ideas if they wish to promote social capital in community gardens. In addition, it is urgent for local governments to integrate community gardens in urban plans and public policies, which can be a practical way to resolve conflicts and enhance community cohesion.

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Appendix A

Table A1. Description of workshop stakeholder participants.

Stakeholder Groups	Background Information	Number
Policy-makers or	Representatives from different policy and administration departments (e.g., from landscaping and urban planning, sustainable development, ecology and environment)	3
Department officials	Representatives from associations and unions (e.g., from NGO (Non-Governmental Organizations)s in community development, real estate, gardening enterprises)	4
Social groups and organizations	Architects, landscape architects, or agricultural experts with rich work experience in community garden design and implementation	5
Designers or experts Researchers	Professors and doctors whose research interests include community garden, community agriculture, and urban agriculture	5

Appendix B

Table A2. Basic Information of Community Gardens.

Number	Name	City	Year	Size (m ²)	Number of Gardeners	Land Type	Land Ownership
1	Yimi Garden	Beijing	2017	960	124	Park	Public
2	Roof Garden	Beijing	2014	324	18	Building roofs	Public
3	Vegetable Garden I	Beijing	2011	160	35	Green space in residential area	Public
4	Dushi Garden	Beijing	2015	4500	190	Vacant Land	Public
5	Vegetable Garden II	Beijing	2011	410	30	Green space in residential area	Public
6	Street Garden	Beijing	2010	250	32	Green space in residential area	Public
7	Yu Garden	Beijing	2017	600	30	Vacant Land	Public
8	Linli Garden	Tianjin	2016	350	25	Green space in residential area	Public
9	Guangyun Garden	Tianjin	2015	352	48	Green space in residential area	Public
10	Jianli Garden	Tianjin	2015	230	18	Community square	Public
11	Xuehuli Garden	Tianjin	2016	264	34	Green space in residential area	Public
12	Sijicun Garden	Tianjin	2014	360	32	Green space in residential area	Private
13	Beiwucun Garden	Tianjin	2015	220	24	Green space in residential area	Public
14	May Garden	Shanghai	2017	450	43	Vacant Land	Public
15	One square meter Garden	Shanghai	2012	500	69	Vacant Land	Private
16	KIC Garden	Shanghai	2016	2200	—	Park	Public
17	Roof Garden I	Shanghai	2016	180	33	Building roofs	Public
18	Knowledge Garden	Chengdu	2017	12,700	420	Vacant Land	Private
19	Courtyard Garden	Chengdu	2016	36	35	Vacant Land	Public
20	Garage Garden	Chengdu	2015	80	23	Garage roof	Public
21	Xinfu Garden I	Chengdu	2017	50	7	Vacant Land	Private
22	Xinfu Garden II	Chengdu	2018	400	46	Green space in residential area	Public
23	Hongse Garden	Chengdu	2017	4520	110	Vacant Land	Public
24	Smart Garden	Chengdu	2017	3333	180	Vacant Land	Public
25	Roof Garden II	Chengdu	2013	44	14	Residential building roof	Private
26	Garage Garden II	Chengdu	2014	360	24	Garage roof	Public
27	Vegetable Garden	Chengdu	2015	45	22	Green space in residential area	Private
28	Happy Garden	Hangzhou	2015	500	—	Vacant Land	Public
29	Yongjin Garden	Hangzhou	2014	150	24	Garage roof	Public
30	Ecological Garden	Guangzhou	2019	780	—	Green Space	Private
31	Love Garden	Guangzhou	2019	200	20	Building roofs	Public
32	Community Garden	Zhongshan	2017	1200	11	Vacant Land	Public
33	Ecological Garden II	Zhuhai	2014	3000	253	Park	Private
34	Xinyue Garden	Shenzhen	2019	200	12	Green space in residential area	Public
35	Yuanling Garden	Shenzhen	2019	100	—	Traffic green space	Public

Appendix C

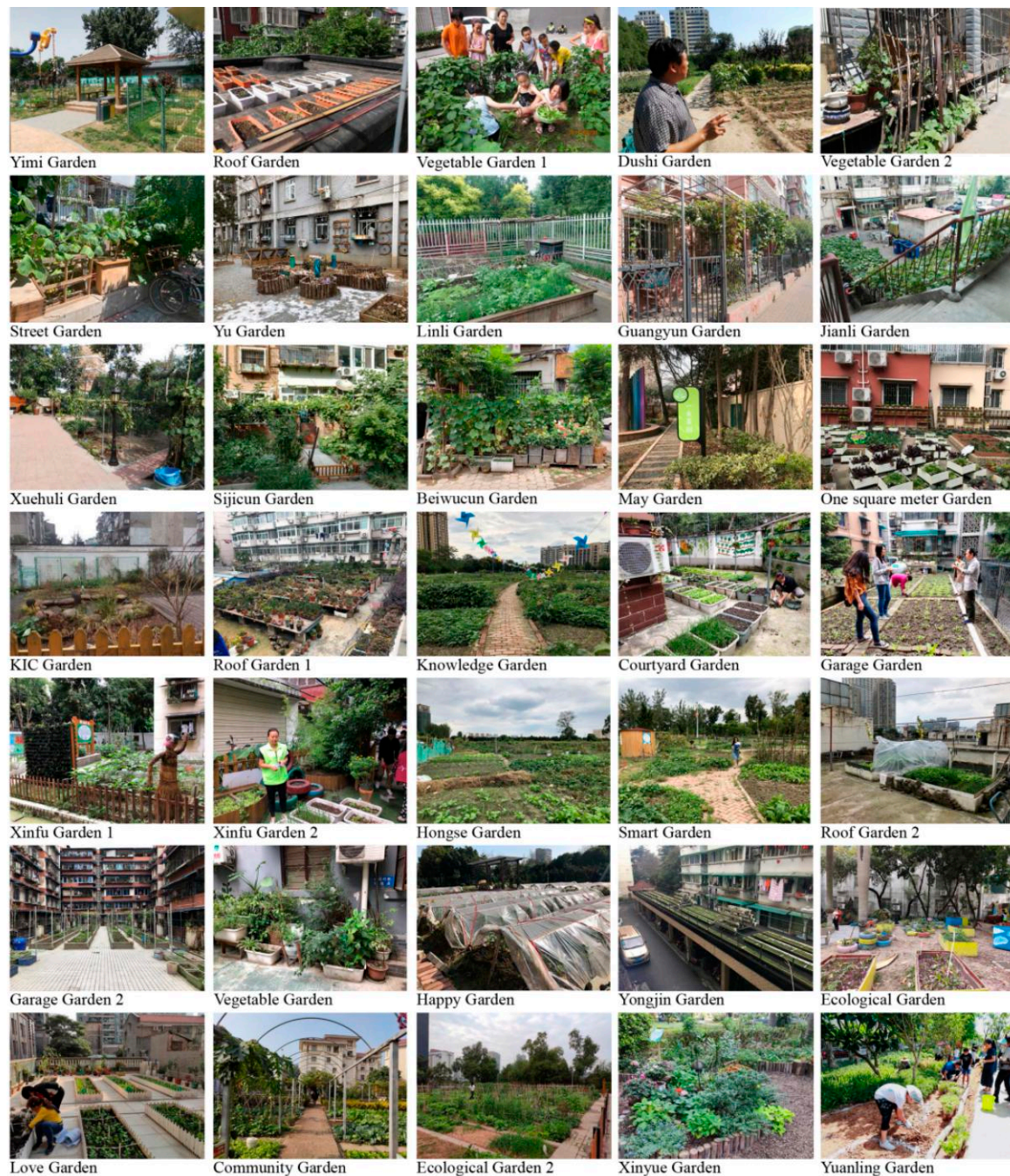


Figure A1. Thirty-five Community Gardens in 2018–2019. (Except the last picture provided by Shenzhen Green Fund Association, all other pictures are taken by the author).

Appendix D

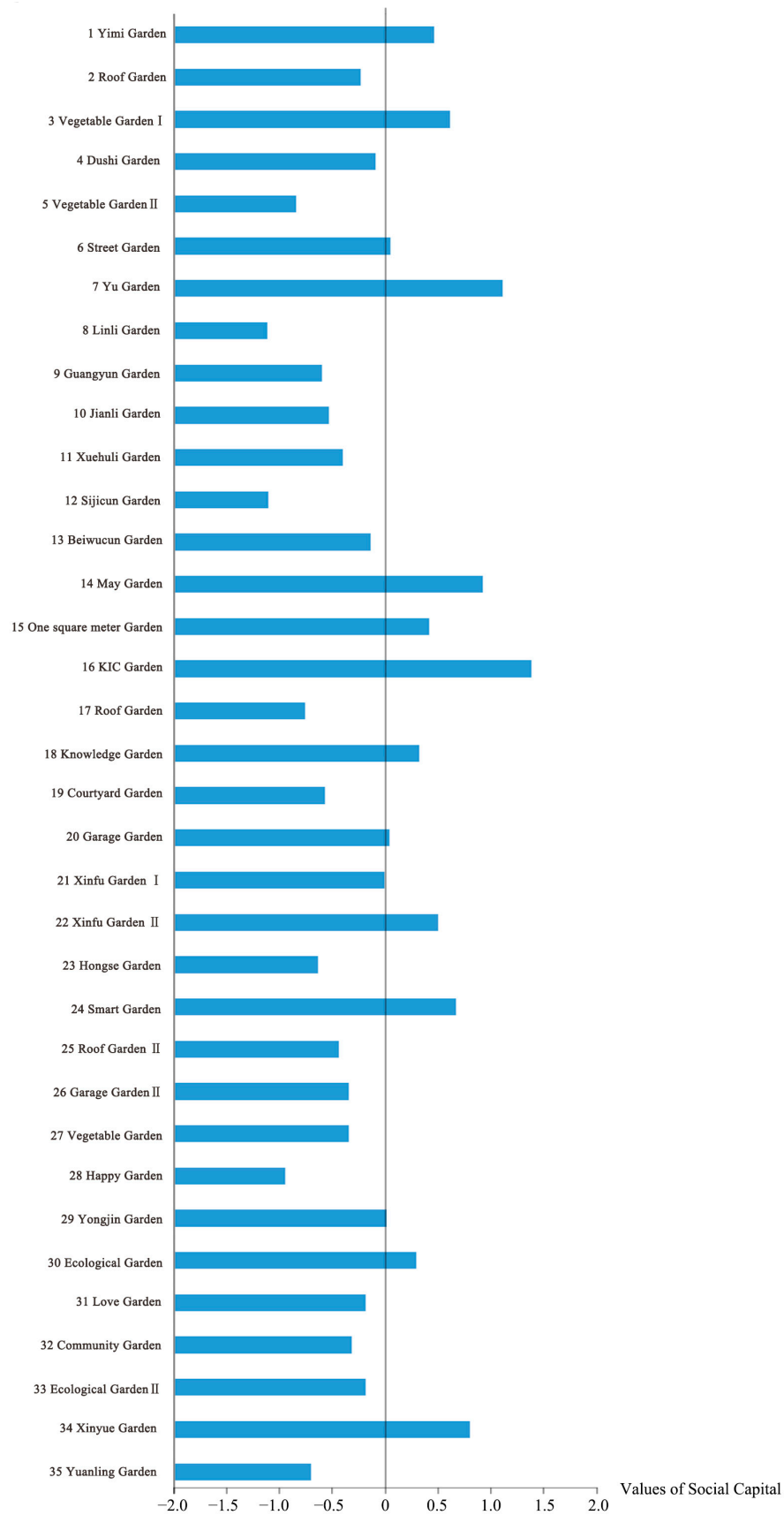


Figure A2. Social capital values of 35 community gardens.

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