

Pathways to wellbeing, social cohesion,
skill development, and participation in
disadvantaged communities

Royal Botanic Garden Sydney's Master Gardener Volunteer Program

RESEARCH REPORT

WESTERN SYDNEY
UNIVERSITY



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**Community
Greening**
People, Plants, Places



AUSTRALIAN
INSTITUTE OF
**BOTANICAL
SCIENCE**



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CONTENTS

Acknowledgement	2
Executive Summary	4
Background to the study	10
The Master Gardener Volunteer Program led by Royal Botanic Gardens and Domain Trust	11
Benefits for Master Gardeners	12
Objectives of the study	12
Methodology	13
Research Design and Procedures	14
Survey Methodology	16
Focus Group Methodology	19
Results	23
Research Question 1: What are the self-reported needs of participants as they commence the Master Gardener Volunteer Program?	23
Research Question 2: How do participants and staff describe their experience of the Master Gardener Volunteer Program?	25
Research Question 3: a. What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what aspects of the program are most helpful?	26
b. How do participants' characteristics influence these changes?	43
Research Question 4: What aspects of the program delivery are reported as being most enjoyable?	45
Research Question 5: What aspects of the program delivery could be improved from the perspectives of participants and staff?	48
Research Question 6: How can more Master Gardeners be recruited?	49
Research Question 7: What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer program support community recovery?	49
Key Findings	50
Recommendations	55
References	57
Appendix	58

EXECUTIVE SUMMARY

The Royal Botanic Garden and Domain Trust (RBGDT) have pioneered the establishment of the Master Gardener Volunteer Program (MGVP) in New South Wales, Australia with anecdotal evidence of positive benefits for not only the communities they serve, but for the Master Gardeners themselves. Within the international literature, however, there is little understanding of the outcomes and benefits for Master Gardeners. This research, conducted from November 2018 to May 2021, sought to investigate the Master Gardener Volunteers' self-reported changes to wellbeing, social cohesion, skill development, and participation as they engage over time in the MGVP; and identify the reported strengths of the program delivery and areas for improvement.

Research Questions

1. What are the demographic characteristics and self-reported needs of participants as they commence the Master Gardener Volunteer Program?

2. How do participants and staff describe their experience of the Master Gardener Volunteer Program?

3. What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what is most helpful? How do participants' characteristics influence these changes?

4. What aspects of the program delivery are reported as being most enjoyable?

5. What aspects of the program delivery could be improved from the perspectives of participants and staff?

6. How can more Master Gardeners be recruited into the program?

7. What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer Program support community recovery?

Research Design

This research was founded on a single intervention mixed method design including 17 MGVP sites across New South Wales. The quantitative survey component included the administration of a survey to Master Gardeners upon commencement, 6 months later, 12 months later, and 18 months later. 192 Master Gardeners completed the survey upon commencement. Matched commencement-and-6 months survey responses were provided by 32 participants, while 13 and 16 participants provided responses at commencement-and-12 months and commencement-and-18 months, respectively.

A total of 10 qualitative focus groups were conducted at an average of 6 months after commencement of the MGVP (range 1 to 10 months) which included 32 Master Gardeners and four stakeholders.

It is important to note, during 2020 the COVID-19 pandemic occurred disrupting both the delivery of the MGVP and the research design. More specifically, the 2020 COVID-19 pandemic government-initiated lockdown occurred before the 12 month and 18 month survey collection points and before eight of the 10 focus groups. This had an impact on the capacity of the MGVP to be delivered in its entirety, the way that the data was collected, and also is likely to have impacted the wellbeing of participants and thus their responses.



Findings

Who becomes a Master Gardener and what are their initial reported needs?

The Master Gardeners included in this study were largely female (79.1%) aged between 35-74 years and born in Australia or New Zealand (66.9%). Notably, 17.2% reported being Aboriginal or Torres Strait Islander, 36.4% reported having a disability or long-term impairment while 21.2% reported having carer responsibility.

Their responses to the survey upon commencement in the MGVP revealed that, on average, there was high psychological distress, low satisfaction with personal health, and low participation in employment, education and volunteering. Master Gardeners with a disability or long-term impairment reported lower personal health and skills, and higher psychological distress. Aboriginal or Torres Strait Islander Master Gardeners were less satisfied with community connectedness and experienced greater psychological distress. Master Gardeners who were born in Australia or New Zealand were less satisfied with their personal health and community connectedness, reported less skills, and greater psychological distress. Those aged under 55 years were less satisfied with community connectedness while those over 55 years participated less in employment, education and volunteering, as did Master Gardeners born outside Australia or New Zealand.

What are participants' experiences of the MGVP?

Participants' experience of the MGVP was characterised by the cultivation of a sense of community and enhanced social engagement. More specifically, participants experienced a sense of belonging, empowerment, and heightened social connection. Self confidence levels were bolstered through the acquisition of knowledge, personal skill building and hands-on experiential learning. The supportive learning environment provided an opportunity to develop new friendships and foster inclusive collaboration.

What changes do Master Gardeners experience over time?

A comparison of survey responses from the commencement in the MGVP to 6 months later showed significant reduction in Master Gardener's psychological distress and increase in self-reported gardening skills and self-reported skills in providing gardening advice to others. No significant changes were apparent at the 12 month point compared to the commencement of the MGVP, noting that the COVID-19 pandemic had occurred prior to this time point. A significant increase in participation in employment, education and volunteering was evidence at the 18 month point compared to at the commencement of the MGVP.

Master Gardeners who were under 55 years reaped greater benefits from their participation with improvements in satisfaction with personal health, self-reported skills and psychological distress. Similarly, those with disability or long-term impairment also received more benefits compared to those without disability as they reported improvements in satisfaction with personal health and psychological distress. Master Gardeners born in Australia or New Zealand reported significant improvements in participation in employment, education and volunteering compared to those born outside Australia or New Zealand.

The focus groups highlighted the enhanced sense of social cohesion achieved as a result of involvement in the MGVP, followed by improvements in wellbeing, gardening skills and proliferation in volunteering, employment and education.



What aspects of the MGVP are most enjoyable and helpful?

The experiential and relational nature of the learning environment was cited as one of the most enjoyable and helpful aspects of the MGVP. The quality of the facilitator was critical in terms of their ability to address the wide variety of learner needs and interests, and create an inclusive environment. The program qualities most conducive to supporting change in wellbeing were the practical, therapeutic garden activities, relational skills and observable accomplishments. Social cohesion was augmented through the creation of a physical garden space in the community and bringing diverse community members together. The salient program elements critical to change in skill development included the hands-on learning and positive interpersonal opportunities provided when learning, gardening and sharing with other community members. Finally, transferrable content, practical learning and experience, and facilitating contact with community agencies were helpful in achieving change in employment and education changes.

What aspects of the MGVP could be improved?

There was broad consensus amongst participants that involvement in the MGVP was a positive and beneficial experience. For some participants, however, the theory or written content was challenging. Some proposed the need to address external administration barriers linked to TAFE. A deep desire was expressed for greater community engagement such as parents with children and schools, and ongoing support from facilitators or community agencies. Further, a key finding to improve the program benefits is related to pathways, building in opportunities to assist community members to take steps toward education and work.

How can more Master Gardeners be recruited?

To attract more Master Gardeners, current participants advised: starting a podcast; increasing social media presence; creating websites with a community focus; attending community meetings; canvassing schools, pre-schools and stay-at-home parent groups; holding more events at existing gardens and distributing flyers. Importantly, 'word of mouth' from past participants can be highly effective.

What has been the impact of COVID-19?

The 2020 COVID-19 pandemic occurred prior to the 12 month and 18 month survey collection and eight of the 10 focus groups. Although the surveys did not seek to directly measure the impact of COVID-19, the results can be viewed through this lens. The focus groups included specific questions around COVID-19 for participants to consider. Some participants welcomed opportunities afforded by the MGVP to engage online, however, the reality of digital inaccessibility for many participants prevented continued engagement in the online program. Given their program hiatus during the pandemic, they were desperate to get back into the garden to experience all of its benefits. COVID-19 impacted on their perceptions of food security, this did in fact confirm for some participants the importance of growing their own produce. Notwithstanding the life stressors imposed by COVID-19, participants reported their experience in the MGVP enabled them to continue to engage in gardening and grow their own food, and (for those with digital access) connect digitally with people.



Recommendations

First and foremost, the MGVP is highly valued by participants and stakeholders, and there is evidence of significant benefits for participants. As such, it is recommended that the MGVP be expanded to support more individuals and communities.

RBGDT review the MGVP program logic to audit the resources, referral pathways, curriculum and pedagogy to ensure the primary needs of participants upon commencement are prioritised in program design.

Whilst the MGVP benefitted particular cohorts of people, RBGDT could consider the possible differentiation of goals and program aspects for diverse participants, particularly across the age groups.

Findings suggest future program delivery continues to ensure a balance between the theoretical or classroom-based sessions, and practical or hands-on components. Embodied learning and outdoor activities must be an enduring component of future programs.

Continued commitment to employing quality staff that prioritise rapport building and diverse learner needs will ensure the ongoing success in coming years.

It is crucial that creating a garden from the ground up continues to be the foci for facilitating personal and

group transformation in future programs. The physical nature of the garden became an incubator for changes in participants' sense of competence, self-belief structures and social connectedness.

Generating legitimate pathways into employment and work should be a key priority of future program design, implementation and delivery. Working with TAFE to dovetail into formal courses may overcome some of the barriers associated with TAFE buy-in and strengthen the success of the program to improve education and employment outcomes.

Building in additional resourcing to check back with participants and communities is critical as this positive quality continued the momentum of the gardening activities.

Holding celebratory events with successful graduates in their newly constructed gardens will help showcase to the broader community the beneficial nature of the MGVP.

Finally, further research employing a larger sample size, and a more rigorous design utilising a comparison group is warranted. Similarly, conducting such a study without the disruption of COVID-19 would provide a more reliable assessment of impact.



192

participants at program commencement

17
SITES

Mixed method research comprising Master Gardener Volunteer Programs (MGVP) delivered at 17 sites in New South Wales.

RESEARCH QUESTIONS

1 What are the demographic characteristics and self-reported needs of participants as they commence the Master Gardener Volunteer Program?

2 How do participants and staff describe their experience of the Master Gardener Volunteer Program?

3 What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what is most helpful? How do participants' characteristics influence these changes?

4 What aspects of the program delivery are reported as being most enjoyable?

5 What aspects of the program delivery could be improved from the perspectives of participants and staff?

6 How can more Master Gardeners be recruited?

7 What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer Program support community recovery?

POST-TEST SURVEYS COMPLETED

32 AT 6 MONTHS **13** AT 12 MONTHS **16** AT 18 MONTHS

FOCUS GROUPS COMPLETED

32 MGVP participants **4** stakeholder participants **10** focus groups

CHARACTERISTICS OF MASTER GARDENERS

ABORIGINAL
16.59%

TORRES STRAIT ISLANDER
0.61%

NOT ABORIGINAL OR TORRES STRAIT ISLANDER
82.8%



AUS & NZ
66.9%

EAST ASIA
12%

SE ASIA & OCEANIA
7.6%

EUROPE
4.3%

LATIN & CENTRAL AMERICA
4.3%

SUB-SAHARAN AFRICA
2.7%

NORTH AMERICA
1.1%

NORTH AFRICA AND MIDDLE EAST
1.1%

15-34 YEARS
13.6%

35-54 YEARS
38.6%

55-74 YEARS
37.9%

+75 YEARS
9.8%



FEMALE
79.1%

MALE
19.4%

UNSPECIFIED
1.5%

YEAR 8
6.0%

YEAR 9
14.1%

YEAR 10
40.9%

YEAR 11
9.4%

YEAR 12
29.5%

DISABILITY
36.4%

NO DISABILITY
63.6%



NO CARER RESPONSIBILITY
79.8%

CARER RESPONSIBILITY
20.2%

Participants' self-reported needs on commencement:



Most enjoyable aspects:

- Meeting the needs and interests of Master Gardeners
- Community empowerment and capacity building
- Theory and practice working together
- Diverse range of learner needs being met
- Potential reach of the program to embrace the wider community
- High quality program facilitators

Suggestions for improvements:

- More opportunities for whole of community engagement and follow-up support and contact
- Creating pathways to education and employment opportunities
- Working with TAFE to create the continuation of educational pathways
- Addressing cultural territoriality associated with community gardens to foster positive cultural awareness

More Master Gardeners can be recruited through:

- Utilising digital methods: podcasts, social media and community websites
- Advertising at community meetings and canvassing schools and parent groups
- Word of mouth, flyers and holding events at the garden to showcase achievements

COVID-19 impacted on program delivery yet the MGVP supported community recovery:

- Skills, interests and community connections served as protective factors
- Gardening activities increased community building, social networks and social cohesion; this was instrumental when social isolation and loss of connection occurred
- Digital inaccessibility prevented continued participation during restrictions

RECOMMENDATIONS:

MGVP continuation and expansion based on participants' reported improvements in wellbeing, skill development, participation and social cohesion.

High quality program facilitators were recognised as critical to success, it is strongly encouraged that rapport building and meeting the diverse needs of learners be a priority in future programs.

Future iterations of delivery should prioritise meeting the primary needs of participants identified at commencement, and consider program and goal differentiation given the diverse results from particular groups, across the age groups.

Creating pathways to employment and education, namely through relationships with TAFE.

Continuation of the hands on, practical pedagogical approach which embraces embodied learning, outdoor activities and establishing gardens.

Building in resources to check back with participants and communities to maximise engagement and value.

BACKGROUND TO THE STUDY

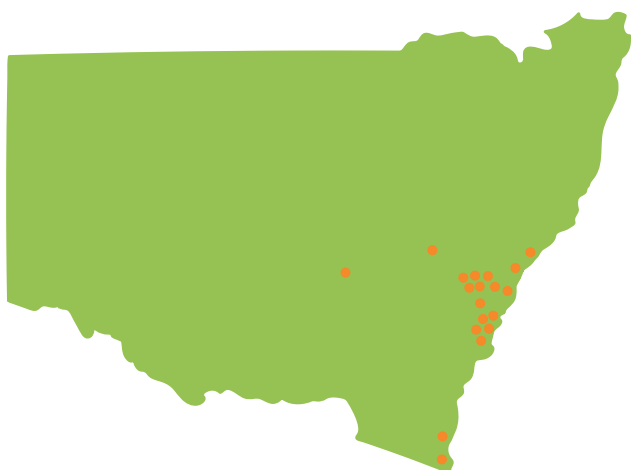
The Master Gardener Volunteer Program led by Royal Botanic Gardens and Domain Trust

The catalyst for the inception of the Master Gardener Volunteer Program (MGVP) in Sydney arose when Philip Pettitt (the then Community Greening Coordinator) travelled to the United States to attend the Botanic Gardens Conservation International Conference in 2015 and was inspired by the Brooklyn Urban Gardener Course operating in New York and Brooklyn. Upon his return, the Royal Botanic Gardens and Domain Trust (RBGDT) piloted three short courses in 2016 funded by the Office of Environment and Heritage. Further funding was received from the Department of Social Services Resilient Communities Fund in 2018 to expand the MGVP for a period of three years.

RBGDT identify the aims of the MGVP as:

- Enhance recognition of volunteer leaders' individual skills and interests, increased self-esteem and value as unique adults.
- Link local community members who are facing challenges of inclusion, e.g. people from culturally diverse backgrounds, with appropriate pathways to training/employment.
- Empowered MGVP leaders to guide others through enriched knowledge of community development and practical gardening skills.
- Provide an opportunity for fellowship and greater connection amongst residents working together in community gardens.
- Improve physical and mental health through active involvement, reduced stress through beneficial social interaction.
- Provide the opportunity for younger participants to learn from mentors in a non-hierarchical context.

This study focuses on the delivery of the MGVP at 17 sites in New South Wales, Australia. These include: Liverpool, Curran, Central Coast, Wollongong, Riverwood, Mt Annan, Auburn, Sydney, Eden, Newcastle, Miller, Telopea, Willmott, Bega, Warrigal, Yallah, and Nowra.



RBGDT describe the MGVP as:

The participants of the MGVP are mostly, but not solely, recruited from community groups and housing providers that have mainly had some contact or ongoing relationship with the RBGDT's existing Community Greening Program.

The MGVP includes a six-day course that runs for approximately five hours per day. It is generally run over two days per week or monthly depending on community needs or geographical location. Importantly, it is delivered in partnership with TAFE where participants complete a recognised Certificate. The sessions include practical sessions in existing community gardens; sessions are equally divided into theoretical and practical community development and horticultural subjects, with additional quarterly workshops.

The course is guided by the themes people-plants-places and covers topics around Horticulture and Community Building. Horticulture topics included: city soils/basic composting; growing food; water-wise gardening; native plants; and streetscape gardening. Community building topics consisted of: community development; building a community of gardeners; regular meeting dates; signage; skills sharing; conflict avoidance; effective communication skills; developing the concept of emotional; and social inclusion/justice.

More specifically, the RBGDT describe that the program explores:





Benefits for Master Gardeners

Gardening, and gardening as a community activity, are popular across time and culture. An expanding body of research highlights the benefits of community gardening to gardener's nutrition (Garcia et al., 2018), physical health (Kunpeuk et al., 2019) and wellbeing (Genter et al., 2015). There is a burgeoning interest in the identification and resolution of health, social and economic inequalities globally (Cash-Gibson et al., 2018), which has been heightened by the accentuation of inequities witnessed in the global COVID-19 pandemic (Gray et al., 2020). However, with the exception of Dyg et al.'s (2019) review study, there is a lack of information on how the benefits of community gardening translate to marginalised and vulnerable communities (Dyg et al., 2019).

Members of the current research team investigated the impact of RBGDT's Community Greening program on participants from social housing communities in New South Wales via focus group interviews and surveys administered on commencement and then seven months later (Truong et al., 2018). Focus group interviews revealed that participants reported both intra and interpersonal benefits of their participation. Pre and post surveys demonstrated that participants experienced a significant improvement in sense of community, particularly shared emotional connection, yet a reduced satisfaction with personal health, which was more profound for older participants.

The MGVP provides an extension of community gardening and although definitions and practices vary, its creation has been attributed to the US in the 1970s (Osafo, 2021). Osafo (2021) explain that the MGVP includes staff who "train and provide programmatic and policy advice to volunteers who have a passion for gardening to help community members with horticulture education. Master Gardener volunteers engage communities in various aspects, including community food gardening, plant clinic, gardening education, and demonstration gardens" (p.78).

Despite the proliferation of MGVPs, research in this area is limited. Furthermore, when this research has been conducted, the impact and outcomes for the Master Gardeners have not been investigated. Instead, recent research has sought to profile the demographic characteristics of Master Gardeners (Dorn, 2018), understand their training needs (Bumgarner & Donaldson, 2017) and what motivates them to volunteer (Dorn, 2021; Gall, 2020; Takle, 2016). Whilst the contribution of Master Gardeners to the gardens and community is significant, it remains unknown how, and even if, Master Gardeners themselves benefit from their education and role in the garden and community. This landmark study seeks to advance knowledge about this under-researched phenomenon.

OBJECTIVES OF THE STUDY

The overarching objectives of this research were to investigate the Master Gardener Volunteers' self-reported changes to wellbeing, social cohesion, skill development, and participation as they engage over time in the MGVP; and identify the reported strengths of the program delivery and areas for improvement.

More specifically, the research sought to address these research questions:

1
What are the demographic characteristics and self-reported needs of participants as they commence the Master Gardener Volunteer Program?

2
How do participants and staff describe their experience of the Master Gardener Volunteer Program?

3
What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what is most helpful? How do participants' characteristics influence these changes?

4
What aspects of the program delivery are reported as being most enjoyable?

5
What aspects of the program delivery could be improved from the perspectives of participants and staff?

6
How can more Master Gardeners be recruited into the program?

7
What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer Program support community recovery?

METHODOLOGY

Research Design and Procedures

The current study adopted a single intervention mixed method design (Creswell, 2018) incorporating both quantitative and qualitative data. A purposive sampling technique was adopted as it was critical to involve people with direct experience of the MGVP in the study. The research objectives were formulated in collaboration with stakeholders from the RBGDT. This collaboration ensured that the research was meaningful for end-users, whilst maintaining the integrity of the research findings for which the research team had responsibility.

Prior to the commencement of the research, ethical approval was obtained from the Western Sydney University Human Research Ethics Committee. New participants joining the MGVP were invited to join the research study. Participation was voluntary and people were able to engage in the MGVP without participating in the associated research study. Participants provided written consent to be involved in the study which included

completing a survey at the commencement and then at six-monthly intervals. A portion of participants were also invited to participate in focus group interviews following their involvement in the MGVP. Figure 1 illustrates the components and sequence of data collection within the study.

The study data collection period ran from November 2018 to May 2021. It is important to note during 2020 the COVID-19 pandemic occurred disrupting both the delivery of the MGVP and the data collection.

Data collection was moved from face-to-face to online in response to the COVID-19 pandemic, and impacted on the 12 month and 18 month survey and eight of the 10 focus groups (see Figure 1).

RBGDT describe the MGVP delivery components per site in Table 1, with particular attention to the disruption to delivery as a result of the COVID-19 pandemic.

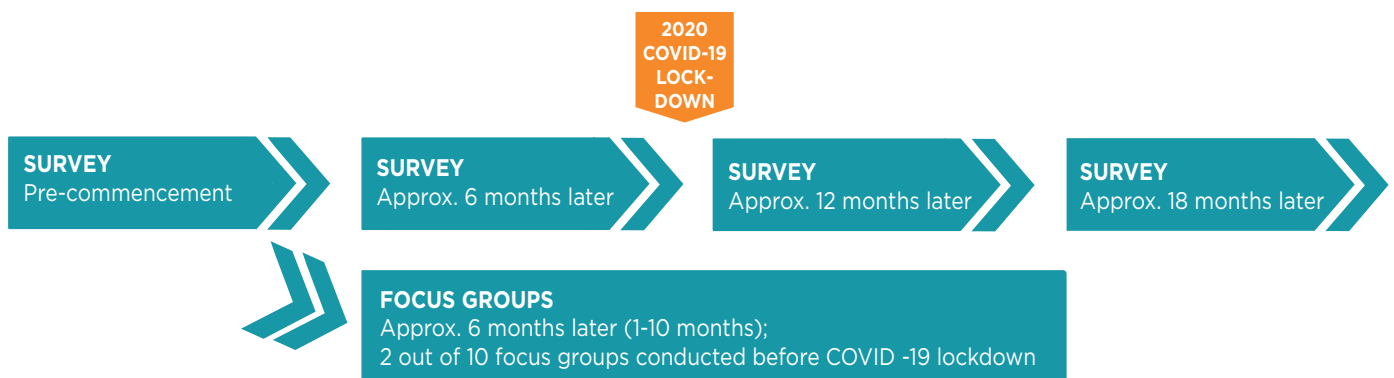


Figure 1: Research Design

Table 1: Program delivery provided at each participating site according to data collection phase

Site	Activities occurring between commencement to 6 months after commencement	Activities occurring between 6 months to 12 months after commencement	Activities occurring between 12 months to 18 months after commencement
Liverpool	Commencing 6-day course		4 workshops
	Two workshops	Two workshops	Phone calls to and from participants
	Phone calls to and from participants	Phone calls to and from participants	Installed four garden beds
	Two participants completed another course		One participant completed another course
Curran	Commencing 6-day course		
	Two visits	Nil	COVID stopped all participation
	Phone calls to and from participants and stakeholders		
Central Coast	Ongoing maintenance		
	Commencing 6-day course		
	Fortnightly workshops	Fortnightly workshops	Fortnightly workshops
Wollongong	Fruit tree maintenance, seed sowing and no dig gardens		
	Commencing 6-day course		Two workshops
	Built four wicking beds	Installed gardens	Three participants completed another course
	Two workshops	Four workshops	COVID impacted further possible workshops
Riverwood	Seed raising and composting	One workshop	
	Commencing 6-day course	COVID impacted further visits in this period	COVID impacted further possible workshops
Mt Annan	Commencing 6-day course		Two visits from staff
	Three workshops	Four visits from staff	Two participants completed another course
Auburn	Commencing 6-day course	One visit from staff	COVID impacted further possible workshops
	4 visits from staff	Contact from the community centre	One participant completed another course
	Two workshops		
Sydney	Commencing 6-day course		
	Four workshops	Four workshops	COVID disrupted ongoing visits

Table 1: Program delivery provided at each participating site according to data collection phase

Site	Activities occurring between commencement to 6 months after commencement	Activities occurring between 6 months to 12 months after commencement	Activities occurring between 12 months to 18 months after commencement
Eden	Commencing 6-day course	Two workshops	Online meetings with stakeholders
	Two workshops	Online meetings with stakeholders	One participant completed another course COVID disrupted ongoing visits
Newcastle	Commencing 6-day course	Fortnightly workshops	Fortnightly workshops
	Fortnightly workshops		Two participants completed another course COVID disrupted ongoing visits
Miller	Commencing 6-day course (but COVID impacted)	Three visits from staff	Two visits from staff
	Two visits from staff	Delivered plants, mulch, and seeds	COVID disrupted ongoing visits
Telopea	Commencing 6-day course	Workshop cancelled due to site issues	COVID disrupted ongoing visits
	Two workshops		
Willmott	Two visits from staff	Two visits from staff	One participant completed another course (mentoring course linked to MGVP)
	Commencing 6-day course		
Bega	Commencing 6-day course	Two visits from staff	N/A
	Two visits from staff		Just past 12 months and scheduled visits have been impacted by COVID Three participants completed another course
Warrigal	Commencing 6-day course	N/A	N/A One participant completed another course
	Three visits from staff		
Yallah	Commencing 6-day course	N/A	Three participant completed another course
	Two workshops		
Nowra	Commencing 6-day course	N/A	N/A
	Still in first six months and scheduled visits have been impacted by COVID		



Survey Methodology

Participants

A total of 192 people completed the survey upon commencement in the program. Their demographic characteristics are presented in Table 2, however, it should be noted that data was missing for a number of characteristics.

More than three-quarters of the respondents (79.1%) were females, and 17.2% reported being Aboriginal or Torres Strait Islander. The majority were aged between 35-74 years (38.6% were 35-54 years; 37.9% were 55-74 years). More than two-thirds (66.9%) were born in Australia and New Zealand, followed by those who were born in East Asia (i.e., China and Japan, 12.0%). Two out of five (40.9%) respondents attained year 10 or equivalent level of schooling. About 36.4% reported having disability or long-term impairment, while 21.2% reported having carer responsibility.

Follow-up surveys were collected approximately 6 months, 12 months and 18 months after baseline data collection. As such, three distinct groups were formed to represent follow-up data: baseline to 6 months; baseline to 12 months; and baseline to 18 months. Characteristics of participants in each group were as followed:

Baseline to 6 months (n=32): The mean age was 47 years (SD 14.46), with 84% identifying as female and 20% as Aboriginal or Torres Strait Islander. Participants were drawn from the following sites: Auburn = 5, Bega = 3, Central Coast = 5, Curran = 2, Liverpool = 6, Mt Annan = 5, Newcastle = 3, Riverwood = 1, Warrigal = 2.

Baseline to 12 months (n=13): The mean age was 61 years (SD 13.29) with 88% identifying as female and 10% as Aboriginal or Torres Strait Islander. Participants were drawn from the following sites: Auburn = 2, Eden = 4, Liverpool = 1, Newcastle = 2, Sydney = 2, Telopea = 1, Wollongong = 1.

Baseline to 18 months (n=16): The mean age was 60 years (SD 16.08) with 80% identifying as female and 7% as Aboriginal or Torres Strait Islander. Participants were drawn from the following sites: Auburn = 2, Eden = 1, Mt Annan = 1, Newcastle = 1, Riverwood = 5, Sydney = 1, Wollongong = 5.

Table 2: Characteristics of Master Gardeners upon program commencement

Characteristics	Frequency (n)	Percentage (%)
Age (n = 132)		
15-34 years	18	13.6
35-54 years	51	38.6
55-74 years	50	37.9
+75 years	13	9.8
Gender (n = 134)		
Female	106	79.1
Male	26	19.4
Unspecified	2	1.5
Aboriginal or Torres Strait Islander (n = 163)		
Aboriginal	27	16.59
Torres Strait Islander	1	0.61
Not Aboriginal or Torres Strait Islander	135	82.8
Highest completed school level (n = 149)		
Year 12 or equivalent	44	29.5
Year 11 or equivalent	14	9.4
Year 10 or equivalent	61	40.9
Year 9 or equivalent	21	14.1
Year 8 or equivalent	9	6.0
Any carer responsibility (n = 178)		
Yes	36	20.2
No	142	79.8
Disability or long-term impairment (n = 129)		
Yes	47	36.4
No	82	63.6
Disability type (n=67)		
Vision problem	3	6.8
Intellectual disability	3	6.8
Acquired brain impairment	3	6.8
Hearing problem	10	22.7
Medical condition	13	29.5
Learning disability	3	6.8
Physical disability	13	29.5
Mental illness	13	29.5
Others	6	13.6
Geographic region of birth (n = 184)		
Australia and NZ	123	66.9
East Asia	22	12.0
Southeast Asia and Oceania	14	7.6
Europe	8	4.3
Latin and Central America	8	4.3
Sub-Saharan Africa	5	2.7
North America	2	1.1
North Africa and Middle East	2	1.1



Measures

A battery of scales was constructed to measure the outcomes stated in the research objectives. The details of each scale are described here.

Wellbeing

The personal health item from the Personal Wellbeing Index (PWI) (International Wellbeing Group, 2013) was administered. Participants were asked to rate how satisfied they are with this aspect of their life on a 11-point likert-type response scale (0 very sad -10 very happy), which is later transformed to a score 0-100 where higher scores indicate higher satisfaction.

The K10 (Kessler et al., 2002) is a measure of psychological distress administering 10 items with a 5-point likert-type scale response: 5= all of the time, 4= most of the time, 3= some of the time, 2= a little of the time, and 1= none of the time. The maximum rating is 50 indicating severe distress, while the minimum rating is 10 indicating no distress.

The General Self-Efficacy Scale (Schwarzer, & Jerusalem, 1995) is a measure of self-efficacy whereby self-efficacy is described as an individuals' belief in their ability to perform well in a variety of situations. 10 items are administered with a 4-point likert-type scale response: 1= not at all true, 2 = hardly true, 3 = moderately true, 4 = exactly true. Total scores range between 10-40 with a higher score indicating more self-efficacy.

Social Cohesion

The community connectedness item from the Personal Wellbeing Index (PWI) (International Wellbeing Group, 2013) was administered. Participants were asked to rate how satisfied they are with this aspect of their life on a 11-point likert-type response scale (0 very sad -10 very happy), which is later transformed to a score 0-100 where higher scores indicate higher satisfaction.

Skill Development

The research team developed four items which asked participants to rate their: social skills, communication skills, gardening skills, and skills in giving gardening advice to others. These responses were scored on a 5-point likert-type scale where higher scores indicate greater self-reported skill: 5= very good, 4= good, 3= moderate, 2= poor, and 1 = very poor.

Participation

The research team developed three items which asked participants to report how many hours they spent on the following activities in the last week: work in paid employment, volunteering, and education or training courses.



Data Analysis

Data in excel form were imported to STATA version 15.0 for checking the collected data was correct, consistent, and usable, and at this step, incorrect data were removed from the further steps of statistical analyses. Statistical analyses involving descriptive statistics such as frequencies, percentages, mean, and standard deviation were used to describe the demographic characteristics of the study participants and the study outcomes.

Group baseline characteristics were compared using an independent sample t-test to check for differences in study outcomes across demographics, where an independent t-test was selected based on previous evidence (Crump et al., 2019; Mishra et al., 2019). To examine the crude changes in the outcome variables over the follow-up periods, paired t-test was implemented by comparing the mean level of the study outcomes at each follow-up period (6, 12 and 18 months) with baseline data. At this stage, matched available data with measurements at both baseline and the corresponding follow-up periods (6, 12 and 18 months) was included in the analysis, assuming missing at random.

Linear mixed effect linear regression model was used to examine the influence of demographic factors on the outcome variables. For this study, linear mixed effect regression modelling was selected (Brown, 2021; Hadjuk, 2017; Rosenblatt, 2019) as it: i) allows for the use of all the data resulting in a larger higher sample size; ii) accounts for the correlation structures between data coming from the same study participants; iii) considers the nesting structures (e.g., psychological distress within an individual and individuals within a same age group may be more similar to each other); and iv) avoids multiple comparisons that would be encountered while using separate analyses. At this stage, interaction checks were performed to investigate the differences in the influences of demographic factors for the changes in the outcome over the follow-up period, and for explanatory variables with significant interaction, a separate effect size estimate was provided for each subgroup of the explanatory factor.

All statistical analysis were performed using STATA version 15.0 (StataCorp, 2017) and R-studio 4.0.10 (R Core Team, 2020). P-value < 0.05 was used to set the statistical significance.

Focus Group Methodology

Participants

A total of 36 people participated in a focus group. Of the 36 participants involved in focus group interviews, 32 were Master Gardener Volunteer Program participants across 13 sites and four were stakeholder participants (Community Cohesion Officer, TAFE teacher, TAFE support teacher, Family Support Worker). With respect to the focus group, 58.3% of the participants also completed a survey at baseline and one of the 6-monthly intervals. Table 3 outlines the characteristics of the 32 MGVP participants involved in focus group interviews.

Table 3: Characteristics of 32 Master Gardener focus group participants

Characteristics	Frequency (n)
Age (n = 17)	
15-34 years	1
35-54 years	8
55-74 years	8
Gender (n = 16)	
Female	14
Male	1
Unspecified	1
Aboriginal or Torres Strait Islander (n = 16)	
Aboriginal	4
Not Aboriginal or Torres Strait Islander	12
Highest completed school level (n = 13)	
Year 12 or equivalent	5
Year 10 or equivalent	6
Year 9 or equivalent	1
Year 8 or equivalent	1
Carer responsibility (n = 24)	
Yes	9
No	15
Disability or long-term impairment (n = 17)	
Yes	6
No	11
Disability type (n=5)	
Hearing problem	1
Medical condition	2
Physical disability	1
Others	1
Geographic region of birth (n = 14)	
Australia and NZ	12
East Asia	1
Sub-Saharan Africa	1



Measures

The focus group method was adopted to provide a deeper understanding of participants' personal and unique experiences and the perceived impact of the MGVP, and the key program elements that participants believed facilitated changes. A total of 10 focus groups were conducted - nine with program participants and one with the stakeholder group. Of the nine program participant focus groups, eight comprised participants who had completed the program together in their community. A critical benefit of the focus group method is the socially oriented nature of the environment (Krueger, 2000) and the sense of belonging to a group that is experienced by group members (Peter, 1993). This social connectedness helps participants feel comfortable and safe to share personal information (Vaughn et al., 1996). Focus groups conducted with participants from the same site were effective as it helped participants feel confident to delve into sensitive, personal circumstances that were positively impacted by their involvement in the MGVP. One focus group was conducted with a mixed group of program participants from across several sites and one focus group was also conducted with MGVP stakeholders connected with communities involved in the program.

Focus group interviews were moderated by the project researchers. The interview protocol consisted of a series of semi structured questions (17 questions) designed to elicit participants' insights and discussion of their experience of the MGVP, and the impact the MGVP had on areas of their life. Stakeholder participants were asked a series of comparable semi structured questions, they brought an insightful, consolidated perspective

of the impact and experience of the program for community members who engaged in the program. Focus group interviews were conducted either in person or online, using the Zoom application during COVID-19, in 2020 and 2021. Focus groups were conducted, on average, 6 months following the collection of the pre-commencement survey (with a range of 1 to 10 months). Interviews ranged from 49 to 87 minutes, with an average of 64.8 minutes. All focus group sessions were audio recorded and later transcribed verbatim into text.

Data Analysis

Both participant focus group interview texts and the staff responses were analysed using thematic coding to facilitate a richer understanding of participant experiences and show how participants describe how the MGVP impacted on their daily lives. Taking advice and direction from the constant comparative method suggested by Glaser and Strauss (1967) and Strauss and Corbin (1998), emergent themes were developed in accordance with usage patterns of key words. In essence, thematic categories were based on consistencies and/or differences identified in the texts of participant experiences and staff responses. Following Creswell's (2018) notions of thematic coding, common themes were then highlighted and clustered. Themes were identified from recurrent terms and phrases expressed by participants, with dimensions providing insight into these themes. Themes were clustered into categories that aligned with the principle outcomes measured by the quantitative survey instruments.

Results

1 What are the demographic characteristics and self-reported needs of participants as they commence the Master Gardener Volunteer Program?

2 How do participants and staff describe their experience of the Master Gardener Volunteer Program?

3 What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what is most helpful? How do participants' characteristics influence these changes?

4 What aspects of the program delivery are reported as being most enjoyable?

5 What aspects of the program delivery could be improved from the perspectives of participants and staff?

6 How can more Master Gardeners be recruited into the program?

7 What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer Program support community recovery?

Research Question 1: What are the self-reported needs of participants as they commence the Master Gardener Volunteer Program?

Self-reported needs of Master Gardeners on commencement

Upon commencement, on average, Master Gardeners reported perceived satisfaction with personal health was 66.42 (SD 22.40), while the mean perceived satisfaction with community connectedness was 73.00 (SD 23.87). The normative range for Australians is 73.4-76.4 (International Wellbeing Group, 2013) suggesting that the commencing Master Gardeners, on average, had lower satisfaction with personal health and toward the low average range of satisfaction with community connectedness than other Australians (see Table 4).

The average reported level of psychological distress upon commencement was 21.36 (SD 8.63). The authors of the measure indicate that when a person scores 20-24 they are considered likely to have a “mild mental disorder” (Kessler et al., 2002) (see Table 4).

The Master Gardeners’ self-reported skills upon commencement produced average scores of 3.81 (social skills), 3.78 (communication skills), 3.34 (gardening skills), and 3.00 (giving gardening advice to others).

On the likert-type response scale, a score of 3 indicated moderate skills while a score of 4 indicated good skills (see Table 4).

Upon commencement, on average, Master Gardeners reported general self-efficacy was 29.60 (SD 7.43). Studies have reported average scores of 29.28 and 28.77 for adults in Germany (Luszczynska, Scholz & Schwarzer, 2005; Schwarzer & Jerusalem, 1995), suggesting the reported general self-efficacy for Master Gardeners on commencement appeared to be within the average range (see Table 4).

The average of total participation hours (including employment, volunteering and education or training) reported in the last week prior to commencing on the program was 10.08 (SD 13.69). This level of participation is low considering the average weekly hours of paid employment for Australians is approximately 25 hours per week (ABS, 2021) (see Table 4).

Table 4: Self-reported needs of Master Gardeners upon program commencement

Area	(n)	Mean	Standard deviation
WELL BEING			
Perceived satisfaction with personal health	179	66.42	22.40
Psychological distress	179	21.36	8.63
General self-efficacy	185	29.60	7.43
SOCIAL COHESION			
Perceived satisfaction with community connectedness	180	73.00	23.87
SKILL DEVELOPMENT			
Social skills	181	3.81	0.92
Communication skills	184	3.78	0.96
Gardening skills	180	3.34	0.97
Giving gardening advice to others	180	3.00	1.14
PARTICIPATION			
Total participation hours last week	177	10.08	13.69



Self-reported needs of Master Gardeners on commencement by demographic characteristics

At baseline, the mean level of perceived satisfaction with personal health was significantly higher among those who did not have carer responsibility as compared to the counterparts (P-value = 0.031), and those who did not have disability or long-term impairment had higher mean for the same outcome (P-value <0.001). A significantly higher mean level of perceived satisfaction was report among those who were not born in Australia or New Zealand (P-value = 0.042) (Appendix Table 1).

Interestingly, participants aged 55 years or more (P-value = 0.001), those who reported not being Aboriginal or Torres Strait Islander (P-value = 0.044), and those who were not born in Australia or New Zealand (P-value < 0.001) had a higher mean level of perceived satisfaction with community connectedness at baseline, as compared to those less than 55 years, reported being Aboriginal or Torres Strait Islander and were born in Australia or New Zealand, respectively (Appendix Table 1).

Participants who reported being Aboriginal or Torres Strait Islander (P-value = 0.010), those with disability or

long-term impairment (P-value < 0.001), and those who were born in Australia or New Zealand (P-value = 0.009) had a higher mean level of psychological distress at baseline, as compared to those who reported not being Aboriginal or Torres Strait Islander, without disability or long-term impairment and were not born in Australia or New Zealand, respectively (Appendix Table 1).

For self-reported skills and general self-efficacy, participants who did not have disability or long-term impairment had a higher mean score at baseline as compared to those with disability or long-term impairment (P-value = 0.046 for self-reported skills and P-value = 0.047 for general self-efficacy) (Appendix Table 2).

Those aged below 55 years (P-value < 0.001) and those who were Australian or New Zealand born (P-value = 0.016) had a higher mean for self-reported participation at baseline, as compared to those aged 55 years or above and those who were not Australian or New Zealand born, respectively (Appendix Table 2).

Research Question 2: How do participants and staff describe their experience of the Master Gardener Volunteer Program?

A wordle was created (see Figure 2) based on the frequency of key words mentioned by participants in the focus group interviews. More specifically, participants were asked to list three words that described their experience of the program. These words then formed the basis of the wordle. Consistencies were identified in the text and words commonly utilised are depicted by larger font sizes indicative of greater usage patterns.



Figure 2. Wordle showing words most commonly used to describe participants' experience of MGVP (larger font indicates greater usage).

Research Question 3: a. What changes do Master Gardeners report over their time participating in the Master Gardener Volunteer Program and what aspects of the program are most helpful?

Survey Data Analysis

Wellbeing: Perceived satisfaction with personal health

Paired t-tests showed that there were no significant differences observed in the perceived level of satisfaction with personal health between the 6 months, 12 months and 18 months follow-up periods and the baseline (Appendix Table 3).

In the matched data, the mean level of perceived satisfaction with personal health was higher at 12 months (69.23 vs 80.00) and 18 months (72.00 vs 74.67) follow-up as compared to the baseline, while there was no mean difference observed at 6 months follow-up (Figure 3).

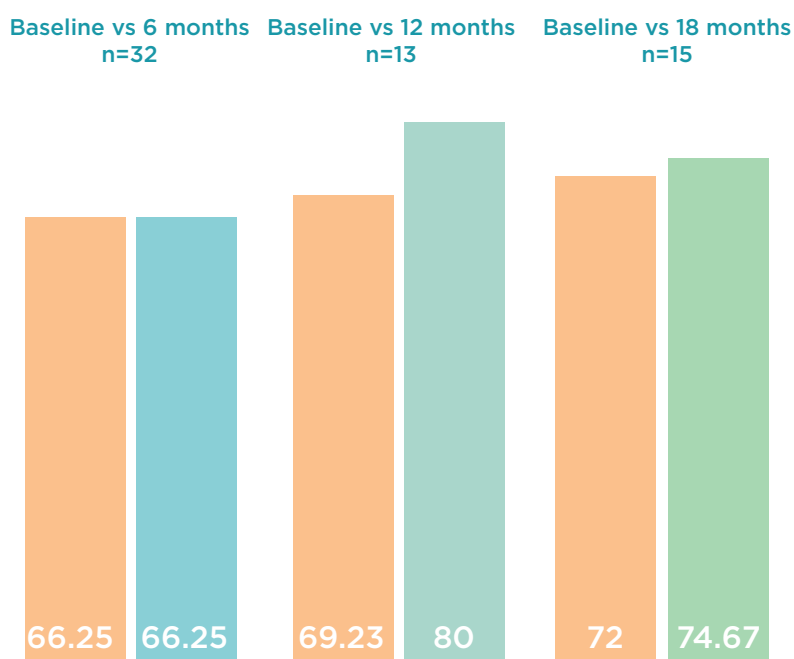


Figure 3: Comparison of mean level of perceived satisfaction with personal health by the follow-up times.

Wellbeing: Psychological distress

Paired t-tests showed that the mean level of psychological distress was significantly lower at 6 months (P-value = 0.031) and 18 months (P-value = 0.031) as compared to the baseline, while no significant difference was observed between baseline and 12 months (P-value = 0.072) (Appendix Table 3).

In matched data, the overall mean level of psychological distress was lower at 6 months (22.22 vs 19.59), 12 months (20.46 vs 16.31), and 18 months (22.65 vs 19.25) as compared to the baseline (Figure 4).

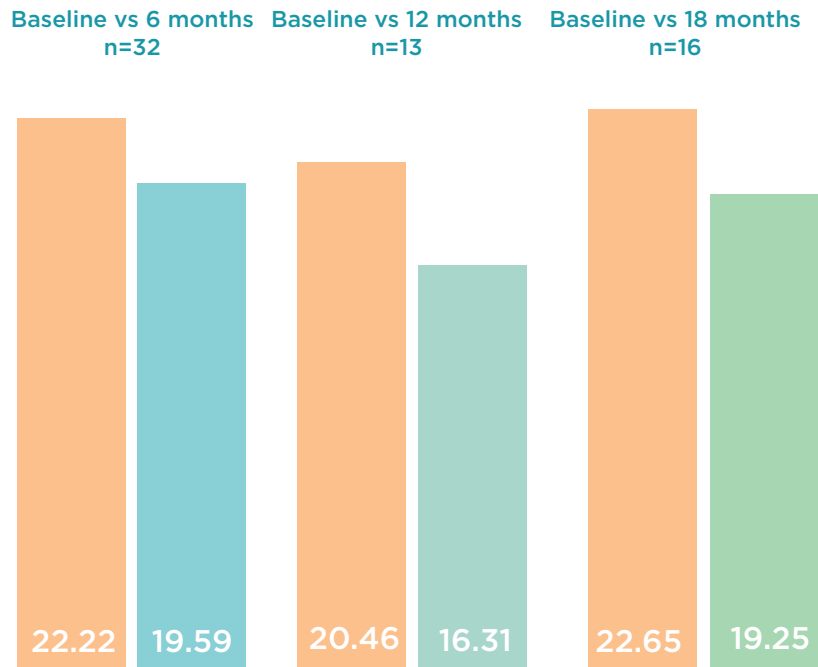


Figure 4: Comparison of the mean level of psychological distress by the follow-up times.

Wellbeing: General Self-efficacy

Paired t-tests showed that there were no significant differences in the mean level of general self-efficacy between 6 months, 12 months and 18 months follow-up, and baseline (Appendix Table 3).

In the matched data, the mean level of general self-efficacy was higher at 6 months (30.84 vs 31.34), 12 months (28.82 vs 31.00) and 18 months follow-up (29.75 vs 31.62), as compared to the baseline (Figure 5).

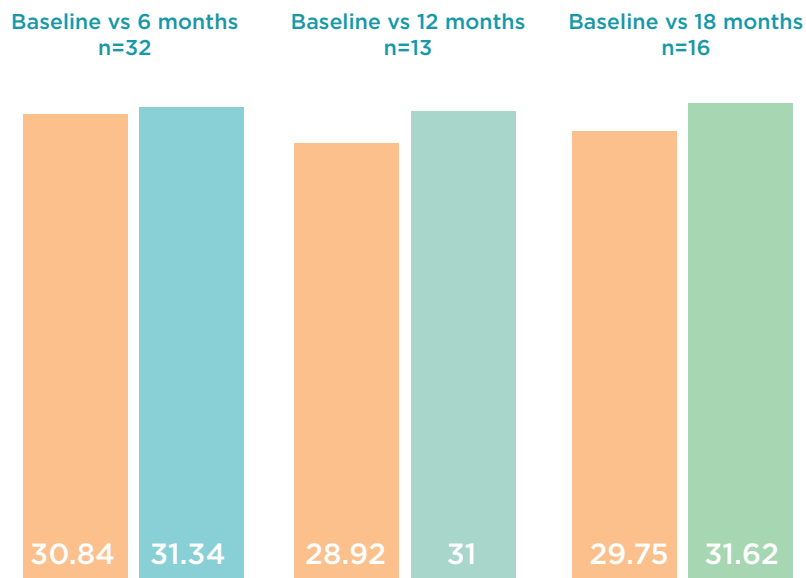


Figure 5: Comparison of the mean level of general self-efficacy by the follow-up times.

Social Cohesion: Perceived satisfaction with community connectedness

The results showed that there were no significant differences in the overall mean level of perceived satisfaction with community connectedness between the 6 months, 12 months and 18 months follow-up periods and the baseline (Appendix Table 3).

In matched data, the overall mean level of perceived satisfaction with community connectedness was lower at 6 months (74.37 vs 73.75) and 18 months (80.00 vs 71.37) as compared to the baseline, while it was higher at 12 months (63.84 vs 80.00) (Figure 6).

It is noteworthy that, as a group, commencing participants reported satisfaction with connectedness in the low average range and the COVID-19 pandemic, which was characterised by social distancing, occurred after the 6 month point. These factors may have influenced these results.

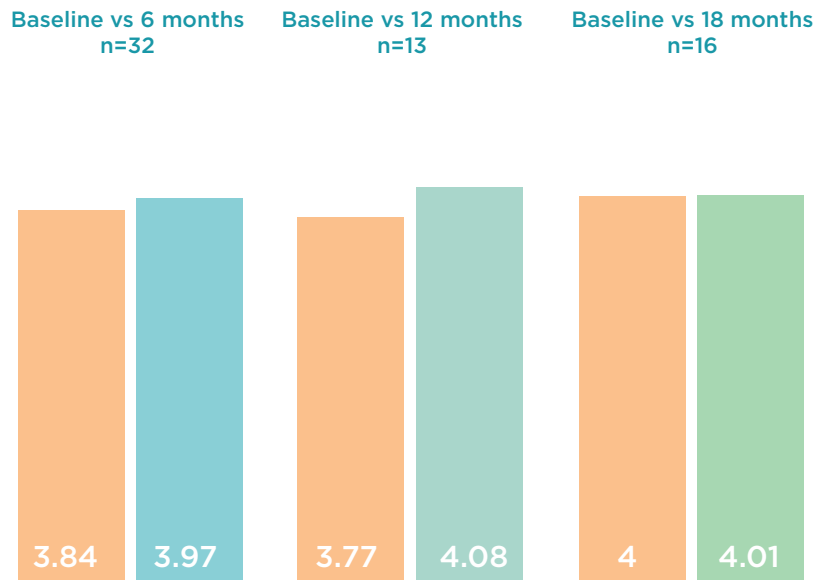


Figure 6: Comparison of the mean level of perceived satisfaction with community connectedness by the follow-up times.

Skill Development: Self-reported Total Skills

Paired t-tests showed that the mean level of self-reported total skills did not change significantly at 6 months, 12 months and 18 months as compared to the baseline (Appendix Table 3).

In matched data, the mean level of self-reported total skills was higher at 6 months (13.81 vs 15.44), 12 months (14.00 vs 15.08) and 18 months (13.75 vs 14.44) as compared to the baseline (Figure 7).

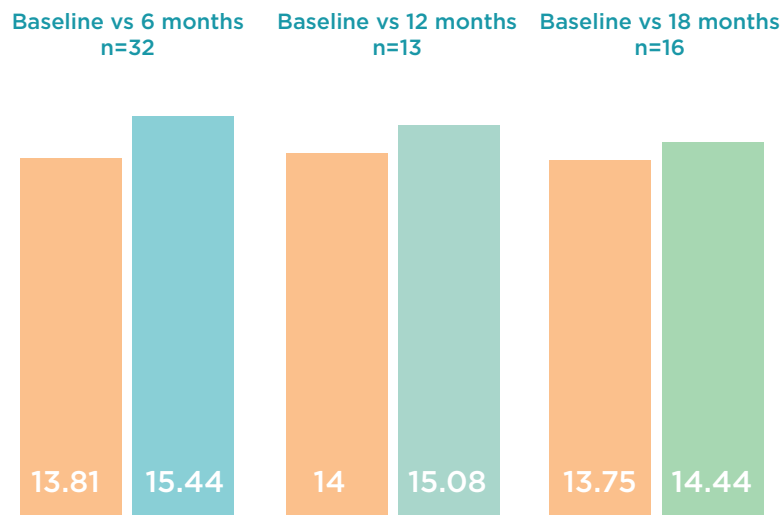


Figure 7: Comparison of the mean level of self-reported total skills by the follow-up times.

Skill Development: Self-reported Social Skills

Paired t-tests showed that the mean level of self-reported social skills did not change significantly at 6 months, 12 months and 18 months as compared to the baseline (Appendix Table 3).

In matched data, the mean level of self-reported social skills was higher at 6 months (4.00 vs 4.16), 12 months (3.77 vs 4.00) and 18 months (3.75 vs 3.87) as compared to the baseline (Figure 8).

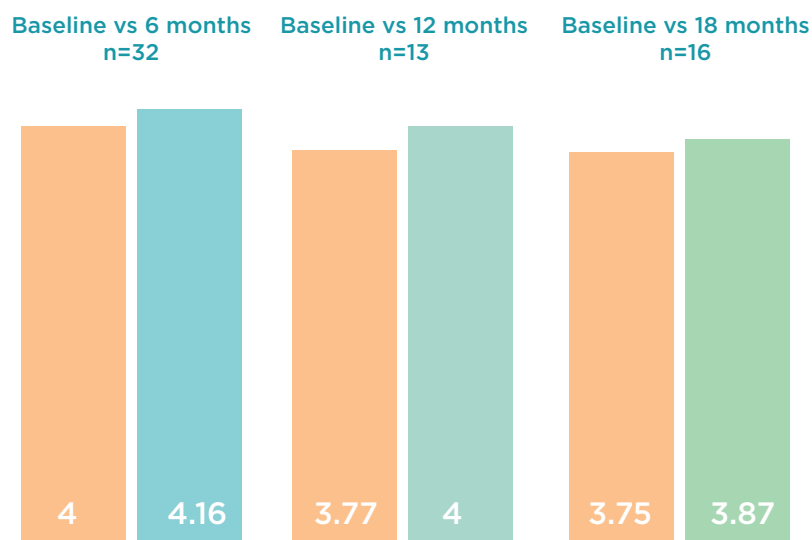


Figure 8: Comparison of the mean level of self-reported social skills by the follow-up times.

Skill Development: Self-reported Communication Skills

Paired t-tests showed that the mean level of self-reported communication skills did not change significantly at 6 months, 12 months and 18 months as compared to the baseline (Appendix Table 3).

In matched data, the mean level of self-reported social skills was higher at 6 months (3.84 vs 3.97), while lower 12 months (4.08 vs 3.77), and not changed at 18 months (4.00 vs 4.00) as compared to the baseline (Figure 9).

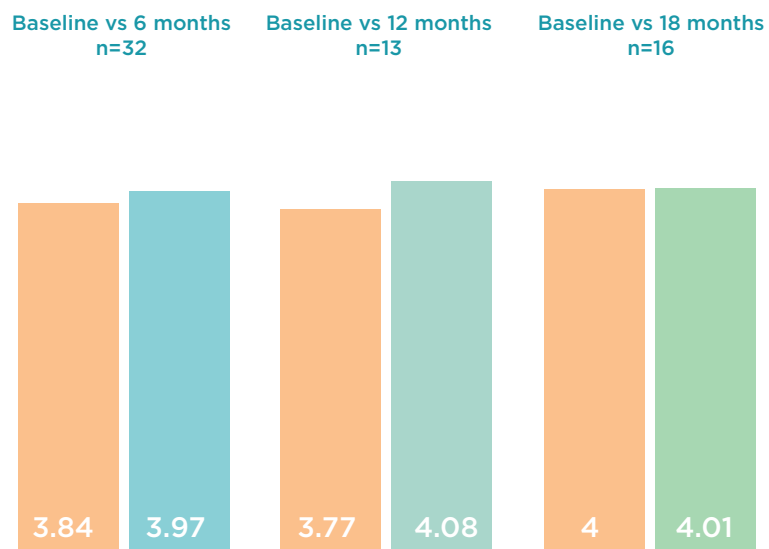


Figure 9: Comparison of the mean level of self-reported communication skills by the follow-up times.

Skill Development: Self-reported Gardening Skills

Paired t-tests showed that the mean level of self-reported gardening skill was significantly higher at 6 months (P-value = 0.001) as compared to the baseline, while no significant differences were observed between baseline, and 12 months (P-value = 0.139) and 18 months (P-value = 0.474) (Appendix Table 3).

In matched data, the overall mean level of self-reported gardening skill was higher at 6 months (3.16 vs 3.78), 12 months (3.38 vs 3.84), and 18 months (3.22 vs 3.37) as compared to the baseline (Figure 10).

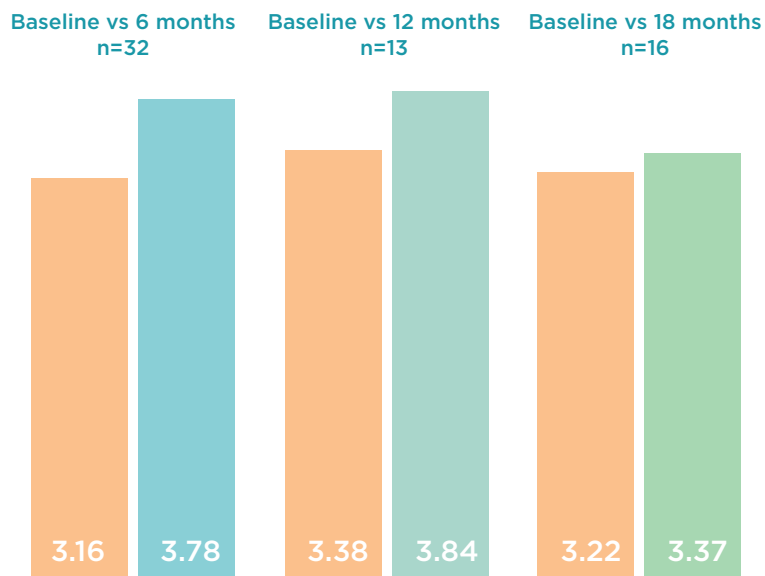


Figure 10: Comparison of the mean level of self-reported gardening skills by the follow-up times.

Skill Development: Self-reported Gardening Advice for Others

Paired t-tests showed that the mean level of self-reported gardening advice for others was significantly higher at 6 months (P-value < 0.001) as compared to the baseline, while there were no significant differences at 12 months (P-value = 0.295) and 18 months (P-value = 0.753) (Appendix Table 3).

In matched data, the overall mean level of self-reported gardening advice for others was higher at 6 months (2.81 vs 3.53), 12 months (3.08 vs 3.15), and 18 months (2.78 vs 3.19) as compared to the baseline (Figure 11).

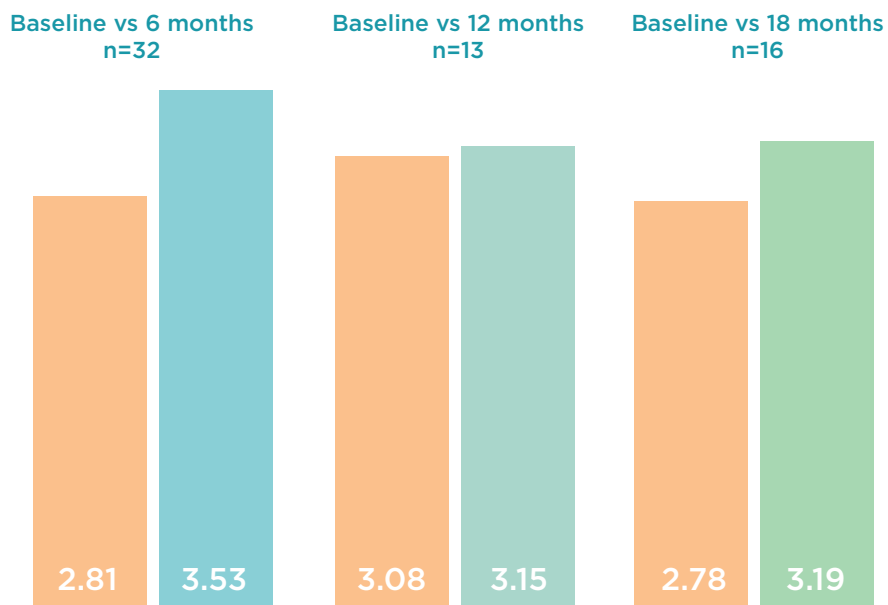


Figure 11: Comparison of the mean level of self-reported gardening advice for others by the follow-up times.

Participation: Employment, training, volunteering

In paired t-test, the mean level of self-reported total participation was significantly higher at 18 months as compared to the baseline (P-value = 0.027), while no significant differences were observed between 6 months and 12 months follow-up, and the baseline (Appendix Table 3).

In the matched data, the mean level of self-reported total participation was higher at 6 months (6.82 vs 10.33), 12 months (8.31 vs 8.92) and 18 months (7.25 vs 15.00) follow-up, as compared to the baseline (Figure 12).

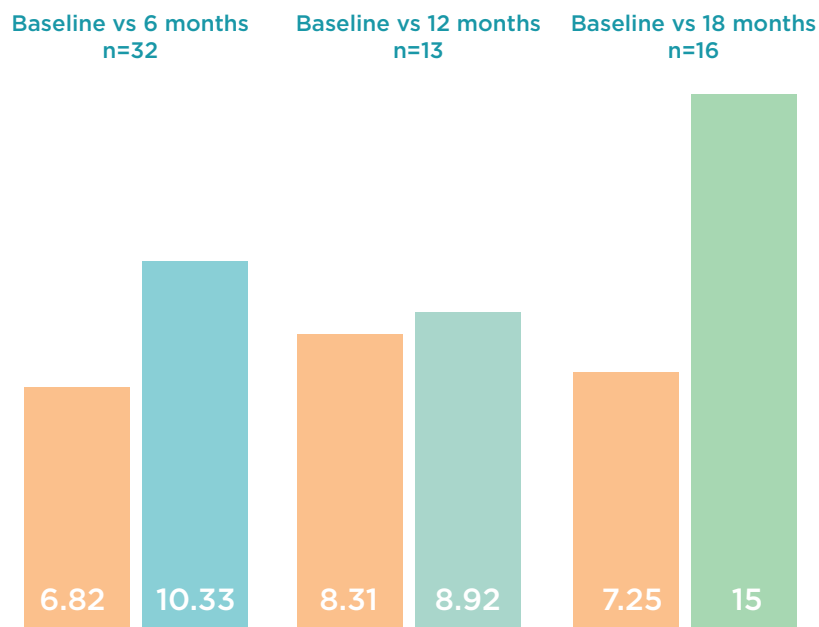


Figure 12: Comparison of the mean level of self-reported participation by the follow-up times.

Focus Group Interview Analysis

There is both a richness and liveliness contained within the story of a community garden. These sites are a microcosm of the wider community where individuals who cultivate soil and plants also grow themselves, alongside others and the community. Individuals who have participated in the MGVP report a wide range of physical and psychological benefits from being involved in the program. Participants have shared their experiences and unearthed a multitude of physical and psychological health benefits.

Community gardens in this context are more than just about food. They afford opportunities for people to build skills, knowledge, and experience. Personal growth and invaluable skills are gained in the community garden. By bringing individuals together, they create significant social interactions where people contribute to the community and social life. These sites empower individuals to organise themselves more effectively and advocate on behalf of their wider community. Through incremental success the larger community can become a better place. They also create a space for people to reflect, restore, and build a healthier lifestyle. People participate in outdoor physical activity that keeps them active and bolsters general health improvements. The individuals participating in the focus groups affirm that their participation had increased their general wellbeing. In turn, this led to greater skill development and a greater sense of connection at the interpersonal level with their community.

Wellbeing: Gardening as therapy and empowerment

There was resounding agreement among many participants that their wellbeing improved as a result of the nature experience afforded by the program and they developed greater self-confidence. The program was a catalyst for improved wellbeing as the gardening activities were less about cerebral engagement and more practical and therapeutic in character. Self-confidence was developed for many, the program built a wide range of relational skills and observable achievements demonstrated their capacity, these program elements mobilised participants to engage in other wellbeing activities.

Participants were invited to reflect on the wellbeing benefits of participating in the MGVP. One participant reported that getting their hands dirty and learning about the earth was:

“healthy for your mind...and, through bare feet and gardening and plants and things, you can sort of gently soothe the soul, and everyone can do it in their own yards.”

The MGVP fosters an opportunity for deep introspection, a place for restoration, escape, or wellbeing, which leads to sleeping better, feelings of happiness. Another participant contemplated:

“Yeah, it’s good to get out in the garden. It’s actually really good psychologically because if one starts to focus on what they’re doing more than who’s doing what, time passes most pleasantly. It’s a moment of being able to reflect on other deeper issues without knowing they’re doing that until afterwards. So, there’s that. It’s like a little bit of a meditation, perhaps.”

The therapeutic benefits of the MGVP were noted as a prominent aspect of participation. This revelation is an important component as articulated by a participant:

“I think definitely being in the garden has ended up not just being an educational thing or a work platform, but also just, like, on a personal level something that’s really nourishing and fun and good for the mind.”

The MGVP was integral in empowering participants and activated a greater sense of self-belief. Many participants reported developing increased confidence and this was inspiring, motivational and empowering. Some conveyed they were now taking ownership for the future trajectory of their life and seeking assistance from other support groups or health and wellbeing programs.

Stakeholders, some of whom work with community members in an ongoing support capacity, confirm MGVP participation positively impacted participants’ level of self-confidence, sense of purpose, life ownership and decision-making abilities in their lives. Collectively, stakeholders explained participants appeared to be applying skills developed through gardening activities to improve their personal wellbeing.



Social Cohesion: Building community and social connectedness

There was consensus among participants that involvement in the MGVP increased social connectedness and developed a sense of community. This was achieved through formally creating a physical space and offering an activity that brought community members together to achieve a shared goal – viz: contribute positively to their community.

In addition to the wellbeing benefits outlined above, the community gardens were seen by participants as a social, caring place, contributing to a greater sense of belonging and a catalyst for friendship formation. Making a difference, contributing to the community, building positive community connections, and focusing on newly forged friendships are some beneficial outcomes of the MGVP. Garden-based knowledge sharing between participants from various cultures also amplified group social interaction. One participant noted their community needs by sharing:

“We want to meet, we want community. We don’t just want the garden to be watered. We want to sit and talk; we’re lonely.” Another participant acknowledged the broader benefits of being involved in the MGVP: “I find that our community garden isn’t only just about growing stuff, it’s about the people being together and being able to connect.”

Interpersonal connections were fostered through bringing, often like-minded, community members together in a safe space. Participants positively recounted and enthusiastically highlighted the enduring friendships and social support systems developed. The program encouraged social engagement and collaboration through the ongoing nature building and care for gardens. For several participants, the MGVP provided an invaluable and welcomed opportunity to socially reengage after a period of social isolation and disconnection due to mental health challenges or personal trauma. This critical impact interrelates into a range of positive perceived health and wellbeing improvements experienced by program participants.

“We hadn’t got together for quite a while, and then was it last week? I think it was last week or the week before four or five of us got together and it was like ‘My God,’ it was like seeing great old friends again. We all walked away feeling so light and so happy. There was a lot of laughter. So today was even more exciting because we’re seeing each other again. It was, wasn’t it? The energy was amazing.”

Insights expressed by stakeholders echoed the impact of MGVP participation on social connectedness. They highlighted the garden became a tool in communities that encouraged social engagement, involvement in a meaningful community activity, sharing of produce, building relationships with support agencies and developing valuable friendships or social networks.



Social Cohesion and Wellbeing: Societal contribution

Increased social contribution was reported for some sites with greater community disadvantage. The MGVP again through practical skill and knowledge development, and bringing community members together through a garden space, led to enhanced self-confidence and capacity and in turn increased civic contributions.

Marginalised or disenfranchised individuals have found new possibilities of more outstanding societal contribution by participating in the MGVP. One participant recognised this as occurring in their garden community. They explained:

"I've seen women that have had a life full of domestic violence that would never leave the home. They never thought that they had any skills or anything to contribute to society. Then they become a part of this garden. Just being able to watch them live again has been one of the most beautiful things I've ever seen... It has been one of the most amazing things that I've seen. Plants help people."

The MGVP has enhanced the wellbeing of its participants into confident and optimistic community members. It has also helped participants increase their sense of connection, community, and overall contribution to

society. Participants have experienced a growth of skills, knowledge, and experience due to their involvement in the program. The MGVP is having success in building vibrant communities and empowered individuals. In addition the garden becomes a vehicle for improving physical and psychological wellbeing.

Stakeholders highlighted the value of ongoing community connectedness that resulted from garden activities. By planting the seed of gardening success, it cascaded into a broader engagement with their local community. For example, program participants became more confident and self-assured to continue engagement in gardening and other community activities and improve the liveability of their community. Stakeholders also explained that the community engagement improved prosocial behaviour in the community, for example less anti-social behaviours and greater respect for the community.

"...they've actually started gardens. They've started growing things. They've started sharing with their neighbours. They have basically increased the liveability of their areas in a lot of places, even if it's just a really small thing. They'll say that people come past and talk to them about it, about what they're growing."



Social Cohesion: Socio-cultural awareness, fostering inclusiveness and diversity

The MGVP was an incubator for inclusiveness and increased socio-cultural awareness. This was achieved through interacting outside your usual social group for extended periods of time. Being together immersed in an intensive course over an extended period of time, afforded participants the opportunity to learn about each other in a respectful and cohesive manner.

Amongst the many perceived positive changes reported as a result of participating in the MGVP, participants overwhelmingly confirmed their cultural awareness had increased. This change occurred as a result of the opportunity for program participants to learn about diverse cultures through conversations with participants from different backgrounds. This exchange included sharing stories, recipes and cultural plant knowledge. In some cases, sharing cultural dishes with one another.

"I remember one day, what I did, I was asking my Vietnamese friend what the names of some of the things were. He said 'I don't know. I don't know. I only know...' Anyway, so I ended up looking them up and I found out about three or four different ones like the Vietnamese coriander and all that. I made up these little signs and I actually wrote the Vietnamese name and then the Anglo name for it and I gave him to him. I said 'That's what they're called,' and we stuck it in the ground."

Interestingly, for some program participants their awareness of the challenges of other social groups was increased through engagement in the program alongside, for example, single mothers.



Skill Development: Gardening knowledge through hands on practical learning

There was overwhelming agreement from participants that they learnt a wide range of valuable gardening skills. This was achieved because the delivery format allowed for hands-on learning which appealed to this cohort.

Apart from the general wellbeing benefits, one of the things that the MGVP excels at is sharing information with participants through hands-on practical learning. As a result, participants learn a wide range of new and practical skills in the garden, which often means feeling better about themselves. For example, one participant commented on their new-found passion in life:

"Before coming in, I did a tiny bit of gardening, not much. I never really had a big passion for it or anything. Still, now that I've come to the - well, a couple - ever since about two years ago, I've been improving my knowledge and skills like planting and gardening and stuff. Ever since I've come to this class, I've learned heaps of different stuff. I've learned more stuff than I've learned over months than I've learned in just a couple of short classes."

The same participant was so inspired that they are considering looking for work in gardening. They noted about what to do next in life:

"Well, probably looking for a job in a nursery or somewhere, or doing land replenishment, but I'm definitely going to continue doing studying with gardening and that sort of thing, horticulture, permaculture."

One participant felt that by learning new skills by trial and error and being hands-on, they felt inspired and motivated to learn more. They reported,

"I want to learn more, I want to learn more, I want to thrive. It's like my brain has just been opened up."

Importantly, developing practical gardening skills and cultivating their site was both fulfilling and empowering. As a natural corollary, these factors were instrumental in strengthening their sense of competence and self-belief structures. Creating productive gardens also addressed a range of issues such as food security, increased positive dietary habits and physical health and safety of communities.

Skill Development: Communication and Social skills

Undoubtedly, participants confirmed they developed communication and interpersonal skills. The MGVP accomplished this by giving participants practical knowledge that was relational and encouraged ease of sharing information with others. The program achieved interpersonal skill development by providing opportunities for experiential activities. In turn, these communication skills were role modelled by the facilitators which encouraged positive engagement and social exchanges between participants.

The development of communication and social skills were key changes many participants reported in their reflections of the changes that resulted from their program participation. Several participants detailed stories of learning to communicate with people, working as a team, learning to work independently, and creating something with purpose. One participant began to use their newly acquired communication skills in the workplace:

"I just share the knowledge and everything that I have in the newsletter at work because that's what I've been doing."

Other participants have developed their communication skills and are sharing their newfound knowledge with their community.

"...it's a big community centre. I'm actually teaching them not to throw their foodstuffs in the red bin. I've already put a little bucket there for them to put their composts in, and we have so many different programs at the Community Centre - we've got playgroups, we've got cooking classes, we've got youth group and that - so I'm encouraging them to put all their food scraps in little buckets, and then I will put them into the compost bin I've created at the community centre."

For some participants, social skill development had been an unexpected change that has resulted from program participation.

"Well, I learnt through the course how to deal with a very toxic dispute that was occurring. It's still occurring in my life, but just gave me really good strategies to be assertive in the dispute and that led me to being able to accept that the people who were in dispute with me may never reconcile with me. So that was quite a profound learning and I think that because part of the master gardening course was about dealing with people and dealing with conflict and that kind of stuff, that it kind of unblocked my way to keep going with it."

Stakeholders provided further insight into the perceived skill development of participants resulting from their engagement in the MGVP. They confirmed participants appeared to develop a range of new skills such as communication skills through sharing acquired knowledge and sustainability skills. Stakeholders offered additional observations of behaviour management skill development. After witnessing the development of valuable social skills, stakeholders felt this could have greater focus in future programs.

"One of the things I'd like to mention was that some of our focus was on working with people with challenging behaviours because in some of these groups there will be people with some behaviours that are difficult to manage in a community. So, again, the facilitator being the person she is, she was looking at the sustainability of the whole program across the state. So we tried to address some of that and upskill people to actually feel confident that they could be teachers in a group because they also had some understanding and ways of managing the groups as such. "

Participation: Engaging in volunteering, employment and education

Participants confirmed their level of involvement increased in one form or another. For instance, they either participated in more volunteer work, increased paid work, re-engaged in formal education or pursued self-education. The MGVP contributed to these changes by providing transferrable content, practical learning and experience, and putting participants in contact with community agencies and/or support officers.

The MGVP was influential in participants engaging in more voluntary work and for a smaller number of participants obtaining paid employment. For both voluntary and paid employment, changes that were reported by participants resulted from the MGVP creating a pathway through networking and skill development. One participant explained the voluntary work that they were engaged in:

"I've been working with people trying to feed people during the pandemic, so I've been working with church organisations and other volunteer organisations trying to get people fed."

Another participant reported the paid work that they had acquired:

".....is a housing estate and a social housing estate, and it has a high percentage of vulnerable people, people who are Aboriginal, Torres Strait Islander background, and of vulnerable communities, disabilities, and so I worked there with the kids in the afternoon... Well, I think being in that master class actually helped me get the employment, yeah. I think if I hadn't have been doing that, I might not have got the work, yea...I think it's just through a network."

Learning new skills and knowledge stimulated the desire to learn more, in other words it become infectious. Many participants highlighted the most significant education change that occurred for them was engagement in self-educational activities. Participants pursued a range of informal activities increasing their personal education, they wanted to know more about gardening and sustainable activities.

The MGVP has the inherent potential to be transformative and life changing for some. Reengagement in secondary education for one young program participant was a noteworthy change which demonstrated the potential power of the MGVP. Participation in the program was perceived to have played a crucial role in re-entering into formal education.

"Being all in the course was really, really helpful. So, my boy... - I might get upset, so just - had been angry for a very long time since his brother's suicide. This was the best time for him to get outside and since he's been making little steps. So, now I've just got a message from his new school teacher. He's back at school doing flexible learning. And, he's been busy and going on holidays to see relatives. So, yeah, it's initiated change with his life."

The impact of the MGVP on the above young person is recounted by another participant:

"But I think [his] story is a really good story, about [him] finding the confidence to re-engage with learning. So, [he] hadn't been engaged with school for a little while, and it was serendipitous that he participated in the program and built a bit of confidence, and then locally a new school opened which was more flexible, and probably more likely to cater to [his] needs than your traditional school... he's going to school now. And, he's a lovely young fellow with a lot of ability, so hopefully that will enrich his life through his learning. And, it's been a good stepping stone, from what I could see, for [him] to take that step, which was a big step for him."

Research Question 3b. How do participants' characteristics influence these changes?

Wellbeing: Change in perceived satisfaction with personal health across demographic characteristics

In the current study, interaction checks for perceived satisfaction with personal health was significantly different across age groups by the follow-up periods (P-value = 0.002). For respondents aged <55 years, the mean perceived satisfaction with personal health was higher (B = 47.21; 95% CI: 25.79, 68.64) at 12 months of follow-up as compared to the baseline, while for those aged 55 years or more, the mean perceived satisfaction with personal health was 45.43 units (95% CI: -70.26, -20.59) lower at 12 months follow-up as compared to the baseline (Appendix Table 4).

Interaction checks in the pattern of the level of perceived satisfaction with personal health was significantly different across disability or long-term impairment (P-value = 0.035). Participants who had disability or long-term impairment had significantly higher perceived satisfaction with personal health at 12 months, as compared to the baseline (B = 27.53; 95% CI: 12.83, 42.22), while those who did not have disability reported significantly lower level of perceived satisfaction with personal health at 12 months, as compared to the baseline (B = -28.14; 95% CI: -50.21, -6.06) (Appendix Table 4).

However, interaction checks for gender, aboriginality, career responsibility, country of birth and highest completed education were not significant across the follow-up periods (Appendix Table 4).

Wellbeing: Change in psychological distress across demographic characteristics

Interaction checks for age groups showed the pattern of psychological distress was significantly different over the follow-up periods (P-value = 0.009). For respondents aged <55 years, the mean level of psychological distress was -17.53 units (95% CI: -23.88, -11.8; P-value = <0.001) lower at 12 months of follow-up, as compared to the baseline, while for those aged 55 years or more, the mean level of psychological distress was 12.24 units (95% CI: 5.30, 19.18) higher at 12 months follow-up, as compared to the baseline (Appendix Table 5).

For participants with disability or long-term impairment, the mean psychological distress was lower at 6 months (B = -6.76; 95% CI: -9.94, -3.58), 12 months (B = -8.71; 95% CI: -13.78, -3.63) and 18 months (B = -7.85; 95% CI: -14.52, -1.19), as compared to the baseline. However, for those who did not have disability or long-term impairment, significantly higher psychological distress was observed at 6 months (B = 7.79; 95% CI: 3.40, 12.17) and 12 months (B = 10.27; 95% CI: 2.64, 17.91), as compared to the baseline (Appendix Table 5).

No significant difference was observed in interaction checks for the mean level of psychological distress across gender groups, highest completed level of education and any career responsibility variables (Appendix Table 5).





Wellbeing: Change in General Self-efficacy across demographic characteristics

Interaction checks for general self-efficacy across demographic factors did not show any significant difference by the follow-up periods (Appendix Table 6).

Social Cohesion: Change in perceived satisfaction with community connectedness across demographic characteristics

Interaction checks for perceived satisfaction with community connectedness across demographic variables did not show any significant difference by the follow-up periods (Appendix Table 7).

Skill Development: Change in self-reported skills across demographic characteristics

Interaction checks for age groups showed the pattern of self-reported skills was significantly different over the follow-up periods (P-value = 0.028). For participants aged <55 years, the mean level of self-reported skills was higher by 3.02 units (95% CI: 1.11, 4.93) at 12 months and by 1.97 units (95% CI: 0.55, 3.38) at 18 months, as

compared to the baseline. For participants aged 55 years or more, the mean level of self-reported skills was significantly lower by -2.32 (95% CI: -4.57, -0.08) at 12 months follow-up, as compared to the baseline (Appendix Table 8).

However, interaction checks for self-reported skills across gender, aboriginality, highest completed level of education, career responsibility, disability and country of birth did not show any significant difference by the follow-up periods (Appendix Table 8).

Participation: Change in employment, training, volunteering across demographic characteristics

Interaction checks for the mean hours of participation in employment, training, volunteering showed that participants who were born in Australia or New Zealand had significantly higher participation at 18 months, as compared to the baseline (B = 16.10; 95% CI: 7.79, 24.42), while those who were not born in Australia or New Zealand had significantly lower participation at 18 months, as compared to the baseline (B = -17.31; 95% CI: -29.23, -5.38) (Appendix Table 9).



Research Question 4: What aspects of the program delivery are reported as being most enjoyable?

Participant insights

The MGVP integrated both experiential learning and relational learning. Garden programs engage participants by providing dynamic environments to observe, discover, experiment, and learn. Learning programs for community gardens are based on experiential learning approaches and draw from real-life experiences and lessons learnt, rather than textbook examples. Activities in the community garden can play a significant role in bridging formal and informal education. The programs also promote a relational method of learning where participants dig deep into lessons of food, food security, social interactions, community development and cultural integration. When interviewed about the most enriching and enjoyable components of the program, the participants' perspective are as follows.

Theory and practice working together

Overall, participants in the MGVP expressed a deep appreciation of the program. In particular, participants enjoyed several qualities of the program, such as the theory-practice balance and the relevant, broad practical content that complemented the theory. One participant explained:

“the gardening kind of exceeded the expectation of what I hope to get out of in a really good way”.

The program delivery incorporated both theory and practice.

Overwhelmingly, participants expressed a strong desire for experiential or, hands-on learning reporting, “Yeah. I want my fingers dirty.” Another remarked:

“I think there should be more done on actual - the visual side of things with plants, so for people to be able to see, touch, feel, smell, to eat”.



Meeting different learning needs

Participants were able to acknowledge the facilitator's attempts at meeting various learner needs and ways of learning. One participant commented that "the best part of the program was that it allowed for different ways of learning." It is not clear if participants knew what their preferred learning method was before starting the course. Still, participants acknowledge their learning preferences during the program. Another participant noted:

"The only thing I didn't like was sitting down and taking in all the information because I'm more hands-on."

One participant explained that they learned about the benefits of trying a new style of learning as they presented their feelings about doing the final assignment:

"At the end of it, it was rewarding because I learnt so much. Because I don't like writing for one, and I don't like reading. But the benefits that come with doing that outweighed the sum of actually doing the thing. So, it was a dislike, but in the end, it was a like."

Another participant appreciated the classroom work but was keen to get outside and apply their newly acquired practical skills. They pointed out the facilitator's attempts at bringing theory and practice together but also their desire to get outside:

"We sat in the classroom, but we still went out to look around so we could virtually see what was going on. But it's just the sitting down first up. So I just want to get out there and actually see different plants and their names and learn a lot more."

Sense of community extended

Apart from emphasising the practical component, other participants were able to see outside their own learning and how the MGVP would suit the needs of other members of their community. For example, one participant wanted to see more community reach:

"What I really, really would like to see to build strength in the community and also to share the skills is incorporating the younger kids with learning difficulties and kids that are learning, to learn the practical skills to build confidence to say 'Okay, they're not good at pen and paper,' but showing them that the physical abilities can be quite valuable and it's not all classroom based."

Overall, participants applauded the MGVP. The facilitators provided them with the practical skills and knowledge required to grow food, connect the theory in the classroom to the outdoor practicals, and strengthen the community by growing and sharing food.

Staff quality really matters

Staff facilitators are first and foremost passionate gardeners and educators. They possess expert knowledge not only of the garden, but of how to engage their participants. They understand the diversity of the needs of the people they are working with and start the program from a grassroots participatory approach to education. Staff ask: Why are you here? What do you want out of this? What are your needs? They use brainstorming and mind mapping to bring the program alive right from the very beginning.

Some of the approaches undertaken with the program delivery are directly related to the above with the staff remaining responsive to participant needs, challenges and interests. They go above and beyond to maintain participation and create an inclusive environment. A participant noted the following observation about a staff member:

"We learnt a lot of things and both [facilitators] were fantastic. The way that she is so enthusiastic, but also explained things in a way that even somebody who doesn't know a lot about gardening could understand, and I mean, I worked in the ... for years, but there's still a lot about gardening I don't understand, and so it was simple and clear and easy to understand, and she, you know, did a lot of good diagrams and that sort of thing, but I also, as I said before, learnt a lot of new things."

Staff insights

When interviewed, stakeholders and/or staff presented the following perspectives.

Meeting the needs and interests of participants

Stakeholders provide insights on the program qualities that were most valued in relation to the program approach, this includes the relationships with and responsiveness to participant need, challenges and interests was strongly expressed. More specifically, the approach is strengths based, centred on upskilling and

tailored to the needs of the community and participants. It is evident that MGVP facilitators are conscious of wanting to build a program that will meet the needs and interests of their participants. They start their programs by building relationships and trust:

"So, basically, relationships are everything. It's about trust. A lot of it is to do with communities that have been let down a lot and have distrust of educational programs. Their whole formative learnings they've been disengaged from often because they're kinaesthetic learners or they've had traumatic backgrounds. So, there is a big distrust of education full stop. You've got to tread very lightly."

They go above and beyond to maintain participation and create an inclusive environment. A participant noted the following observation about a staff member:

"I love the outreach stuff and we get to engage a lot of people who fall between the gaps, people who are often very nervous about that sort of thing. What's particularly great about it is that because we work with a lot of people who are in housing who have difficulty getting places, is that [facilitator] can pick them up. She picks them up and brings them to the course."

Community empowerment and capacity building

Facilitators are clear that their hope is the participants will say "We want this!." They also recognise that often the participants are starting out from "knowing nothing" and the first barrier is often that people don't understand the value of growing good, nutrient dense food. Stakeholders reflect on the best aspects of the program and the mobilisation of community, supporting communities to address food security issues, encourage health lifestyles and building community capacity.

Research Question 5: What aspects of the program delivery could be improved from the perspectives of participants and staff?

The question pertaining to suggested improvements for the program delivery is answered through the lens of participant and stakeholder insights.

Participant insights

The following participant perspectives are offered to enhance the MGVP.

Program delivery

Some participants had mixed feelings about the overall balance of theory and practice. Areas for improvement included, external administration barriers, classroom activities or written content. One participant commented that they like the practical side of things because other participants really focused on learning in the hands-on components:

“I like the practical side of it, getting out and doing stuff. But, like, the theory was good too, so I’m just, like, I find that everybody wants to talk at the same time with theory and all that. Still, when everybody is out and doing the practical work, everybody’s got their head down and got their own little sections or whatever.”

Some participants expressed a desire that the program is longer in length:

“So much information, so little time” and “I wish it went longer” were some comments from participants.

Community engagement and follow-up

Participants reflected on the community’s engagement in the gardening activities in the short-term and long term. Participants suggested that a whole of community approach could be beneficial to the community, that is involving child groups, children and parents and culturally diverse participants. This also relates to the desire of participants to have greater community

involvement or buy-in and community confidence to engage in gardening activities. Further, for some community members, follow-up contact and support could be another area that would assist in improving the effectiveness of the program.

Pathways to opportunities

MGVP participants offered several insights relating to furthering opportunities to move into education and employment. These included more formal training, work credits, encouragement of ongoing involvement in gardening activities and volunteering in community activities.

Staff insights

Stakeholders and/or staff when interviewed offered the following perspectives.

Provision for educational pathways

Some growth that could occur with the program included prolonged challenges that could ensure the continuation of participants with further education along the same pathway. There is a lack of appropriate course pathways at the TAFE level to meet the needs of the participants in the same way that their needs are being met in the MGVP. A strong TAFE partnership could be considered.

Cultural awareness

The change in cultural awareness was a strong feature of the impact of program participation on community members. However, upon stakeholder reflections there is opportunity for improvement. Territoriality in community is not uncommon, in fact ownership can result in positive outcomes such as caring for a common public amenity and reduced anti-social behaviour. However, in the case of community gardens cultural territoriality can result in cultural tensions and discrimination. Consideration of these unintended outcomes could be the focus of developing positive cultural awareness.

Research Question 6: How can more Master Gardeners be recruited?

Starting a community garden that is open to all is an excellent way to increase community engagement and the overall mood of those living nearby. Everyone can acquire some new gardening skills and save money by not purchasing as much fresh produce from the grocery store. In addition, it's an excellent opportunity for the community to work on something which embraces environmental, health and social outcomes. A well-known American garden activist, (Finley, 2020) chose a bold approach by starting a food revolution in his urban area. Known as the "gangsta' gardener, Finley (2020) chose this word carefully to inspire a vision of strength and engage a diversity of people, first in his local area and now worldwide. He believes in the people element of the food revolution and uses a variety of techniques to engage his local community.

Master Gardeners were asked how to increase uptake in the community programs. Participants were not without ideas. They offered many ways to invite the community to become involved in their local garden. Some of these include:

- Starting a podcast
- Increasing social media presence (Facebook pages, groups and live videos)
- Websites with a community focus
- Community meetings in their local areas
- Canvassing schools, pre-schools and stay-at-home parent groups
- Holding events at their garden
- Word of mouth
- Flyers

Some participants are discouraged by their efforts to enlist new members to the group. For example, one participant explained:

"We had one open day, and we advertised different things in the library when we handed out leaflets at various shopping centres near us. We've put it on the council website as well, and you get a lot of people asking about it, but then they don't show, and you might only get a handful."

Others are hopeful that if community members see familiar faces doing something positive that they might become interested. Another participant talked about the strength of inter-agency support in the future. One spoke about using their community garden with children and creating events such as native bee talks and making wicking beds. Overall, Master Gardeners are using word of mouth to spread the importance of their community garden and its programs.



Research Question 7: What impact did COVID-19 have on program delivery and how did the Master Gardener Volunteer program support community recovery?

The resilience of Australian communities has been tested significantly in the past two years. From bushfires to COVID-19, communities have been experiencing a loss of connection and increased social isolation. The focus group results suggest that the MGVP increases community building, participants' feelings of contributing to society and cultural awareness. Participants see their gardens as spaces to connect with others outside their social networks and improve their sense of social cohesion. Worldwide, gardening has been used to promote healing especially after trauma and community disaster. For example, consider the response in Christchurch after the earthquakes where community gardens were introduced as a mechanism to de-stress, communicate shared experiences, and regain local community support (see Shimpo, Wesener, & McWilliam, 2019).

This begs the question: How are the MGVP participants responding to the events in Australia over the past few years? How is the MGVP supporting community recovery? One participant recognised the wellbeing impact COVID-19 was having on them and decided to enrol in the MGVP. They noted:

"I didn't have any other stuff going on to go to, where I was sitting at home and this COVID, all you see is COVID on TV every second of the day, and, like - and even though I already lost someone, that was eating at me just sitting at home being bored, not having anything to do. I actually forced myself out to go find something because I was turning into a slump and, like, it's like, "I don't want to be stuck just doing this", you know, like, and I know my personality is more better than that and, like, I wanted to show it, so - and it come at a great time."

Participants took advantage of the limitations that COVID-19 imposed and embraced the MGVP:

"With COVID, you couldn't be indoors or anything. You have to do social distancing. You know, alright, what a perfect place to do it in doing gardening, because it's outdoors and everything, so I wasn't breaching any social distancing or whatever."

One of the things that COVID-19 seems to have impacted worldwide are people's perceptions of food security. According to Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), Australia is not in a food security risk, but with widespread panic buying and empty shelves because of this, people think that there is a food shortage, and this had led to an increase in questioning self-sufficiency (ABARES, 2020).

Some participants in the program alluded to feeling both uneasy about food security and being able to maintain social distancing. The practical gardening knowledge and skills developed from engaging in the MGVP have helped participants deal in a proactive way the impact of the pandemic on communities, as one person noted:

"So, since COVID, I've started growing my own veggies. Because it's hard to get decent veggies at the shop, and with COVID and not wanting to go to the shop, like being afraid, so if I grow my own veggies, it's much better. So, I've been doing a lot of gardening and this great course. By doing this I can grow my own veggies."

The MGVP has experienced both positive and negative impacts. Some of the participants have reported that as the course went online in a new format, it prevented hands-on engagement, something noted earlier as an integral component of the course. Others have recognised some online barriers because of digital inaccessibility for participants and those unwilling to engage digitally. Some noted a frustration that COVID-19 has impacted their ability to further upskill in an area where they have found passion. Alternatively, some have been able to see the benefits that COVID-19 has provided and have been inspired by sharing their stories and successes on social media:

"We are watching the live feeds from what Community Greening's doing. Then we talked to (staff member) this morning about doing one ourselves. So he's going to film us doing a live feed. All of a sudden we've got these people that we don't know interacting with us on social media. We've got our own Facebook page and we are incorporating a lot more gardening in that...So that's how it spreads. I think it's just growing all the time."

Where people have been able to continue involvement in their gardens, the immersion activity has allowed for strengthening social relationships between new and existing gardeners. Some participants talked about the positives of learning from other communities by being inspired to maintain social connections via online photo and video sharing.

In sum, COVID-19 presented challenges for the MGVP and its participants whereby the hands-on learning and face to face community connections were compromised (see Table 1). Notwithstanding these impediments, the MGVP and the skills, interests and community connections made during the MGVP served as a protective factor for limiting the negative impact of COVID-19 on participants' lives.

KEY FINDINGS

The current findings are based on a single intervention mixed method design which extends our understanding of the benefits for Master Gardeners themselves and suggestions for future iterations of the MGVP. Although the study advances the current focus and method utilised in this under-researched space, it is important to note that the study did not employ a comparison group and relied on a small sample size. Additionally, the COVID-19 pandemic occurred during the study where the 2020 government-initiated lockdown took place before the 12 month survey and eight of 10 focus groups. Not only was the delivery of the Master Gardener Volunteer Program restricted (see Table 1) but the impact on individuals was likely to be detrimental. Notwithstanding these limitations, the findings provide persuasive evidence of positive benefits for participants and user-led recommendations to shape the future delivery of the MGVP.

Who participates in the MGVP and what are their needs?

Of the Master Gardeners considered in this study, 79.1% were female, and 17.2% reported being Aboriginal or Torres Strait Islander. The majority were aged between 35-74 years (38.6% were 35-54 years; 37.9% were 55-74 years). More than two-thirds (66.9%) were born in Australia and New Zealand. Two out of five (40.9%) attained year 10 or equivalent level of schooling. About 36.4% reported having disability or long-term impairment, while 21.2% reported having carer responsibility. As such, the MGVP appears to attract a high portion of participants who would be considered as vulnerable or disadvantaged.

Upon commencement into the MGVP, on average, the participants reported low satisfaction with personal health, psychological distress equivalent to a “mild mental disorder”, and low participation rates including employment, education and volunteering.

Satisfaction with one’s personal health was lower for those with a carer responsibility, a disability or long-term impairment, or born in Australia or New Zealand. Satisfaction with community connectedness was lower for those aged under 55 years, those who are Aboriginal or Torres Strait Islander, or born in Australia or New Zealand.

Greater psychological distress upon entry was reported by those who were Aboriginal or Torres Strait Islander, those with a disability or long-term impairment, and those who were born in Australia or New Zealand. Self-reported skills were lower for those with a disability or long-term impairment while participation in employment, education and volunteering was lower for those over 55 years and not born in Australia or New Zealand.

What are participants’ experiences of the MGVP?

Underpinning the participants’ experience of the MGVP is the emergent characteristics such as cultivating a sense of community and enhanced social engagement. Participants experienced a sense of belonging, empowerment, and heightened social connection. Self confidence levels were bolstered through the acquisition of knowledge, personal skill building and hands-on experiential learning. The supportive learning environment provided an opportunity to develop new friendships and foster inclusive cooperation.





What changes do Master Gardeners experience over time and does this vary by demographic characteristics?

The current study answered this question through the collection of pre-post quantitative survey data and post focus group interview data. The survey results are presented first followed by the focus group interview results.

Following participation in the MGVP, significant improvements were evidenced via the pre and post survey for participants in the areas of wellbeing, skill development and participation. There were significant changes in the average scores reported for psychological distress (from baseline to 6 months, and baseline to 18 months), whereby at entry the average score indicated a “mild mental disorder” yet at 6 months and 18 months this rating was no longer applicable for the average score.

Self-reported gardening skills (from baseline to 6 months), self-reported gardening advice to others (from baseline to 6 months), and participation in employment, education and volunteering (from baseline to 18 months) also evidenced significant improvements.

It is encouraging that significant improvements were witnessed in these areas. In addition to understanding the impact of the MGVP on participants, it is helpful to understand which participants are most likely to receive the most substantial benefits from the MGVP. Those participants under 55 years reported significant improvements in satisfaction with personal health (from baseline to 12 months), psychological distress (from baseline to 12 months) and self-reported skills (from

baseline to 12 months, and from baseline to 18 months). Participants with disability or long-term impairment reported significant improvements in satisfaction with personal health (from baseline to 12 months) and psychological distress (from baseline to 6 months, from baseline to 12 months, from baseline to 18 months). Finally, those born in Australia and New Zealand reported significant improvements in participation in employment, education and volunteering (from baseline to 18 months). Unfortunately, participants over 55 years reported less satisfaction with their personal health and more psychological distress at 12 months compared to baseline which requires further consideration. It could be, however, that the impact of COVID-19 and the subsequent lockdown which occurred just before this period was felt more significantly by older people.

The focus group interview data complemented and extended the survey results. Similarly, focus group participants confirmed that their wellbeing had improved in the form of psychological empowerment; as well as an improved skill in gardening and increased participation in volunteering, employment and education. The most salient theme identified in the focus groups was the enhanced sense of social cohesion. More specifically, participants highlighted that their participation in the MGVP increased community building, their contribution to society and cultural awareness. Finally, focus group participants reported that communication and social skills were developed through the MGVP.



What aspects of the MGVP are most enjoyable and helpful?

One of the most enjoyable aspects for participants was the experiential and relational nature of the learning environment. The intertwined nature of theory and practice was perceived as a helpful component of the program. The opportunity to gain theoretical knowledge and put this into practice appears to be critical for supporting participants to continue gardening activities beyond the program. Participants specifically acknowledged the course facilitators' endeavours to address the wide variety of learner needs and interests. They also made considerable reference to the facilitators' desire to create an inclusive environment during the program. The facilitators' commitment to delivering quality programs were applauded by the majority of participants and undoubtedly enriched the experience. These exemplary efforts were repeatedly mentioned as key features of the program and are crucial to ongoing success when working with diverse communities with a range of learning needs.

Focus group interviews provided insight into program elements that assisted in facilitating the improvements reported by participants. The program qualities most conducive to supporting change in wellbeing were the practical, therapeutic garden activities, relational skills and observable accomplishments. Social cohesion was facilitated through the creation of a physical garden space in the community and bringing diverse community members together. The salient program elements critical to change in skill development included the hands-on learning and positive interpersonal opportunities provided when learning, gardening

and sharing with other community members. Finally, transferrable content, practical learning and experience, and facilitating contact with community agencies were helpful in achieving change in formal and informal employment and education changes. Collectively these findings clearly indicate how the MGVP enriched and transformed the lives of many participants.

What aspects of the MGVP could be improved?

Overall, there was consensus amongst participants that involvement in the MGVP was a positive and beneficial experience. Although participants and stakeholders did offer insights into several areas with room for improvement. For some participants, the theory or written content was challenging. They articulated a strong desire for an extended length of the program to accommodate the expansive content, given the demographic background of participants this is an important finding. External administration barriers linked to TAFE could be addressed to encourage greater buy-in and support for the MGVP. Considering the reach and implications of MGVP beyond the direct program experience, a deep desire was expressed for greater community engagement such as parents with children and schools, and ongoing or follow-up support from facilitators or community agencies to improve the effectiveness of the program. Further, a key finding to improve the program benefits is related to pathways, building in opportunities to assist community members to take steps toward both informal and formal education and work was strongly expressed by participants and stakeholders.



How can more Master Gardeners be recruited?

Given the promising benefits for Master Gardeners found in this study, implementing successful recruitment strategies for future programs is paramount. The following ideas were put forward as solutions to recruiting more gardeners: start a podcast; increase social media presence (Facebook pages, groups and live videos); create websites with a community focus; attend community meetings in their local areas; canvas schools, pre-schools and stay-at-home parent groups; hold more events at existing gardens; past participants become a megaphone for the program and utilise 'word of mouth' more frequently; and finally construct flyers for distribution.

What has been the impact of COVID-19?

Participants took advantage of the limitations imposed by COVID-19 restrictions and welcomed the opportunities afforded by the MGVP to engage online. However, the reality for many participants is that digital inaccessibility prevented them from continuing to engage in the program online when COVID-19 restrictions were in place and they were desperate to get back into the garden to experience all of its benefits. COVID-19 impacted on their perceptions of food security, this did in fact confirm for some participants the importance of growing their own produce. Notwithstanding the life stressors imposed by COVID-19, participants reported that their experience in the MGVP enabled them to continue to engage in gardening and grow their own food, and (for those with digital access) connect with people.

How do the results derived from the MGVP differ to those derived from the Community Greening Program?

A comparison of the current findings with the results of the previous study conducted with the Community

Greening program (Truong et al., 2018) provides valuable insights into the unique contributions of the specialised MGVP. The most notable difference witnessed is the capacity of the MGVP to improve the employment, education and volunteering participation of Master Gardeners (as revealed in both the survey and focus group results) where this shift was not evident in the Community Greening program results. This may be attributed to the inclusion of the 6-day TAFE certificate, being mindful that the MGVP participants were also a younger cohort where this outcome is more malleable to change.

Improvements in social cohesion were evident in both studies, although moreso in the Community Greening program where this improvement was also evident in the pre and post surveys. The participants in the Community Greening program reported relatively low participation in community gardens prior whilst participants in the MGVP mostly had prior familiarity in the Community Greening program. It is hypothesised that, although both contribute to social connection, with the MGVP largely serving established community gardeners, the significant improvements in social connection appear when people first encounter Community Greening.

Interestingly, a common finding across both programs was that older participants report a lower satisfaction with their personal health after participating in either program. It could be that prior, they perceive their health to be adequate yet when faced with the reality of gardening, they realised their physical limitations. This did not occur for younger participants.

Finally, it is important to consider the participants across both programs varied whereby those in the MGVP were younger, more likely to be female, and a larger portion identified as Aboriginal or Torres Strait Islander.

RECOMMENDATIONS

In consideration of the project findings, the following recommendations are presented:

First and foremost, the MGVP is highly valued by participants and stakeholders, and there is evidence of significant benefits for participants. The survey pre-post results indicate significant improvements in the areas of wellbeing (reduced psychological distress), skill development (increased skill in gardening and providing gardening advice to others), and participation (increased hours in employment, education and/or volunteering). The focus group interviews indicate improvements in the areas of wellbeing, skill development and participation, and most prominently, social cohesion. As such, it is recommended that the MGVP be expanded to support more individuals and communities.

Future program development and delivery should recognise that the primary need of participants upon entry, on average, is reduced wellbeing where participants report low perceived health and high psychological distress; as well as low participation in employment, education and/or volunteering. It is encouraging that these initial challenges improved for participants, on average, overtime. RBGDT could review the MGVP program logic to audit the resources, referral pathways, curriculum and pedagogy to ensure these needs are prioritised in program design.

The MGVP appeared to benefit particular groups of people (e.g. those under 55 years, those with disability) moreso than their counterparts (especially those over 55

years). RBGDT could consider the possible differentiation of goals and program aspects for diverse participants, particularly across the age groups.

Findings suggest that future program delivery continues to ensure a balance between the theory or classroom and practical components, although it is necessary to be aware that the workbook and classroom activities may still be too challenging for a portion of participants. Enabling participants to put theoretical knowledge into practice as much as possible in their community should remain a primary focus of the program. Continued commitment to employing quality staff that prioritise rapport building and diverse learner needs will ensure the ongoing success in coming years.

Continuing to embed hands-on learning activities in whatever capacity possible at all locations is certainly a strong suggestion emanating from the research findings. Embodied learning and outdoor activities must be an enduring component of future programs. Findings advocate for learning to remain tangible and real throughout the program design, implementation and delivery.

It is crucial that creating a garden from the ground up continues to be the foci for facilitating personal and group transformation in future programs. The physical nature of the garden became an incubator for changes in participants' sense of competence, self-belief structures and social connectedness.





Recommendation for improvements

Given the quantitative and qualitative results clearly indicated improvements in participation, both formal and informal work and education, putting effort into creating legitimate pathways into employment and work should be a key priority of future program design, implementation and delivery. It was obvious from participant insights that assistive program elements were those that facilitated more direct links to volunteering or paid work opportunities. This relates to another area of improvement, TAFE barriers, working with TAFE to dovetail into formal courses may overcome some of the barriers associated with TAFE buy-in and strengthen the success of the program to improve education and employment outcomes.

For those sites where checking back with participants and communities was present, this positive quality continued the momentum of the gardening activities. Those sites that did not have the opportunity for follow-up would have benefited from this ongoing support. RBGDT could consider the possibility of building in ongoing support, this may be connected to the

employment pathways strategies that are developed.

Holding celebratory events with successful graduates in their newly constructed gardens will help showcase to the broader community the beneficial nature of the MGVP. This in itself will become infectious and attract future buy-in from the broader community such as schools, single parent groups. Further, the use of online platforms to leverage multiple audiences and raise awareness of the valuable nature of these programs is a consideration for future MGVP promotion strategies.

Finally, further research employing a larger sample size, and a more rigorous design utilising a comparison group is warranted. Similarly, conducting such a study without the disruption of COVID-19 would provide a more reliable assessment of impact. This research would bolster the evidence-based user-led development of the MGVP but also extend knowledge nationally and internationally given the dearth of research investigating the benefits for Master Gardeners and preferences for the delivery of the program.

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APPENDIX

Appendix Table 1. Perceived personal health, perceived community connectedness and psychological distress at baseline by demographic characteristics.

Characteristics	Perceived personal health		Perceived community connectedness		Psychological distress	
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Age group						
Less than 55 years	64.12 (21.66)	0.293	67.50 (25.47)	0.001**	23.00 (7.47)	0.099
+55 years	69.22 (22.73)		80.95 (19.73)		20.79 (7.75)	
Gender						
Female	65.67 (22.76)	0.830	74.00 (24.08)	0.209	22.28 (7.41)	0.918
Male	64.15 (20.64)		67.31 (24.58)		22.01 (8.67)	
Aboriginal or Torres Strait Islander						
Yes	63.21 (20.19)	0.290	65.71 (24.86)	0.044*	24.75 (7.26)	0.010*
No	68.11 (22.52)		75.49 (22.78)		20.70 (7.56)	
Highest completed school level (n = 149)						
Year 10 or equivalent	67.19 (22.67)	0.750	73.65 (24.18)	0.363	20.97 (8.18)	0.607
Less than 10 completed	68.67 (21.93)		78.00 (19.01)		20.13 (6.83)	
Any carer responsibility						
Yes	59.17 (23.10)	0.031*	72.78 (27.53)	0.998	23.71 (8.00)	0.168
No	68.23 (22.05)		72.77 (23.06)		21.67 (7.88)	
Disability or long-term impairment						
Yes	52.22 (20.98)	<0.001***	69.13 (24.48)	0.141	25.57 (6.95)	<0.001***
No	72.56 (19.80)		75.73 (24.04)		19.77 (7.25)	
Country of birth						
Australia and NZ	63.81 (21.99)	0.042*	67.39 (23.63)	<0.001***	22.65 (9.02)	0.009**
Not Australia or NZ	71.00 (22.37)		83.67 (20.49)		19.15 (6.99)	

Appendix Table 2. Self-reported skills, general self-efficacy and self-reported participation at baseline by demographic characteristics.

Characteristics	Self-reported skills		General self-efficacy		Self-reported participation	
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Age group						
Less than 54 years	13.94 (3.23)	0.844	30.87 (5.11)	0.001**	13.95 (16.38)	<0.001***
+55 years	14.05 (2.94)		29.33 (6.82)		6.02 (8.07)	
Gender						
Female	13.98 (3.17)	0.589	29.90 (6.16)	0.209	10.17 (13.87)	0.204
Male	14.35 (2.65)		31.54 (5.09)		14.23 (16.86)	
Aboriginal or Torres Strait Islander						
Yes	13.36 (2.93)	0.318	29.96 (5.33)	0.044*	13.50 (14.35)	0.147
No	14.01 (3.16)		30.62 (6.08)		9.29 (13.78)	
Highest completed school level						
Year 10 or equivalent	14.02 (3.07)	0.405	30.01 (7.17)	0.363	9.28 (13.33)	0.329
Less than 10 completed	13.47 (3.77)		29.23 (7.57)		12.08 (16.08)	
Any carer responsibility						
Yes	13.94 (3.71)	0.973	30.19 (7.15)	0.998	10.36 (15.01)	0.868
No	13.96 (2.98)		30.19 (5.82)		9.93 (13.41)	
Disability or long-term impairment						
Yes	13.28 (3.09)	0.046*	28.80 (5.94)	0.141	9.99 (15.67)	0.573
No	14.41 (3.04)		31.01 (5.99)		11.51 (14.06)	
Country of birth						
Australia and NZ	13.75 (3.01)	0.243	29.16 (6.89)	<0.001***	11.70 (14.82)	0.016*
Not Australia or NZ	14.33 (3.29)		30.83 (7.59)		6.52 (10.13)	

Appendix Table 3: Analysis of the changes in the self-reported wellbeing, skill development, participation and social cohesion of the study participants

Self-reported needs			n1	Diff1 (SD)	P-value			n2	Diff2 (SD)	P-value			n3	Diff3 (SD)	P-value
Perceived satisfaction with personal health	66.25 (24.19)	66.25 (21.81)	32	0.00 (14.59)	0.500	69.23 (26.91)	80.00 (12.25)	13	-10.77 (28.71)	0.899	72.00 (21.45)	74.67 (15.52)	15	-2.27 (19.07)	0.702
Perceived satisfaction with community connectedness	74.37 (24.08)	73.75 (21.96)	32	0.62 (20.15)	0.862	63.84 (26.63)	80.00 (17.78)	13	-16.15 (32.54)	0.099	80.00 (23.90)	71.33 (21.99)	15	8.67 (18.07)	0.085
Psychological distress	22.22 (7.40)	19.59 (6.80)	32	2.63 (6.58)	0.031*	20.46 (8.17)	16.31 (5.86)	13	4.15 (9.60)	0.072	22.65 (7.77)	19.25 (7.36)	16	3.40 (5.71)	0.031*
Self-reported total skills	13.81 (3.12)	15.44 (3.22)	32	-1.62 (2.21)	0.999	14.00 (3.11)	15.08 (1.89)	13	-1.08 (2.46)	0.929	13.75 (3.17)	14.44 (2.19)	16	-0.69 (2.36)	0.869
Social skills	4.00 (0.95)	4.16 (1.05)	32	-0.16 (0.72)	0.23	3.77 (1.09)	4.00 (0.71)	13	-0.23 (0.83)	0.832	3.75 (1.12)	3.87 (0.88)	16	-0.12 (0.81)	0.728
Communication skills	3.84 (0.85)	3.97 (1.03)	32	-0.12 (0.75)	0.354	3.77 (1.17)	4.08 (0.64)	13	-0.31 (0.95)	0.264	4.00 (1.15)	4.00 (0.73)	16	0.00 (0.89)	0.999
Gardening skills	3.16 (0.92)	3.78 (0.94)	32	-0.63 (0.98)	0.001***	3.38 (0.77)	3.84 (0.80)	13	-0.46 (1.05)	0.139	3.22 (0.98)	3.37 (0.72)	16	-0.16 (0.85)	0.474
Giving gardening advice	2.81 (1.18)	3.53 (1.14)	32	-0.72 (0.96)	<0.001***	3.08 (0.95)	3.15 (0.90)	13	-0.08 (0.86)	0.753	2.78 (1.14)	3.19 (0.75)	16	-0.41 (1.50)	0.295
General self-efficacy	30.84 (6.02)	31.34 (4.54)	32	-0.50 (4.65)	0.547	28.92 (6.06)	31.00 (2.77)	13	-2.08 (4.78)	0.144	29.75 (6.85)	31.62 (5.20)	16	-1.87 (7.05)	0.304
Total participation hours for last week	6.82 (11.00)	10.33 (7.37)	32	-3.50 (15.73)	0.217	8.31 (12.03)	8.92 (12.34)	13	-0.62 (9.82)	0.825	7.25 (7.42)	15.00 (15.11)	16	-7.75 (12.61)	0.027*

Diff1: mean difference between baseline and six months follow-up; Diff2: mean difference between baseline and 12 months follow-up; Diff3: mean difference between baseline and 18 months follow-up; P for interaction: P-value for differences in the effect of a characteristics

Appendix Table 4: Linear mixed effect regression analysis on the influence of demographic factors on perceived satisfaction on personal health

Characteristics	Personal health		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	0.292	0.002**
+55 years	3.99 (-3.40, 11.38)		
<55 years age group			
Baseline	Ref		
6 months	2.52 (-5.29, 10.34)	0.527	
12 months	47.21 (25.79, 68.64)	<0.001***	
18 months	3.64 (-16.21, 23.49)	0.720	
+55 years age group			
Baseline	Ref		
6 months	-12.54 (-26.05, 0.96)	0.071	
12 months	-45.43 (-70.26, -20.59)	<0.001***	
18 months	6.41 (-16.32, 29.14)	0.581	
Gender			
Female	Ref	0.823	0.900
Male	-1.06 (-10.35, 8.23)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.207	0.424
No	4.91 (-3.87, 13.70)		
Highest completed education			
10 completed or higher	Ref	0.710	0.800
Less than 10 completed	1.43 (-7.23, 10.08)		
Any career responsibility			
Yes	Ref	0.021*	0.745
No	9.32 (1.47, 17.16)		
Disability or long-term impairment			
Yes	Ref	<0.001***	0.035*
No	20.25 (13.11, 27.39)		
Disability or long-term impairment [==Yes]			
Baseline	Ref		
6 months	5.18 (-4.39, 14.75)	0.290	
12 months	27.53 (12.83, 42.22)	<0.001***	
18 months	20.15 (0.162, 40.14)	0.049	
Disability or long-term impairment [==No]			
Baseline	Ref		
6 months	-10.60 (-23.77, 2.56)	0.116	
12 months	-28.14 (-50.21, -6.06)	0.013*	
18 months	-13.92 (-37.14, 9.31)	0.242	
Country of birth			
Australia and NZ	Ref	0.034*	0.711
Not Australia or NZ	7.18 (0.57, 13.79)		

Appendix Table 5: Linear mixed effect regression analysis on the influence of demographic factors on psychological distress

Characteristics	Personal health		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	0.951	0.009**
+55 years	-0.67 (-3.52, 2.18)		
<55 years age group			
Baseline	Ref		
6 months	-2.38 (-5.81, 1.05)	0.177	
12 months	-17.53 (-23.88, -11.8)	<0.001***	
18 months	-4.76 (-9.53, 0.01)	0.053	
+55 years age group			
Baseline	Ref		
6 months	-0.39 (-6.03, 5.26)	0.893	
12 months	12.24 (5.30, 19.18)	<0.001***	
18 months	1.50 (-4.27, 7.26)	0.612	
Gender			
Female	Ref	0.877	0.956
Male	-0.19 (-3.41, 3.04)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.009**	0.373
No	-4.04 (-7.03, -1.05)		
Highest completed education			
10 completed or higher	Ref	0.596	0.901
Less than 10 completed	-0.83 (-3.93, 2.26)		
Any career responsibility			
Yes	Ref	0.158	0.784
No	-2.04 (-4.87, 0.79)		
Disability or long-term impairment			
Yes	Ref	0.001**	<0.001***
No	-5.87 (-8.44, -3.31)		
Disability or long-term impairment [==Yes]			
Baseline	Ref		
6 months	-6.76 (-9.94, -3.58)	<0.001***	
12 months	-8.71 (-13.78, -3.63)	<0.001***	
18 months	-7.85 (-14.52, -1.19)	0.022*	
Disability or long-term impairment [==No]			
Baseline	Ref		
6 months	7.79 (3.40, 12.17)	<0.001***	
12 months	10.27 (2.64, 17.91)	0.009**	
18 months	5.35 (-2.45, 13.15)	0.181	
Country of birth			
Australia and NZ	Ref	0.007	0.359
Not Australia or NZ	-3.50 (-6.00, -1.00)		

Appendix Table 6: Linear mixed effect regression analysis on the influence of demographic factors on general self-efficacy

Characteristics	Personal health		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	0.520	0.093
+55 years	-1.50 (-3.53, 0.54)		
Gender			
Female	Ref	0.251	0.760
Male	1.63 (-0.84, 4.10)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.487	0.898
No	0.66 (-1.67, 2.98)		
Highest completed education			
10 completed or higher	Ref	0.641	0.828
Less than 10 completed	-0.78 (-3.52, 1.97)		
Any career responsibility			
Yes	Ref	0.973	0.650
No	0.01 (-2.12, 2.12)		
Disability or long-term impairment			
Yes	Ref	0.039*	0.160
No	1.97 (0.13, 4.26)		
Country of birth			
Australia and NZ	Ref	0.140	0.847
Not Australia or NZ	1.66 (-0.43, 3.75)		

Appendix Table 7: Linear mixed effect regression analysis on the influence of demographic factors on perceived satisfaction with community connectedness

Characteristics	Personal health		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	0.001**	0.135
+55 years	13.54 (5.86, 21.23)		
Gender			
Female	Ref	0.280	0.786
Male	-6.78 (-16.96, 3.39)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.022*	0.963
No	9.80 (0.63, 18.96)		
Highest completed education			
10 completed or higher	Ref	0.437	0.871
Less than 10 completed	4.30 (-4.85, 13.45)		
Any career responsibility			
Yes	Ref	0.888	0.059
No	0.02 (-8.54, 8.57)		
Disability or long-term impairment			
Yes	Ref	0.303	0.416
No	6.76 (-1.73, 15.26)		
Country of birth			
Australia and NZ	Ref	<0.001***	0.171
Not Australia or NZ	16.27 (9.42, 23.12)		

Appendix Table 8: Linear mixed effect regression analysis on the influence of demographic factors on self-reported skills

Characteristics	Self-reported skills		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	0.685**	0.028*
+55 years	0.11 (-0.95, 1.16)		
<55 years age group			
Baseline	Ref		
6 months	1.09 (-0.14, 2.32)	0.084	
12 months	3.02 (1.11, 4.93)	0.002**	
18 months	1.97 (0.55, 3.38)	0.007**	
+55 years age group			
Baseline	Ref		
6 months	1.57 (-0.56, 3.69)	0.151	
12 months	-2.32 (-4.57, -0.08)	0.044*	
18 months	-1.41 (-3.12, 0.29)	0.107	
Gender			
Female	Ref	0.695	0.884
Male	0.36 (-0.94, 1.67)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.302	0.925
No	-0.55 (-1.81, 0.71)		
Highest completed education			
10 completed or higher	Ref	0.369	0.965
Less than 10 completed	-0.83 (-3.93, 2.26)		
Any career responsibility			
Yes	Ref	0.894	0.858
No	0.02 (-1.11, 1.15)		
Disability or long-term impairment			
Yes	Ref	0.179	0.076
No	1.15 (0.07, 2.24)		
Country of birth			
Australia and NZ	Ref	0.169	0.649
Not Australia or NZ	0.57 (-0.37, 1.52)		

Appendix Table 9: Linear mixed effect regression analysis on the influence of demographic factors on self-reported participation

Characteristics	Self-reported participation		P-value for interaction
	B (95% CI)	P-value	
Age group			
Less than 54 years	Ref	<0.001***	0.691
+55 years	-7.79 (-12.30, -3.29)		
Gender			
Female	Ref	0.297	0.350
Male	3.98 (-2.50, 10.46)		
Aboriginal or Torres Strait Islander			
Yes	Ref	0.143	0.165
No	-4.21 (-9.88, 1.46)		
Highest completed education			
10 completed or higher	Ref	0.440	0.832
Less than 10 completed	2.80 (-2.79, 8.40)		
Any career responsibility			
Yes	Ref	0.993	0.390
No	-0.42 (-5.69, 4.86)		
Disability or long-term impairment			
Yes	Ref	0.477	0.909
No	1.46 (-4.05, 6.97)		
Country of birth			
Australia and NZ	Ref	0.003**	0.040*
Not Australia or NZ	-5.17 (-9.51, -0.84)		
Country of birth [==Australia and NZ]			
Baseline	Ref		
6 months	2.86 (-2.33, 8.05)	281	
12 months	-0.51 (-7.63, 6.61)	0.888	
18 months	16.10 (7.79, 24.42)	<0.001***	
Country of birth [==Not Australia and NZ]			
Baseline	Ref		
6 months	-3.81 (-13.07, 5.45)	0.421	
12 months	-1.31 (-19.26, 16.63)	0.886	
18 months	-17.31 (-29.23, -5.38)	0.005**	



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