Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Research Paper

Physically apart but socially connected: Lessons in social resilience from community gardening during the COVID-19 pandemic

Neelakshi Joshi a,*, Wolfgang Wende a,b

a Leibniz Institute of Ecological Urban and Regional Development, Weberplatz 1, 01217 Dresden, Germany
b Faculty of Architecture, Technische Universität Dresden, Zellescher Weg 17, 01062 Dresden, Germany

HIGHLIGHTS

- Urban green spaces gained importance during the COVID-19 pandemic.
- Urban community gardens provide social resilience in times of physical isolation.
- Gardeners also reported loss of community in comparison to pre-pandemic times.
- Garden committees invested extra time and effort to implement pandemic protocols.
- Social resilience of community gardens varies across crises events.

GRAPHICAL ABSTRACT

Urban green spaces, like community gardens, received increased attention during the COVID-19 pandemic. Drawing from an ethnographic study on participating in community garden activities in Edmonton, Canada and inputs from 194 gardeners and 21 garden coordinators, this paper captures the experiences of creating community during a pandemic. Garden coordinators had to rethink and rework their operating styles in keeping participants physically apart but socially connected. Participants confirmed that garden activities provided respite from the pandemic restrictions. Findings also indicate that some participants missed group activities like work bees and potlucks while others were able to re-create community in digital spaces and in chanced and informal interactions. This study draws from and subsequently contributes to the existing literature on social resilience provided by community gardens during and after a crisis event. It also provides policy recommendations on how the city administration can help facilitate garden activities during times of disruptions.

1. Introduction

The onset of the COVID-19 pandemic brought about drastic changes in personal mobility across the globe. While restrictions bound people to their homes during the initial months of the pandemic, many cities across the globe recorded an increased access to green spaces like parks and gardens. In Canada, where this research is situated, Google’s COVID-19 Community Mobility Report between March-September 2020

* Corresponding author.
E-mail addresses: n.joshi@ioer.de (N. Joshi), w.wende@ioer.de (W. Wende).

https://doi.org/10.1016/j.landurbplan.2022.104418
Received 5 November 2021; Received in revised form 21 March 2022; Accepted 26 March 2022
Available online 30 March 2022
0169-2046/© 2022 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).
indicated a drop in mobility to workplaces, public transit stations, retail and groceries following physical distancing regulations (Google LLC, 2021). At the same time, it indicated a 150% increase in mobility to parks and outdoor spaces. Similar trends have been observed in countries like Germany, Sweden, Norway and Denmark (Google LLC, 2021).

With limited or no access to indoor public spaces, the COVID-19 pandemic was a time for many people to rediscover nature, particularly for urban residents (Venter et al., 2021). Urban nature provided respite to residents against the uncertainty, restrictions and stress of living through a global pandemic (Cheng et al., 2021; Ribeiro et al., 2021; Samuelsson et al., 2020; Yao et al., 2022). One such green space, where people sought respite from the prolonged confinement of their homes, were urban community gardens.

Urban community gardens typically refer to plots of land, managed by citizen groups, to grow fruits and vegetables (Firth et al., 2011). Other than providing fresh produce, community gardens are known to be beneficial for the physical, social and mental well-being of their participants as well as for the urban inclusion of citizens (Pedro et al., 2020; Petrovic et al., 2019; Torres et al., 2018). Community gardens are also recognized as valuable components for achieving the United Nations Sustainable Development Goal (SDG) No. 11: “Make cities and human settlements inclusive, safe, resilient and sustainable” (United Nations, 2015). Gardeners report improved physical and mental health by virtue of spending time outdoors (Soga et al., 2017), consuming fresh fruits and vegetables (Litt et al., 2015) and feeling a sense of connection to nature (Chan et al., 2016; Egerer et al., 2018). Social benefits of a community garden are associated with gardeners experiencing a sense of social cohesion (Chan et al., 2016; Soga et al., 2017) and an involvement in one’s community (Litt et al., 2015). Previous research has indicated that social interactions in community garden spaces contribute towards the gardeners’ self-reported mental well-being (Artmann & Sartison, 2018). Participation in collective activities like work bees and sharing tools and seeds helps build social connections through community gardening (Firth et al., 2011; Kingsley & Townsend, 2006).

Given the multiple individual and collective benefits that participants derive from being a part of urban community gardening, they take on a special role during crisis events. Historically, community gardens have played an important role in providing food security to urban residents at the time of the crisis and distress like the Great Depression as well as during the two World Wars (Barthel et al., 2015; Ginn, 2012; Music et al., 2021). Previous research from community gardens in Barcelona after the 2007–2008 economic crisis (Calvet-Mir & March 2019), in New York City post Hurricane Sandy in 2012 (Chan et al., 2015) and in Christchurch, New Zealand following the Canterbury Earthquake in 2011 (Shimpo et al., 2019) indicate towards social resilience, in terms of community support and social connections, provided by the community gardens.

Social resilience is defined as “the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change” (Adger, 2000, p. 347) and respond positively to crises (Maguire & Hagan, 2007). Social resilience spans from initial forms of coping with a crisis to dynamic forms of self-organisation exhibited in planning and re-organizing (Folke, 2006; Marshall & Marshall, 2007). Social resilience can be drawn from physical places of gathering to intangible feelings of social support and a sense of community (Kwok et al., 2016; Kwok et al., 2019). Urban green spaces, like community gardens, have the potential to provide social resilience (Nursery-Bray et al., 2014), particularly during time of crisis (McPherson et al., 2015). On the one hand, community gardens are an avenue for urban residents to re-connect with nature (Chan et al., 2016; Egerer et al., 2018). On the other hand, community gardens provide an opportunity for social contact and help strengthen social ties, thus providing social resilience to the participants from loneliness and isolation (Chan et al., 2015; Nursery-Bray et al., 2014; Okvat & Zautra, 2011). However, as each disaster has a different impact on a community and its social ties, there is a need to expand upon the multiple ways in which community gardens provide social resilience (Shimpo et al., 2019). The COVID-19 pandemic is the most recent example.

The physical distancing regulation implemented during the COVID-19 pandemic have had a negative impact on the social and mental well-being of individuals and communities. These include loneliness and a loss of community, particularly among aged populations (Berg-Weger & Morley, 2020; Hwang et al., 2020). Urban green space, like community gardens, serve to counter these impacts by re-connecting people to nature as well as society (Jennings & Bamkole, 2019; Petrovic et al., 2019), particularly during the COVID-19 pandemic (Egerer et al., 2022; Marsh et al., 2021; Meija et al., 2020; Music et al., 2021; Samuelsson et al., 2020; Sia et al., 2022).

There is emergent research on the impacts of gardening, both individual and collective, on urban residents during the COVID-19 pandemic (Egerer et al., 2022; Meija et al., 2020; Mullins et al., 2021; Schoen et al., 2021; Sia et al., 2022). In this paper, we add to this scholarship by presenting empirical evidence from an ethnographic study of a community garden in Edmonton, Canada. The setting of a community garden is intentional as it brings together elements of contact both with nature as well as society (Firth et al., 2011). We highlight the role played by the community garden in fostering social resilience by providing a place for safe social contact during the pandemic. Additionally, we address aspects of resilience, of both the gardeners and the organizers, in the face of the disruptions caused by the global pandemic. The three questions that we answer are:

i. How did community gardens adapt to the COVID-19 regulations?
ii. What opportunities and challenges did community gardening present during the COVID-19 pandemic?
iii. What lessons can be learnt for urban social resilience from the experience of community gardening during the pandemic?

2. Methods

2.1. Research context

Early on in the pandemic, there was a renewed interest in gardening activities in Canada, both collective and individual (Mullins et al., 2021; Music et al., 2021). Citizens, garden organizers and non-government organizations across Canadian cities advocated for re-opening community gardens in April 2020 and for them to be listed as an essential service, rather than a recreational one (Klinkenberg, 2020). In Edmonton, where this research is situated, the city administration allowed for the reopening of community gardens in April 2020 with certain physical distancing restrictions in place (CBC News, 2020). These included not allowing more than 15 people in the garden at one time, no sharing of gardening tools, no in-person social events and disinfecting frequently used surfaces like water points after use (City of Edmonton, 2020). Masks were not mandated for outdoor spaces in Edmonton (Riebe, 2020). This news was welcomed by the 90 plus community gardens in Edmonton (CBC News, 2020).

Most community gardens in Edmonton are situated on public owned land that is managed by a bottom-up, community based neighbourhood organizations called Community Leagues (EFCL, 2020). Each garden further has a group of elected volunteers called the Garden Steering Committee (GSC). Our research is situated in the Strathcona Rail Community Garden (SRCG) located in the neighbourhood of Strathcona, Edmonton. The community garden covers an area of approximately 3000 m² and has 71 individual plots and some collective space for fruit trees, berries, herbs, and community resources like a tool shed, water pump and water totes. Plot sizes vary from full plots (24 m²) to half plots (12 m²), typically assigned to new gardeners (SRCG, 2017). Plots are separated by 45–50 cm wide pathways and are not fenced. As a new gardener, Joshi was allotted a half plot and participated in the garden activities between May-October 2020 as an overt ethnographer. Fig. 1 shows Joshi’s allotted garden plot and Fig. 2 provides an impression of
2021). The unique context of the community garden was an exception as interviews, participant observations or embedded ethnographies (Podjed, &

an extended period of time, in the everyday lives of people (Hammersley.

2.2. Research design

Ethnographic research involves the researcher being embedded, for an extended period of time, in the everyday lives of people (Hammersley & Atkinson, 2019). Ethnographic research allows for a fine-grained understanding of a social context, especially if the phenomenon under study is relatively new (Greener, 2011). In the process, the researcher may draw from a wide range of data i.e. participant observation, formal or informal interviews, documents and artefacts (Hammersley & Atkinson, 2019). Ethnographic studies in the context of community gardens have helped researchers understand the everyday experience of gardeners through participation and observation (Hondagneu-Sotelo, 2017; Mejia et al., 2020; Pitt, 2016). These include a range of activities from actively participating in gardening, attending organizational meetings and interviewing other participants. However, the COVID-19 pandemic has been a challenging time for qualitative researchers, particularly those that work in close contact with people through interviews, participant observations or embedded ethnographies (Podjed, 2021). The unique context of the community garden was an exception as it provided an arena to safely conduct ethnographic research as it was outdoors and allowed for physical distancing.

Joshi participated as a gardener at the SRCG in Edmonton between May 2020 and the end of the growing season in October 2020. We adopted an overt design, declaring the research intentions to the GSC and sought their approval in talking with gardeners and committee members regarding their experience of gardening during the COVID-19 pandemic. Additionally, Joshi explained the research question to gardeners, before asking them about their gardening experiences. During the research period Joshi:

i. Worked on the assigned plot in the garden 2–3 time in a week.
ii. Volunteered on the common area maintenance committee.
iii. Informally interviewed six gardeners and two organizing committee members.
iv. Attended the garden Zoom events at the beginning and end of the growing season.
v. Actively reviewed and contributed to the garden’s Facebook page.
vi. Actively reviewed and contributed to the monthly garden newsletters.
vii. Participated in the in-person garden show and tell event held in September 2020.

During this period Joshi maintained a research diary, recording any discussion on pandemic related impact on community gardening.

In addition to the ethnographic data, we were granted access to the part of the survey data collected by Sustainable Food Edmonton (https://www.sustainablefoodedmonton.org/), a non-profit charitable organization promoting urban agriculture in Edmonton, through their Gardeners’ and Coordinators’ Survey 2020 conducted at the end of the growing season. This included anonymized opened ended responses to the following questions from gardeners and garden coordinators across 90 community gardens in Edmonton:

i. Gardeners (188 responses): What was gardening in the COVID-19 pandemic like? Please describe.
ii. Garden coordinators (19 responses): This year COVID-19 guidelines were instituted in all community gardens. How were the new processes for your group? Please describe any challenges.

As the gardening guidelines issued by the City of Edmonton were the same for all gardens, this survey data provides an opportunity to triangulate the ethnographic data collected from one garden with the gardening experience from multiple gardens across the city.

2.3. Data analysis

Field notes from the ethnographic observations, notes from the interviews with gardeners at SRCG and members of the SRCG’s GSC were coded into three broad categories of positive, negative or neutral responses. Positive responses included gardeners reporting joy, stress relief and/or community connections by participating in garden activities, as has been established in previous literature (Kingsley & Townsend, 2006; Petrovic et al., 2019). Negative impacts included gardeners feeling a loss of community or feeling uncomfortable participating in the garden, on account of the pandemic. Neutral gardeners did not notice any changes in their garden participation on account of the pandemic. These three broad categories were further inductively coded for recurrent or new themes (e.g. additional work on account of following cleaning protocols or problems in accessing tools). Similar themes were then abridged, condensed and compiled (Kvale, 2007) and are presented in Section 3. A same process was adopted with textual data from the open ended questions in the Gardeners’ and Coordinators’ Survey 2020. As the survey and interview questions were open ended, gardeners and coordinators reported mixed responses which were broken down and categorized under positive, negative and/or neutral. This resulted in a total of 218 responses from 194 gardeners and 25 responses from 21 garden coordinators. As the survey data was more extensive, it helped build upon existing themes from the first stage of analysis as well as resulted in new themes (e.g. challenges with tool sharing).
The following section elaborates upon the findings, arranged chronologically as the garden season progressed.

3. Findings

3.1. Preparing for gardening

To facilitate community gardening during the COVID-19 pandemic, each GSC in Edmonton was required to draft a garden access plan, based on the municipal guidelines (City of Edmonton, 2020). Before the gardening season began in 2020, SRCG’s GSC worked on the following aspects to ensure compliance to the City of Edmonton’s COVID-19 policy:

i. Creating a COVID-19 Policy that included detailed procedures to be followed at the garden (work schedules, tool sharing, touch points etc.).

ii. Installation of COVID-19 related signs in the garden.

As per the COVID-19 policy, gardeners with even numbered plots could work on their plots on even numbered days and the rest on odd numbered days. This was done to ensure adequate physical distancing in the garden as well as to regulate the number of people present at one given time. Additionally, hand sanitizers were provided by SRCG’s GSC near touch points like the community shed and water totes. The GSC further organized an online Zoom session with gardeners (34 attendees) to discuss these guidelines and answer questions and concerns. Gardeners who could not attend the Zoom call (because of the lack of internet access), could hear and participate in the discussion via telephone, as the garden’s communication coordinator simultaneously relayed the meeting via telephone. Furthermore, the communications committee started a closed Facebook group (68 members) for frequent communication and to connect current gardeners with one another. These steps introduced the gardeners to the new COVID-19 regulations. New gardeners, 13 in number, were invited for an in-person, physically distanced tour of the garden in groups of five. As a new gardener, Joshi also received an invite from a long-term gardener to act as a mentor during the first year. However, for the SRCG GSC, this meant additional tasks and time investment. This is reflected in the inputs from garden coordinators at the SRCG as well as in the feedback survey from 19 gardener coordinators across Edmonton. Garden coordinators point towards the challenge of accommodating the new rules:

“The process was new and intense at first. We sanitized all of our communal tools and areas and ensured everyone worked 6 feet apart. It was a challenge to train lots of people to enforce rules and clean and have volunteers who were interested in working extra hours”

and.

“Our committee had to take on more work since we kept the communal area (water source in shed, compost, etc.) locked”.

Figs. 3 and 4 below indicate some precautionary measures put in place by the GST for the gardening season in 2020.

3.2. Gardening begins

Once the gardening season began, Joshi was able to have conversations with gardeners from the neighbouring plots as well as online on the Facebook group. Gardeners offered advice on what to plant and how to care for some plants. Similar conversations also took place between other gardeners as they worked on their respective plots. Further, Joshi volunteered at physically distanced work bees to help with weeding and pruning common areas in the garden. This was an additional opportunity to meet other gardeners, spend some time outdoors as well as learn about local plants. Given that individual garden plots were at least 3 m

Fig. 3. City of Edmonton’s Community Garden Guidelines signs installed in the garden.

Fig. 4. Common tools in the community garden shed sealed for the season.
× 4 m, there was adequate space in the community garden for maintaining the 2 m physical distancing rule. Although there were no mask mandates for outdoor space (Riebe, 2020), some gardeners voluntarily wore masks.

One gardener who frequented her plot mentioned that she was working from home and coming to the garden was the only activity she considered safe. It was also a pleasant break from working on the computer all day. This is reflected in the gardeners’ survey where 95 out of 194 respondents report some positive association with coming to the garden. These include self-reported stress relief and happiness at having some human contact. Gardeners also enjoyed being outdoors and not having to wear masks. Some gardeners describe being in the garden a “source of joy” and a “happy place”. As elaborated by two gardeners in the survey:

“It was incredibly beneficial to have the garden plot. We also garden at home but having the community plot gave me and my children a reason to get out of the house. I love having the community plot…it is such a great place”

and.

“It was an excellent activity for my mature mother. She walked, met people and loved maintaining her little plot. COVID was not in her mind at all”.

However, 70 out 194 gardeners also reported negative associations related to their gardening experience in 2020. These included feeling lonely and isolated in the garden, missing in-person social events, restrictive access to their plots and losing access to communal resources like tools. As elaborated in the following responses:

“We were unable to have our garden potlucks. And had to socially distance from each other. While the gardens did well; it was a very different community garden year”

and.

“It was individual rather than communal. It was also cumbersome with the cleaning that was necessary to ensure safety for all and the need to use our own equipment”.

53 out of 194 respondents reported little or no difference in their gardening experience in 2020. This group found the community garden guidelines easy to follow and experienced no significant difference form other gardening years.

3.3. Recreating lost community

As the gardening season progresses, the SRCG’s GSC made efforts to keep gardeners connected through Facebook and monthly newsletters circulated via email. Gardeners posted questions, shared gardening tips and recipes. Furthermore, the GSC facilitated long term tool lending for gardeners who needed them. As a new gardener without tools, Joshi was able to borrow a basic set of tools for the season.

Some gardeners continued old garden traditions, without compromising physical distancing measures. Gardeners shared excess produce by leaving it in the common shed and inviting other gardeners over...
Facebook to take what they wanted. The Facebook page also offered suggestions on online gardening workshops, lectures and documentaries. Figs. 5 and 6 capture some ways in which gardeners connected over Facebook.

3 gardeners could not join the Facebook group, because of age, lack of internet access and choice. The garden’s outreach coordinator contacted these gardeners via telephone to announce important garden events like seed or manure distribution. However, these gardeners missed out on spontaneous posts by other gardeners on Facebook.

Community was also found in chanced meetings and conversations with other gardeners in the garden. As is expressed by one gardeners from SRCG in an informal interview:

“We could not meet people indoors for the longest time so it was nice to have the possibility to meet them safely outdoors. We also got a lot of useful hints from other gardeners for our plot”.

Similar experiences can be seen in the feedback survey where gardeners report:

“Gardeners maintained physical distance and did not share tools. However, we still would get together at our plots to talk [with] gardens and growing food and sharing our successes”

and.

“It was one of the few times i saw neighbours, and i enjoyed spending time with them even more than usual”.

Joshi often ate dinner in the common green area in the garden and had other gardeners join in for long spontaneous conversations. When the COVID-19 restrictions and the weather permitted, Joshi played some board games with her garden plot neighbour outdoors while maintaining physical distancing.

The only in-person event organized by SRCG’s GST was a show-and-tell in September 2020. The GSC made the following announcement to gardeners:

“Having social events is tough during COVID but we are missing the ‘community’ part of our community garden. We want to give everyone a chance to meet each other and exchange experiences in the garden, while doing it in a safe outdoor space. Being in a community garden is part of being a community. Of course this year has been one of a kind, but we see the value in getting to know our neighbours and creating new friendships.”

Gardeners who attended the event wore masks, kept an adequate physical distance, and shared their gardening experiences from the growing season of 2020 (see Figs. 7 and 8). While most gardeners were happy with the possibility to continue gardening during the COVID-19 pandemic, one gardener pointed out that in the beginning of the season she ended up spending less time in the garden as she was not comfortable being outside in a public space with other people.

The SRCG has a tradition of organizing an end of season potluck to celebrate and share the produce from the garden. Due to the pandemic restrictions, an end of season Zoom call was organized instead. This was attended by 42 gardeners. Those who did not have access to Zoom, could join in via telephone. Overall, gardeners were content with their gardening experiences and the physical distancing and sanitation measures in place. Challenges in accessing communal tools were discussed. The strategy of lending tools for the season was found to be a good solution. However, it was still challenging for people who lived in small apartments with no place to store the tools. Gardeners also discussed the
studies conducted on gardening during the COVID-19 pandemic have been reported by gardeners emerging from other pandemics (Egerer et al., 2022). Our findings indicate that a majority of the community gardens after the initial physical distancing measures of the COVID-19 pandemic, our respondents have brought forth different aspects of resilience provided by community gardens in different geographical contexts can help build a single case study is illustrative, but not generalizable. Studies from community gardens in different geographical contexts can help build a fuller picture of the role that community gardens have played during the COVID-19 pandemic (Egerer et al., 2022; Marsh et al., 2021; Mejia et al., 2020; Sia et al., 2022). Further, using different methods, researchers have brought forth different aspects of resilience provided during the pandemic. Qualitative research, like ours and Marsh et al. (2021) and Mejia et al. (2020) has provided an insight into gardeners’ experiences and feelings. Quantitative research like Egerer et al. (2022) and Sia et al. (2022) has helped understand how different age, gender and social groups experienced green spaces differently.

Our particular focus on community gardens helped highlight not just individual benefits experienced in coming in contact with nature but also social and community benefits that people experienced as being part of a larger social group. This focus was driven by the nature of the pandemic in keeping people physically apart and hence potentially impacting social ties. Although, research on urban green spaces during the COVID-19 pandemic have brought forth insights into gardeners’ mental, physical and social well-being, longitudinal research can help gauge if urban residents continue to benefit from these positive associations in a post-pandemic world.

5. Conclusion

The COVID-19 pandemic has been a time for urban residents to rethink and rebuild their relationship with the urban green spaces around them. The lessons from the COVID-19 pandemic are important as cities and their residents brace for the uncertainties of the Anthropocene (Elmqvist et al., 2021). In this paper, we have presented empirical evidence of how community gardens in Edmonton, Canada adapted their social resilience provided by community gardens is not experienced equally by all participants. Individual social expectations, living situations, work pressures, risk perception, age and gender are some factors that might have played a role in how gardeners experienced social resilience. As we have largely drawn from ethnographic data and anonymised open-ended survey responses, we are limited in unpacking how these factors might have contributed towards building or eroding an individual’s social resilience around community garden activities. Research focused on particular social groups (e.g. Hondagneu-Sotelo 2017) or drawing from larger datasets with demographic information (Egerer et al., 2022; Venter et al., 2021) can help fill this gap.

While community gardens contribute towards building social resilience to a crisis, we would like to highlight that this involved additional work for community organizers and volunteers. Existing research on the role of bottom-up community organizations in running and maintaining sustainability initiatives points towards the limitations of volunteer time and efforts (Joshi et al., 2022; Seyfang & Haxeltine, 2012; Seyfang & Smith, 2007). In this paper, we have highlighted the critical role played by the garden steering committee in keeping the garden operational during the pandemic. Similar observations have been made by Mejia et al. (2020). The garden steering committee responded to the crisis situation by prompt re-organization (Folke, 2006; Marshall & Marshall, 2007). This came at the cost of additional human resources expended by the garden volunteers. Crisis situations like the COVID-19 pandemic, are an opportunity for the city administration to reach out to community organizations and provide resources to alleviate the additions roles and responsibilities that community organizations might have in tackling new challenges to continue functioning. Additionally, urban green spaces, like community gardens, often have to compete for space and resources against the pressures of neoliberal urban agendas (Shaw et al., 2018). The growing evidence on the socio-ecological resilience provided by community gardens to urban residents is important for urban planners as they prepare cities for future shocks as well as for community activist in indicating the value of the green spaces they often have to fight to preserve.

A single case study is illustrative, but not generalizable. Studies from community gardens in different geographical contexts can help build a fuller picture of the role that community gardens have played during the COVID-19 pandemic (Egerer et al., 2022; Marsh et al., 2021; Mejia et al., 2020; Sia et al., 2022). Previous research from post-crisis events does not report a significant change in the functioning of the garden or restrictions on social gatherings (Chan et al., 2015; Shimpo et al., 2019). The COVID-19 pandemic, however, impacted community garden operations. This included cancellation of group activities and tool sharing and inclusion of cleaning protocols and physical distancing measures. This resulted in some participants experiencing a loss of community, in comparison to the pre-pandemic times. Gardeners reported reduced frequency of visiting the garden, missing working together with other gardeners in common areas and missing social events like pot-lucks and harvest festivities. While most gardeners were able to create new forms of interaction in online and offline spaces, some barriers like access to internet prevented others from joining in. Here the unique nature of the pandemic adds a layer of analysis to how some individuals experienced an erosion of social resilience associated with the community garden.

A third group of survey participants reported no significant difference in their gardening practices or social interactions. The existence of these three categories (positive, negative and neutral) highlight that the social resilience provided by community gardens is not experienced equally by all participants. Individual social expectations, living situations, work pressures, risk perception, age and gender are some factors that might have played a role in how gardeners experienced social resilience. As we have largely drawn from ethnographic data and anonymised open-ended survey responses, we are limited in unpacking how these factors might have contributed towards building or eroding an individual’s social resilience around community garden activities. Research focused on particular social groups (e.g. Hondagneu-Sotelo 2017) or drawing from larger datasets with demographic information (Egerer et al., 2022; Venter et al., 2021) can help fill this gap.

While community gardens contribute towards building social resilience to a crisis, we would like to highlight that this involved additional work for community organizers and volunteers. Existing research on the role of bottom-up community organizations in running and maintaining sustainability initiatives points towards the limitations of volunteer time and efforts (Joshi et al., 2022; Seyfang & Haxeltine, 2012; Seyfang & Smith, 2007). In this paper, we have highlighted the critical role played by the garden steering committee in keeping the garden operational during the pandemic. Similar observations have been made by Mejia et al. (2020). The garden steering committee responded to the crisis situation by prompt re-organization (Folke, 2006; Marshall & Marshall, 2007). This came at the cost of additional human resources expended by the garden volunteers. Crisis situations like the COVID-19 pandemic, are an opportunity for the city administration to reach out to community organizations and provide resources to alleviate the additional roles and responsibilities that community organizations might have in tackling new challenges to continue functioning. Additionally, urban green spaces, like community gardens, often have to compete for space and resources against the pressures of neoliberal urban agendas (Shaw et al., 2018). The growing evidence on the socio-ecological resilience provided by community gardens to urban residents is important for urban planners as they prepare cities for future shocks as well as for community activist in indicating the value of the green spaces they often have to fight to preserve.

A single case study is illustrative, but not generalizable. Studies from community gardens in different geographical contexts can help build a fuller picture of the role that community gardens have played during the COVID-19 pandemic (Egerer et al., 2022; Marsh et al., 2021; Mejia et al., 2020; Sia et al., 2022). Further, using different methods, researchers have brought forth different aspects of resilience provided during the pandemic. Qualitative research, like ours and Marsh et al. (2021) and Mejia et al. (2020) has provided an insight into gardeners’ experiences and feelings. Quantitative research like Egerer et al. (2022) and Sia et al. (2022) has helped understand how different age, gender and social groups experienced green spaces differently.

Our particular focus on community gardens helped highlight not just individual benefits experienced in coming in contact with nature but also social and community benefits that people experienced as being part of a larger social group. This focus was driven by the nature of the pandemic in keeping people physically apart and hence potentially impacting social ties. Although, research on urban green spaces during the COVID-19 pandemic have brought forth insights into gardeners’ mental, physical and social well-being, longitudinal research can help gauge if urban residents continue to benefit from these positive associations in a post-pandemic world.

5. Conclusion

The COVID-19 pandemic has been a time for urban residents to rethink and rebuild their relationship with the urban green spaces around them. The lessons from the COVID-19 pandemic are important as cities and their residents brace for the uncertainties of the Anthropocene (Elmqvist et al., 2021). In this paper, we have presented empirical evidence of how community gardens in Edmonton, Canada adapted their
functioning to the challenges of physical distancing brought about by the COVID-19 pandemic. A large number of the gardeners in 2020 in Edmonton pointed towards the positive social impacts associated with garden activities. At the same time, some gardeners also felt a loss of community and feelings of isolation in the garden, in comparison to their pre-pandemic experiences.

We found the framework of urban social resilience, applied to community gardening, helpful in capturing the response of the gardeners during the pandemic. However, social resilience associated with community gardens was experienced differently by individuals. Furthermore, adapting garden activities to ensure their smooth functioning during a crisis event, required additional time and efforts from the garden organizers.

The impacts of climate change might disrupt the physical and social function of cities in the future. In such a scenario, the lessons learnt from urban community gardening and their resilience in the face of crisis and change will be important for researchers, planners and activists.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank the Steering Committee of the Strathcona Rail Community Garden, Edmonton for allowing us to conduct this research as well as Sustainable Food Edmonton for sharing part of the 2020 Gardeners’ Survey. The research design was approved by the Research Ethics Office, University of Alberta, Canada. We acknowledge the financial and intellectual support provided by the Leibniz Institute of Ecological Urban and Regional Development, Dresden for publishing this research.

References

Adger, W. N. (2000). Social and ecological resilience: Are they related? Progress in Human Geography, 24(3), 347–364. https://doi.org/10.1191/030913200071540465
Armstrong, M., & Sartison, K. (2018). The Role of Urban Agriculture as a Nature-Based and Regional Development, Dresden for publishing this research.
Artmann, M., & Sartison, K. (2018). The Role of Urban Agriculture as a Nature-Based and Regional Development, Dresden for publishing this research.
Berg-Weger, M., & Morley, J. E. (2020). Loneliness and Social Isolation in Older Adults during the COVID-19 pandemic. https://doi.org/10.1016/j.ajo.2020.05.004
Birch, M., Maye, D., & Pearson, D. (2011). Developing ‘community’ in new community gardens. Local Environment, 16(6), 555–568. https://doi.org/10.1080/13549839.2011.586025
Chan, J., Pennisi, L., & Francis, C. A. (2016). Social-Ecological Refuges: Reconnecting In

Egger, M., Philpott, S., Bichier, P., Jha, S., Liere, H., & Lin, B. (2018). Gardener Well-Being along Social and Biophysical Landscape Gradients. Sustainability, 10(2), 96. https://doi.org/10.3390/su10020096
Elmqvist, T., Anderson, E., McPherson, T., Bai, X., Bettencourt, L., Bronzini, E., … Van Der Leeuw, S. (2021). Urbanization in and for the Anthropocene. Npj Urban Sustainability, 1(1), 6. https://doi.org/10.1038/s42492-021-00018-w
Firth, C., Maye, D., & Pearson, D. (2011). Developing ‘community’ in new community gardens. Local Environment, 16(6), 555–568. https://doi.org/10.1080/13549839.2011.586025
Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. Global Environmental Change, 16(3), 253–267. https://doi.org/10.1016/j.gloenvcha.2006.04.002
Ginn, F. (2012). Dig for Victory! New histories of wartime gardening in Britain. Journal of The Historical Geography, 89, 294–305. https://doi.org/10.1016/j.jhgeog.2012.02.001
Google LLC. (2021). Google COVID-19 Community Mobility Reports. https://www.google.com/covid19/mobility/
Hendersgy, I. (2011). Designing Social Research: A Guide for the Bewildered. SAGE Publications Ltd.
Hammersley, M., & Atkinson, P. (2019). Ethnography: Principles in Practice (4th ed.). Routledge. https://doi.org/10.4324/9781315146027
Hondagneu-Sotelo, P. (2017). At home in inner-city immigrant community gardens. Journal of Housing and the Built Environment, 32(1), 13–28. https://doi.org/10.1007/s10901-015-9491-0
https://doi.org/10.21307/sagj-2016-004
https://doi.org/10.1098/rstb.2016.0088
Jennings, V., & Bamkole, O. (2019). The Relationship between Social Cohesion and Urban Green Space: An Avenue for Health Promotion. International Journal of Environmental Research and Public Health, 16(3), 452. https://doi.org/10.3390/ijerph16030452
Joshi, N., Agrawal, S., & Welegedara, N. P. Y. (2022). Something old, something new, something green: Community leagues and neighbourhood energy transitions in Edmonton, Canada. Energy Research & Social Science, 88, Article 102524. https://doi.org/10.1016/j.erss.2022.102524
Kingsley, J., ‘Yotti’, & Townsend, M. (2006). ‘Dig in’ to Social Capital: Community Gardens as Mechanisms for Growing Social Urban Connectedness. Urban Policy and Research, 24(4), 525–537. https://doi.org/10.1080/08111101060135200
Klinkenberg, M. (2020, April 25). Why it matters that birds felt louder: The garden as a refuge during COVID-19. https://doi.org/10.4135/9781849208963
Kwok, A. H., Doyle, E. E. H., Becker, J., Johnston, D., & Paton, D. (2016). What is ‘social resilience’? Perspectives of disaster researchers, emergency management practitioners, and policymakers in New Zealand. International Journal of Disaster Risk Reduction, 19, 197–211. https://doi.org/10.1016/jijdrr.2016.08.013
Kwok, A. H., Hudson-Doyle, E., Johnston, D., Becker, J., & Paton, D. (2019). Stakeholders’ Perspectives of Social Capital in Informing the Development of Neighborhood-Based Disaster Resilience Measurements. Journal of Applied Social Science, 13(1), 26–57. https://doi.org/10.13971/jsscem.2015.09.004
Maguire, B., & Hagan, P. (2007). Disasters and Communities: Understanding Social Resilience. The Australian Journal of Emergency Management, 22(2), 16–20.
Maguire, B., Dienck, L. O., Egger, M., Lin, B., Osola, A., & McPherson, T. (2012). Where birds felt louder: The garden as a refuge during COVID-19. Wellbeing. Space and Society, 2 100055. https://doi.org/10.21307/jwss-2021-00055
Marshall, N. A., & Marshall, P. A. (2007). Conceptualizing and Operationalizing Social Resilience within Commercial Fisheries in Northern Australia. Ecology and Society, 12 (1). https://www.ecologyandsociety.org/vol12/iss1/art1/.
McPherson, T., Anderson, E., Elmqvist, T., & Frantzesseki, N. (2015). Resilience and of through urban ecosystem services. Ecosystem Services, 12, 152–156. https://doi.org/10.1016/j.ecoser.2014.07.012
Meja, A., Bhattacharya, M., Nigon-Crowley, A., Kirkpatrick, K., & Katcho, C. (2020). Community gardening during times of crisis: Recommendations for community-engaged dialogue, research, and praxis. Journal of Agriculture, Food Systems, and Community Development, 15(2), 1–12. https://doi.org/10.3683/jafscd.2020.101.006
Mullins, L., Charlebois, S., Finch, E., & Music, J. (2021). Home Food Gardening in Canada in Response to the COVID-19 Pandemic. Sustainability, 13(6), 3056. https://doi.org/10.3390/su13063056
Music, J., Finch, E., Done, P., Toze, S., Charlebois, S., & Mullins, L. (2021). Pandemic Victory Gardens: Potential for local land use policies. Land Use Policy, 109, Article 105600. https://doi.org/10.1016/j.landusepol.2021.105600
Njere-Bray, M., Farnell, E., Ankerby, R. A., Bray, H., & Ridd, D. (2014). Community gardens as pathways to community resilience? Reflections on a pilot study in Adelaide, South Australia. South Australian. Geographical Journal, 113(1), 13–28. https://doi.org/10.1111/sagj.2014.004
Okvat, H. A., & Zautra, A. J. (2011). Community Gardening: A Parasisomorphic Path to Individual, Community, and Ecological Resilience. American Journal of Community Psychology, 47(3–4), 374–387. https://doi.org/10.1007/s10464-010-9404-4
Pedro, A. G., Görner, A., Lindner, A., & Wends, W. (2020). More than fruits and vegetables Research in Urbanisim Series, Vol. 6, 219-242 Pages. 10.7480/BUIES.6.101.
Petrovic, N., Simpson, T., Orlove, B., & Dowd-Uribe, B. (2019). Environmental and social dimensions of community gardens in East Harlem. Landscape and Urban Planning, 183, 36–49. https://doi.org/10.1016/j.landurbplan.2018.10.009

Pitt, H. (2016). Growing together: An ethnography of community gardening as place making [Cardiff University]. http://orca.cardiff.ac.uk/id/eprint/53953.

Podjed, D. (2021). Renewal of Ethnography in the Time of the COVID-19 Crisis. Sociologija i Prostor, 59(1), 267–284. https://doi.org/10.5673/sip.59.0.19

Ribeiro, A. I., Triguero-Mas, M., Jardim Santos, C., Gómez-Nieto, A., Cole, H., Anguelovski, I., … Baró, F. (2021). Exposure to nature and mental health outcomes during COVID-19 lockdown. A comparison between Portugal and Spain. Environment International, 154, Article 106664. https://doi.org/10.1016/j.envint.2021.106664

Riebe, N. (2020). Mask up: What you need to know about masks in Edmonton. https://www.cbc.ca/news/canada/edmonton/edmonton-city-council-covid-19-1.5669648.

Samuelsson, K., Barthel, S., Colding, J., Macassa, G., & Giusti, M. (2020). Urban nature as a source of resilience during social distancing amidst the coronavirus pandemic [Preprint]. Open Science Framework. https://doi.org/10.31219/osf.io/3wx5a

Schoen, V., Blythe, C., Caputo, S., Fox-Kamper, R., Specht, K., Fargue-Lelièvre, A., … Federiczak, K. (2021). “We Have Been Part of the Response”: The Effects of COVID-19 on Community and Allotment Gardens in the Global North. Frontiers in Sustainable Food Systems, 5, Article 732641. https://doi.org/10.3389/fsufs.2021.732641

Seyfang, G., & Hazelline, A. (2012). Growing Grassroots Innovations: Exploring the Role of Community-Based Initiatives in Governing Sustainable Energy Transitions. Environment and Planning C: Government and Policy, 30(3), 381–400. https://doi.org/10.1068/c10222

Seyfang, G., & Smith, A. (2007). Grassroots Innovations for Sustainable Development: Towards a New Research and Policy Agenda. Environmental Politics, 16(4), 584–603. https://doi.org/10.1080/09644010701419121

Shaw, D., Cumbers, A., McMaster, R., & Crossan, J. (2018). Scaling Up Community Action for Tackling Climate Change. British Journal of Management, 29(2), 266–278.

Shimp, N., Wesner, A., & McWilliam, W. (2019). How community gardens may contribute to community resilience following an earthquake. Urban Forestry & Urban Greening, 38, 124–132. https://doi.org/10.1016/j.ufug.2018.12.002

Sia, A., Tan, P. Y., Wong, J. C. M., Arail, S., Ang, W. F., & Ez, K. B. H. (2022). The impact of gardening on mental resilience in times of stress: A case study during the COVID-19 pandemic in Singapore. Urban Forestry & Urban Greening, 68. https://doi.org/10.1016/j.ufug.2021.127448

Soga, M., Cox, D., Yamaura, Y., Gasto, K., Kurisu, K., & Hanski, K. (2017). Health Benefits of Urban Allotment Gardening: Improved Physical and Psychological Well-Being and Social Integration. International Journal of Environmental Research and Public Health, 14(1), 71. https://doi.org/10.3390/ijerph14010071

SRCG. (2017). Strathcona Rail Community Garden. https://strathconacommunity.ca/community/strathcona-rail-community-garden/

Torres, A. C., Prévot, A.-C., & Nadot, S. (2018). Small but powerful: The importance of French community gardens for residents. Landscape and Urban Planning, 180, 5–14. https://doi.org/10.1016/j.landurbplan.2018.08.005

United Nations. (2015). Sustainable Development Goals. http://www.un.org/sustainabledevelopment/sustainable-development-goals/

Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., & Nowell, M. S. (2021). Back to nature: Norwegians sustain increased recreational use of urban green space months after the COVID-19 outbreak. Landscape and Urban Planning, 214, Article 104175. https://doi.org/10.1016/j.landurbplan.2021.104175

Yao, Y., Lu, Y., Guan, Q., & Wang, R. (2022). Can parkland mitigate mental health burden imposed by the COVID-19? A national study in China. Urban Forestry & Urban Greening, 67, Article 127451. https://doi.org/10.1016/j.ufug.2021.127451