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Enhancing urban nature and place-making in social housing through community gardening

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Introduction

The provision of green space, including community gardens, in urban planning has gained increasing attention over the past decade (Haaland & van den Bosch, 2015; Sartison & Artmann, 2020). Access to natural areas and green space, such as parks and gardens, has been shown to offer a myriad of health promotion outcomes that include restorative effects, such as improved mental health and enhanced wellbeing (Krusky et al., 2015). There has been a corresponding and expanding evidence base related to community gardens and related health outcomes (see Lovell, Husk, Bethel, & Garside, 2014; Mintz & McManus, 2014; Soga et al., 2017; Spano et al., 2020), as well as broader social and community outcomes (see Nettle, 2010a, 2010b, 2014; Okvat & Zautra, 2011). However, studies indicate spatial disparities and inequalities may exist in the access to, and distribution of, green spaces (Astell-Burt, Feng, Mavoia, Badland, & Giles-Corti, 2014; Landry & Chakraborty, 2009; Wen, Zhang, Harris, Holt, & Croft, 2013) and that there are cross-city inequities in park provision and quality (Rigolon, Browning, & Jennings, 2018).

Inequalities in green infrastructure and access to green space

Green infrastructure is a broad term used to describe vegetated land, such as parks and trees that provide ecological benefits to urban areas (Heckert & Rosan, 2016). Private and public spaces, such as gardens, cemeteries, green roofs, woodland, grassland, moors, and wetlands can be encompassed within this term (Cheshmehzangi & Griffiths, 2014). Green infrastructure may also refer to the processes involved in creating urban green space, such as the introduction and maintenance of green land that is properly designed to support the health of trees and appeal to urban citizens (Eisenman, 2016; Jennings, Baptiste, Jelks, & Skeete, 2017). The potential impact of green infrastructure includes its capacity to increase broader social and community benefits, particularly when communities are consulted in the early

Enhancing urban nature and place-making in social housing through community gardening stages of urban design. However, not all neighbourhoods and communities have equal access to green space, potentially furthering health inequities and impacting the health of those who are already marginalised (Jennings et al., 2017; Jennings, Larson, & Yun, 2016).

In a study of neighbourhood spatial access to parks and green spaces in the United States Wen and colleagues (2013) found that census areas with lower levels of income were underexposed to green spaces. These findings support the observation that disadvantaged neighbourhoods generally lack environmental resources that promote health and invite physical activity. Relatedly, a cross-sectional study of Australia's most populous cities suggests "...lower income neighbourhoods within Perth, Brisbane, Sydney and (especially) Adelaide were less likely to have at least 10% green space" (Astell-Burt, et al., 2014, p. 4). Additionally, Astell-Burt et al. (2014) propose that residents of lower income neighbourhoods have fewer opportunities to make use of green spaces, which decreases the health promoting resources available in these communities. They call upon policymakers and communities to address the socioeconomic inequity of available green spaces in lower income neighbourhoods.

Community gardens: A unique tool for strengthening social capital

Urban food gardens and community gardens are increasingly recognised for their beneficial role in enhancing wellbeing and cultivating a sense of community in gardeners (Kingsley & Townsend, 2006; Pollard, Roetman, Ward, Chiera, & Mantzioris, 2018; Soga et al., 2017; Soga, Gaston, & Yamaura, 2017). For example, studies have shown urban food production could promote social cohesion (Sartison & Artmann, 2020) and that community gardens contribute towards the development of social capital (Firth, et al., 2011; Lanier, Schumacher, & Calvert, 2015). Moreover, community gardens have been shown to play a meaningful role in improving community connections that are gradually eroding as a result of

Enhancing urban nature and place-making in social housing through community gardening urbanisation (Kingsley & Townsend, 2006; Teig et al., 2009; Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007).

Community gardens act as platforms for nurturing social processes, building community relationships, exploring social connections, and promoting public participation in community life (Lanier et al., 2015; Spano et al., 2020; Teig et al., 2009). Research has shown how community gardeners share common values, such as cooperation and collective norms, and develop mutual trust to act for mutual benefit (Alaimo, Reischl, & Allen, 2010; Glover, 2004; Putnam, 1995). The degree of interaction gardeners initiate with fellow gardeners helps build cohesion and vitality in a community through shared social capital (Firth et al., 2011). These social connections between individuals from diverse backgrounds in dissimilar situations, such as in formal relationships where elements of power and authority are visible, may improve when individuals link their social capital (Claridge, 2013).

There is increasing appreciation for the potential of community gardens to facilitate engagement across diverse populations and bolster resilience (Dyg, Christensen, & Peterson, 2019; Kingsley, Townsend, & Henderson-Wilson, 2009; Kunpeuk, Spencer, Phulkerd, Suphanchaimat, & Pitayarangarit, 2019; Smidl, Mitchell, & Creighton, 2017). Studies have highlighted how community gardens may improve social cohesion and community engagement in low-income communities, and culturally and linguistically diverse populations (Booth, Chapman, Ohmer, & Wei, 2018; Bussell, Bliesner, & Pezzoli, 2017; Carney et al., 2012; Cumbers, Shaw, Crossan, & McMaster, 2018; Hartwig & Mason, 2016; Ober Allen, Alaimo, Elam, & Perry, 2008; Teig et al., 2009). For example, Shiner, Glover, & Parry (2004) found that both African American and White gardeners in their study agreed that community gardens may serve as potential sites for interracial interaction; other studies have found participants from different racial, language, and geographical backgrounds felt community gardening brought them together in a safe and unbiased setting (see Hartwig &

Enhancing urban nature and place-making in social housing through community gardening (Mason, 2016; Ohmer, Meadowcroft, Freed, & Lewis, 2009; Okvat & Zautra, 2011). Egerer, Barona, Lin, and Kendal (2019) pointed out that ethno-culturally diverse populations speaking English as an additional language regarded community gardens as collective community places offering security.

Within the Australian context, the research focus is expanding to study community gardens with involvement of individuals from diverse groups (Guitart et al., 2014; Martin et al., 2017; Mintz and McManus, 2014). Kingsley, Foenander, and Bailey (2019) found there are variations in participant motivations related to community gardening. To further understand these factors, they highlighted the need for additional quantitative and more in-depth qualitative research across different garden settings and to broaden the scope of community garden research. Likewise, Christensen (2017) has also called for the use of qualitative methods that provide a rich understanding of participant experiences and meanings of urban gardening engagement.

Study context

In partnership with the New South Wales (NSW) Department of Communities and Justice (DCJ), the Royal Botanic Garden Sydney's Community Greening program is committed to facilitating community-led gardens in social housing estates across NSW. In NSW, social housing refers to "secure and affordable rental housing for people on low incomes with housing needs which includes public, community and Aboriginal housing" (NSW Government, 2019, para. 1). The residents of social housing estates may experience disadvantages in accessing material and social resources likely affecting their capacity for active engagement in their communities (Australian Bureau of Statistics, 2018). The Community Greening program aims to address these concerns by providing social and

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In 2017, the Royal Botanic Garden Sydney and NSW DCJ partnered with the researchers to examine the impact of the Community Greening program on the perceived benefits of residents living in social housing communities in NSW (Gray, Tracey, Truong, & Ward, 2022; Truong, Gray, Tracey, & Ward, 2018). The project aims were also informed by the Measuring Social Housing Outcomes report (Family and Community Services [FACS] NSW, 2016a) and the Future Directions for Social Housing in NSW (FACS NSW, 2016b) to explore how new initiatives such as community gardens may contribute to better social housing experiences. The primary objective of this exploratory study was to ascertain the following: what are the self-perceived and observed educational, social, and community engagement outcomes from participation in the Community Greening program?

Methods

Study design

The study was conducted in six social housing communities located in Greater Sydney, NSW, Australia, that were new to the Community Greening program. The project included researcher site visits during the planning and construction of the community gardens, and focus group interviews with participating residents after a period of six to seven months. Social housing staff members were also on-site during project activities and were sent an open-ended questionnaire by email to ascertain their observations and perspectives on the impact of the gardens on community members and the community more broadly. The findings discussed in this article arose from the focus group interviews with residents and the questionnaires from the staff members.

Site selection and participants

Site selection was conducted in collaboration with the Community Greening program coordinators to identify prospective social housing communities whose staff and/or residents had indicated an interest in becoming involved. The gardens were built in six different suburbs in the Greater Sydney region, which is a particularly culturally, linguistically, and socioeconomically diverse area. A total of 42 adult participants from all six sites (26 females; 16 males; age range 29 to 83; average age 59 years) took part in the focus group interviews, ranging from three to 13 people per site. Residents were invited to participate in the focus groups by social housing staff and through recruitment posters in each community. The focus group interviews were scheduled six to seven months after the initial construction of the gardens and the meeting details were shared by the community bulletin board and/or through internal communications with the assistance of staff. Among the participants, nearly half reported they were born in Australia; the remainder were born in Afghanistan, Chile, Fiji, Iran, Mauritius, New Zealand, Philippines, and Poland. Nearly a quarter of participants reported that English was not their first language.

Each site had different organizational structures and staff members assigned to specific roles related to the management of the housing community. Staff members from all sites were invited to complete an open-ended questionnaire. Four staff members from four of the six sites returned a completed questionnaire. Job titles of the participating staff members included community development worker, manager, tenant participation officer, and tenancy officer.

Data collection and analysis

One to two members of the research team attended each orientation day with potential participants to explain the purpose of the study and to obtain informed consent. Members of

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the research team were also present at each site during the first construction day when garden beds were built or installed, and they participated in the initial construction and planting of various vegetables, herbs, and plants. The Community Greening staff continued with regular activities over the course of the following six to seven months, which included occasional site visits and capacity building on topics, including gardening, composting, and recycling. The same research team member(s) returned to their original sites to conduct the focus group interviews. One limitation of the study is that attendance and garden-use rates were not tracked. The gardens were located within shared outdoor spaces in the social housing sites and all residents, and not just those who participated in the study were encouraged to garden based on their levels of interest, ability, and availability. Therefore, each site had recurrent and occasional gardeners.

A focus group interview was conducted at each of the six sites. The average length of interviews was 50 minutes with a range of 34 to 70 minutes. There were three to 13 participants per site, for an average of seven people per focus group interview. At certain sites, language interpreters were present to facilitate participation of those from culturally and linguistically diverse backgrounds. The interviews consisted of 13 open-ended questions designed to elicit discussion on the impact of the community gardens, including motivations for gardening, perceived individual, social, and community benefits, areas of learning, and suggestions or recommendations. The staff questionnaires were adapted from the focus group interview questions to examine staff members' perspectives on the impact of community gardens for social housing estates, as well as their observations and interactions with residents related to the gardens.

Focus group interview transcripts and staff questionnaires were managed and analysed with the use of NVivo software. Guided by the constant comparative method, categories were developed based on similarities and differences of ideas within the data to

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identify common themes representing the participants' views and experiences (Creswell, 2018; Strauss & Corbin, 1998). The semi-structured focus group interviews and questionnaires helped to provide a richer understanding of participants' community gardening experiences and views on the impact of the gardens in the community and their everyday lives.



Image 1: Example of a constructed raised garden bed built with participants.



Image 2: Example of prefabricated raised garden beds installed with participants.

Results

Community gardens as sites for knowledge generation and connection to nature

Participation in the program provided an informal context for knowledge generation about gardening and appreciation for urban and nearby nature. When asked about what they had learned, many participants indicated they had increased their knowledge and understanding of gardening, directly from the Community Greening team, as well as from each other or through their own independent study. For example, participants shared with one another different ways of cooking vegetables, learned about recycling in their community, and developed skills to independently seek information about gardening or planting a particular type of seed. In some instances, they discussed learning from their mistakes and building on previous knowledge to cultivate future gardens.

Participants identified many topics of new knowledge gained through the Community Greening program. This included the construction of garden beds, specific information about planting and caring for vegetables, natural methods for pest control, establishing composting and worm bins, as well as native flora and fauna. While discussing what they had learned as result of the program, one participant shared:

“We’ve learnt about crop rotation, gardening methods and I think next year, especially during the spring and summer, we will probably be a bit more productive...And the plants are needy, you know. So, what the worms give me, they go back into the garden bed, which, therefore, improves the soil, and gives the plants nutrition. So, these are the things I’m learning, composting, what I’m doing wrong, and how I can improve it.”

Several participants were novice gardeners whilst others possessed varying levels of experience. Notably, all expressed appreciation for what they had learned through the

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“It’s just wonderful. I’ve been an amateur gardener, and even through to my grandmother...What I’ve learnt with [the Community Greening coordinator] and with the others here has just been so amazing, and I’m revitalising my own garden at home and getting to grow more things again, so it will be ongoing and I’ll just share it with my little grandchildren. They’re getting to know about the garden as well. Sometimes I give them a pot with some little veggies or something I’ve grown.”

As a result of the program, some participants reflected on their sense of connection with nature and gained a deeper appreciation for the natural world and food gardens. For example, one resident shared:

“I think that with gardening it’s a way to be in contact with the natural life. We realise how beautiful it is just planting flowers or lettuce or tomatoes or whatever. We realise how these plants grow and give us life, so we can get food.”

The fortified sense of connection with nature and the increased knowledge of gardening led to new ideas for community greening. Participants discussed an interest in planning their garden beds differently based upon what they had experienced, such as planting fruit trees and native plants, and thinking about ways to attract more wildlife and birds. There was a common desire communicated amongst participants to continue working together to improve their shared spaces, and more specifically, to increase or enhance the green space available to them. This was exemplified in the following comment on the benefit of urban nature within densely populated areas:

“And they’re a benefit, and also because we’re living near the city, just bringing green into the area because, you know, we’ve all got terraces, small front yards, small backyard, and to be able to bring green into a quite urbanised area is important.”

Over the course of this study, the Community Greening team helped to encourage and facilitate an informal learning environment whereby the garden beds served as an entry point to share knowledge about gardening and developing a sense of connection with nature. The housing estate staff members observed that residents were learning new skills, such as the “*organic way to grow plants*” and there was enjoyment in growing food they can eat and share. This experiential process demonstrates the potential impact of a community-based approach to build capacity for green infrastructure, such as gardens, at the local level. The gardens provided a shared space for these community processes to unfold and for new relationships to be formed.

Cultivating social connection and sense of community through community gardening

Feelings of social connection and interactions with others were the most frequently expressed comments in each of the focus group interviews. The social interaction with one another was demonstrated in different ways across the participating groups, including helping each other with gardening tasks and meeting new people and engaging in conversation. The garden was described by participants as a “meeting place,” a space that “brings people together” or an area in the social housing estate with a “draw-in factor.” Additionally, it was viewed by a participant as common ground that could assist with initiating conversations and more positive relationships with other residents. This social connection was perceived as valuable to participants particularly within the setting of the social housing estates, which

Enhancing urban nature and place-making in social housing through community gardening typically had a high number of residential units in a relatively small geographical space. Many participants shared that there was a previous pattern of low contact, interaction, or communication amongst residents. However, they found that the garden beds became focal points in the community and were instrumental in helping to initiate conversations and opportunities for ongoing social interactions.

Correspondingly, gardening assisted the residents with learning about each other's gardening interests or shared interests for planting and growing flowers, herbs, or vegetables. This was viewed as a valuable outcome, particularly within the culturally diverse contexts of the social housing estates. Across some sites, the community garden was found to create a sense of place within and across cultural groups. In one focus group, gardening was described as sharing culture and a common commitment, whereby relationships were formed by helping each other. For example, community members from similar cultural backgrounds gardened together or shared garden beds, growing plants and vegetables unique to their own cuisine. On the other hand, the shared garden also created opportunities for residents from different backgrounds to initiate and form relationships. While language was viewed as a potential obstacle to relationship building, gardening was considered an enabling factor that helped to navigate the barrier. Several participants also reported that they shared culturally specific produce with each other, exchanging information on different uses and ideas for recipes. These stories demonstrated the potential for the gardens to enable intercultural engagement. Participants acknowledged the importance of the garden being accessible for everyone and the generosity experienced by sharing the produce was viewed positively. The social relationships formed over the months not only elevated a sense of community, but also in some instances created stronger friendships.

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Staff members at the social housing estates also shared their perspectives on the impact of the Community Greening program and new community gardens for residents. The staff members' responses aligned with participants' views that the community garden had contributed towards a stronger community. One staff member observed that there was increased cooperation, and a visible increase of social consciousness and social cohesion amongst residents in the social housing estate. In addition to improving relationships amongst residents, another staff member reported the program also helped to improve relationships between staff and residents:

“One of the benefits I observed on the garden build day and since then is the strengthening of the relationship between [staff] and residents. It was a positive experience for the Housing Manager to attend the garden build day and pitch in alongside tenants. This has helped to build trust between the tenants and their housing manager.”

This observation highlights the importance of engaging multiple stakeholders in the process of planning for green infrastructure, to support social cohesion, community development, and the potential sustainability of new greening and place-making initiatives.

Improving residents' sense of pride and public perceptions of social housing through community gardening

Throughout the focus group interviews it became evident that there was a growing sense of community pride stemming from the development of the gardens over the previous six to seven months. There was an internal community appreciation amongst residents for the garden's aesthetic, as well as the change and growth over time. The participants also

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“The garden’s been a success, because we get people from outside the complex visiting just to look at it. That happens regularly and the local coffee house supports us with free coffee grains. So, a number of elements are coming together that weren’t there before . . . It was not very attractive before, but there’s a lot more to do...It’s changed the stereotype. We’re not all junkies, we’re not all, you know, mad. We’re a valuable part of the community and we are a positive part of the community.”

In some instances, participants invested their personal funds by buying seeds, plants, tools, and other supplies to maintain or expand the garden. There was a strong sense of achievement in contributing toward the transformation of the community and to receive recognition from strangers or other members of the broader local area, which became a source of pride.

When reflecting on the process of becoming involved with the Community Greening program, three site staff shared that it was the community members who took the lead on pursuing the initiative. Site staff also observed how residents’ participation and collective actions helped to build a sense of agency and community, as illustrated in one questionnaire response: *“It helps to build up a genuine enthusiasm, increased cooperation, visible increase of social consciousness and social cohesion in the Housing Estate community.”* Similarly, the sense of achievement and pride was clearly observed by another staff member: *“The residents*

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are very proud of their block and there is a real sense of ownership and pride in the common areas and community garden.”

Lastly, participants from one community discussed changes in their perceptions of safety and security within the housing estate. During initial meetings, there were some concerns amongst residents prior to the construction of the garden beds that they could be intentionally damaged; however, this did not occur at any of the participating sites. In the focus group interview, participants indicated that rather than being a space that was at risk of being vandalised, the garden resulted in a sense of enhanced security, as there were more people outside while gardening. In some cases, the presence of the garden itself was viewed as a possible deterrent for uninvited activity, as it indicated that the space was regularly used, as shared during one interview:

“From a security point of view, there’s a lot more people out and, therefore, keeping an eye. As I said, after 7 o’clock there’s no-one back there, but during that time people know...it gives the perception that that space is used all the time. So, there’s less chance of undesirables going into that area, and surprisingly, we haven’t had any damage by tenants or undesirables coming in to destroy it, which actually surprised me. I was expecting the other way.”

Participants expressed the importance of achieving a collective accomplishment. This feeling was communicated by one participant who stated: *“We want the neighbourhood to see what’s behind it because after all, it is community guided.”* The shared viewpoints of success and ownership of their new gardens contributed towards the process of improving perceptions of social housing estates and participants’ overall sense of community.

Discussion

Our findings provided a deeper understanding of the impact of the community gardens and the lived experience of engaging with the Community Greening program. The outcomes included gaining gardening knowledge, sense of connection to nature, social connection and sense of community generated through engaging in shared activities, and a sense of community pride. Participants also expressed ideas and motivation to continue to grow the garden and develop the green spaces in their communities. Our results align with research that has acknowledged the varied benefits of community gardens. Although previous studies have identified many health benefits of community gardening, further studies are needed to highlight multiple layers of meanings that individuals in specific population groups, such as those in low-income or vulnerable circumstances, may experience through their participation. Gaining a deeper understanding of the experiential outcomes from diverse groups would enrich the current body of literature examining community gardens and their unique roles in densely populated urban environments.

Community gardens as local nature-based solutions to improve green space in social housing contexts

The findings from this study indicate the Community Greening program and participation in community gardening make direct contributions towards the achievement of the NSW state's vision for social housing (see FACS NSW, 2016a, 2016b) by addressing the strategic priority area of creating a better social housing experience. Participants reported that the construction of the garden beds encouraged getting out of the house, and meeting, connecting, and gardening with their neighbours. While there was diversity across each site with regards to access to green space and public parks, each social housing community had

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limited access to nearby nature. For example, the garden beds were often constructed in the only available spaces, such as directly beside a building or adjacent to parking areas. At one site, the garden beds were built on existing parking spots, due to a lack of lawn or available open space. At another, the garden was installed in a back alleyway between the side of the housing unit and a fence. In this community, there were some initial concerns the garden would attract unwanted activity; however, there were not any occurrences of damage or security issues during the study. The residents found that the increased traffic and use of the green space for gardening resulted in a sense of security. This finding is consistent with other studies that indicate heavier foot traffic in neighbourhoods leads to heightened natural surveillance of an area, which may deter crime and increase opportunities for recreation (see Harris, Larson, & Ogletree, 2018).

The commonly identified best features of the gardens included the aesthetic appeal of the garden beds, the accessibility of working with a raised garden bed, and attracting wildlife. These findings reflect an appreciation for the provision of, and access to, nearby nature, particularly within the context of social housing. With increasing trends towards urbanization, access to nearby nature, including small parks and green spaces, are being recognized as places for restorative experiences and are important considerations for city planning and design (Nordh & Østby, 2013). Furthermore, community gardening was also viewed as a gateway into addressing other community greening efforts, including learning about composting and worm farms. Residents at one site were also researching and planning for the installation of a native beehive, which facilitated new discussions related to pollination, as well as urban nature design. This finding points to the potential of community gardening programs to promote environmental stewardship, and the need as highlighted by Langemeyer et al. (2018) to create wider understanding and awareness of the role of urban

Enhancing urban nature and place-making in social housing through community gardening gardens in ecosystem services; the latter referring to the benefits people and society obtain from natural ecosystems (Birkhofer et al., 2015).

The role of community gardens in a place-making approach for social housing

The findings from this study support the view that participation in community gardening promotes social cohesion and sense of community, and may lead to the development of social capital. Defined as “features of social organisations, such as networks, norms, and trust, that facilitate actions of cooperation for mutual benefit” (Putnam, 1995, p. 67), the key components of social capital that empower the individual are community, sense of place, social networks, trust, and reciprocal benefit. Collectively, these elements of social capital strongly influence an individual’s level of participation and engagement within their community (Kingsley & Townsend, 2006). Community gardens provide a platform for a range of social processes such as forming relationships, social connections, public engagement, and community building (Lanier, et al., 2015; Teig et al., 2009). The gardens create a context where social capital is produced, accessed, and utilised by a network of community gardeners. As a natural corollary, the establishment of neighbourhood norms and values is also developed in parallel to these gains (Alaimo, et al., 2010; Glover, 2004). The ability to cooperate and share resources is benefited by the social connections and social capital they create during the gardening process (Alaimo et al., 2008). These processes were observed and reflected in many of the participants’ experiences as shared during the focus group interviews. Some residents commented on an increase in community engagement, and in particular, in meeting neighbours and developing listening and teamwork skills.

The participants experienced a significant increase in sense of emotional connection with the community, which can be defined as “emotional support stemming from the struggles and successes of community living” (Chipuer & Pretty, 1999, p. 646). Many also

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shared that community gardening enhanced feelings of social connection, facilitated intercultural and intergenerational interaction, and produced feelings of achievement and pride. This supports the findings of Krasny and Tidball (2017), who found that participation in community gardening may lead towards feelings of self-empowerment and having a positive impact by contributing to the community.

Involvement in the construction of the garden beds and the process of growing fresh produce may contribute towards establishing or strengthening a sense of place attachment, defined as "...the cognitive emotional bond to a meaningful setting" (Scannell & Gifford, 2017, p. 256). Landscape and environment characteristics are important considerations when developing a sense of place, place attachments, and place satisfaction (Stedman, 2003). Research suggests that place attachment bonds are positively related with quality of life (Manzo & Perkins, 2006; Scannell & Gifford, 2017), and community health and residential satisfaction (Ghafourian & Hesari, 2017; Tester, Ruel, Anderson, Reitzes, & Oakley, 2011). Therefore, place-making is an important consideration for community planning. In the same vein, Mee's (2009) study on Australian public housing identified specific factors that were found to foster a sense of belonging for residents; these aspects included having a space to care for themselves or their family, caring neighbours, stability and certainty, especially for older adults, and the ability to have a garden.

In this study, the gardens were found to contribute towards a place-making approach to building a sense of community. We echo the call from Bijen and Piracha (2017) that place-based social housing estate renewal projects must emphasise the importance of place, community, and urban design, and should include social and physical environment interventions. The participant experience was characterised by enjoyment of social interactions, which included sharing knowledge about food, cooking methods, and recipes. The changes to the physical environment through the construction of the garden beds also

Enhancing urban nature and place-making in social housing through community gardening supported a deeper appreciation of nature. Together, these elements contributed towards cultivating social cohesion and a stronger sense of community.

Lessons Learned and Recommendations for Future Research

This study resulted in practical lessons learned and recommendations to improve the community gardening experience for residents that may have resonance across other urban garden contexts. To promote social interaction, the creation of a ‘swap club’ was suggested to share different produce. Another suggestion was to increase the number of garden beds to enable more community members to become involved. Whilst this research identified many positive outcomes from participants’ experiences, it is important to recognise that community gardens are shared social spaces and residents also expressed the potential challenge of maintaining positive relationships when misunderstandings arise or there are different points of view about how the gardens should be used or maintained. They identified the need for collective organisation and communication, and the need to create a shared understanding within the community for participation and guidelines for the gardens.

While the focus of this article is based on a small-scale study, the research design included multiple garden sites over an extended period, which allowed for more in-depth data collection. Further case study research should consider the use of a longitudinal design, which systematically tracks the development of gardens and participation of community members over a longer period of time, including seasonal considerations. Additionally, studies with a larger sample size may lead to more diverse and representative participant groups and findings. Specific program goals tailored for diverse participant groups may provide deeper insight into the unique outcomes of community gardening across varied settings and contexts. Additional studies are needed to examine the relationship between

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community gardening and sense of place, individual and collective agency, as well as broader
planning for social housing community development through greening initiatives.

Topics that warrant further investigation include how green infrastructure may also
bring environmental, economic, and health solutions to low-income communities (Dunn,
2010; Jennings et al., 2017; Kumar et al., 2019). Kumar et al. (2019) argue that if planned
correctly, green infrastructure has the potential to reduce air pollution, which may lead to
subsequent health benefits, as well as reduce stress and boost community cohesion.
Correspondingly, additional research is needed to examine how community gardens may
serve as multifunctional nature-based solutions with the potential to provide a local food
source, build social cohesion, and promote health and wellbeing, while also contributing
towards small scale climate mitigation (Cabral, Costa, Weiland, & Bonn, 2017), and promote
the development of ecosystem services values (Langemeyer et al., 2018).

While further research is needed to examine the effects of green infrastructure and in
particular, the role of small-scale community gardens on air pollution and climate mitigation,
it is encouraging to consider the incremental and collective impact of green space within
neighbourhoods and communities on social and environmental wellbeing. Based upon our
research findings, we suggest future policy frameworks for the development and renewal of
social housing prioritise green infrastructure in the early planning stages to optimise the
potential environmental and health promoting effects of urban nature.

Conclusion

The present study has many implications for local and national governments in
amending or forming policies to support community gardens in social housing and urban
planning. The participants' lived experiences provided deeper insight into the health
promoting aspects of the community gardens related to connection to nature, as well as social

Enhancing urban nature and place-making in social housing through community gardening and community connection. Expansion of the program, particularly for low income and social housing communities in other parts of Sydney and other cities in Australia will benefit a greater number of participants, especially as urban densification continues to rise. Multi-sectoral collaboration within the public and private spheres, including health, community services, housing and infrastructure, and environment and sustainability is needed for integrated approaches that may lead to urban development for improved public health and environmental sustainability.

A key aim of this study was to ascertain the impact of the Community Greening program on participants living in social housing communities. Specifically, the focus was to broaden the research aperture to better articulate the lived experience of building and growing a community garden. The findings from these six sites highlighted the potential for community gardens to create opportunities for learning about gardening and connection to nature. These outcomes also demonstrate how community gardens, as local and multifunctional nature-based solutions improve access to green space in social housing contexts. Relatedly, the findings illustrate the potential of even small garden beds to serve as a catalyst to enhance residents' participation and social interactions, leading towards a stronger sense of connection, place, and pride within the community.

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Son Truong: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – original draft. Tonia Gray: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – review & editing. Kumara Ward: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Writing – review & editing

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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.

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