

‘Earth community’: The significance community gardens have for
participants and environmental knowledge

Biodiversity Management - Masters by Research Thesis

By Courtney Rogers

September 2023

Word count – 14,458

Abstract

Previous research suggests that community gardens have a multitude of wellbeing benefits for participants, including that of social, physical and mental wellbeing. Research also suggests that community gardens educate participants on not just gardening, but also environmental issues. Negative wellbeing is a growing concern within the UK, with the number of suicides rising in the last few years. Additionally, more people need to be educated about the impact of climate change on the environment. The current study investigated community gardens in the UK, their significance to participants and whether attendance to a community garden positively contributes to an increase in environmental knowledge. A secondary aim of the study was to understand whether a community garden could be defined as an 'earth community', supporting individual wellbeing, human-human relationships, human-environment relationships and nature/wildlife communities. The study consisted of a research observation of a community garden (Kent Community Oasis Garden; KCOG), a preliminary interview with 14 participants from KCOG, and a self-report questionnaire completed by 95 participants from 46 community gardens around the UK. Out of the 95 respondents, 58 identified as female, 34 as male and 3 as non-binary. The most common age group of the participants was 65-74 years old (26 out of 95 respondents), with the age of the respondents ranging from 18-84. The majority of the 95 participants were retired (36 participants), 31 were employed, 9 were students, 5 were unemployed and 4 had other commitments. When the participants were asked if they feel they struggle with their mental health, 56 out of 95 participants responded no, 36 responded yes and 3 preferred not to say. This study discovered that community gardens positively affect participant wellbeing, specifically through physical gardening, socialising and connection to nature. There was also an increase in subjectively ranked environmental knowledge regarding four main subjects: conservation, sustainability, wildlife and gardening. Furthermore, when dividing the data into participants who feel they struggle with their mental health and participants who do not, there was a difference in importance regarding the top-ranked reason of attendance to the community garden. This study determined that those who reported struggles with their mental health ranked 'mental health' as the top reason for attendance. This information could be used to understand how important community gardens are for people who feel they struggle with their mental health. Overall, these findings provide evidence that community gardens have a multitude of benefits. Future research should measure the extent to which community gardens increase environmental knowledge to determine the role of community gardens in the education of environmental issues, as well as investigate the extent of the importance of community gardens specifically for people who struggle with their mental health.

Keywords – community garden, earth community, wellbeing, knowledge, conservation, sustainability, wildlife, environment, gardening

Table of Contents

Chapter 1 – Introduction	5
Green spaces, wildlife and conservation	5
Community Gardens	8
Wellbeing	13
Chapter 2 – Methodology.....	17
Aims and objectives of this study.....	17
Hypothesis.....	17
Observations and Interviews	17
Questionnaire	18
Data analysis	19
Chapter 3 – Results and Discussion	20
What are the reasons participants attend their community garden?	20
What activities keep participants attending their community garden?	23
How do participants feel after attending their community garden in relation to wellbeing?.....	26
Does participation in the garden give individuals a better understanding of the importance of wildlife, conservation and sustainability?.....	29
How do participants view conservation and sustainability?	30
Other important findings	33
Chapter 4 – Conclusion	35
Chapter 5 – References	37
Chapter 6 – Appendix	43
Tables	43
Interview guide.....	45
Questionnaire	46

Figures and Tables

Figure 1 – A histogram representing the reasons participants attend their community garden	21
Figure 2 – A histogram representing the top-ranked reasons why participants attend their community garden	22
Figure 3 – A histogram representing the reasons participants indicated that they struggle with their mental health attend at their community garden	23
Figure 4 – A histogram representing the activities participants enjoyed at their community garden	24
Figure 5 – A histogram comparing enjoyed activities of adult and older adult participants	24
Figure 6 – A histogram comparing enjoyed activities of male and female participants.....	25
Figure 7 – A histogram representing the top-ranked most enjoyed activities participants chose for their community garden.....	26
Figure 8 – A histogram representing feelings of participants before, during and after attending their community garden.....	27
Figure 9 – A histogram representing feelings of participants who indicated that they struggle with their mental health, before, during and after attending their community garden	28

Figure 10 – A pie chart representing themes from the words used to describe the atmosphere within community gardens	29
Figure 11 – A histogram representing participant rated knowledge before and after joining a community garden in relation to: wildlife, conservation, sustainability and gardening	30
Figure 12 – A histogram representing male and female views on the importance of conservation	31
Figure 13 – A histogram representing male and female views on the importance of sustainability	31
Figure 14 – A histogram representing adult and older adult views on the importance of conservation	31
Figure 15 – A histogram representing adult and older adult views on the importance of sustainability	31
Table 1 – A table representing Kolmogorov-Smirnov test results regarding male, female, adult and older adult views on conservation and sustainability	32
Table 2 – A table representing Mann-Whitney U test results regarding male/female and adult/older adult views on conservation and sustainability	32
Table 3 – A table representing Mann-Whitney U mean rank results regarding male/female and adult/older adult views on conservation and sustainability	32
Table 4 – A table representing participant rated questionnaire statements.....	33

Acknowledgements

I would like to thank Kent Community Oasis Garden for welcoming me into their garden, which helped tremendously with this project, along with all of the community gardens whom participated in the questionnaire. I would also like to thank my friends, family and partner for ongoing support throughout my studies. Finally, I would like to thank Dr Rajindra Puri and Dr Joseph Tzanopoulos for supervising my project and advising me throughout.

Introduction

Green spaces, wildlife and conservation

Nature, wilderness and green spaces

Green spaces are becoming a popular topic for research, especially regarding wellbeing. However, many studies do not define their interpretation of a green space (Taylor & Hochuli, 2017; McIntyre et al., 2000). This could be due to academic anthropologists and scientists' ongoing argument on how to define nature and how humans engage with nature/wilderness (Ellen, 2020). There is a common misconception about the divide between nature and humans. The words 'nature' and 'wilderness' are often seen as 'pure' areas that should not be changed by humans (Cronon, 1996). If anthropogenic change does occur, then it could be seen as unnatural and therefore nature/wilderness has no place for humans (Cronon, 1996). This, however, is not the case, human involvement within natural environments is often good and needed for conservation (Cronon, 1996). Nature lives all around us, humans are part of nature, even in towns and houses there are often wild/green areas close to home, such as gardens and ponds (Cronon, 1996). Green areas are seen as beneficial to wildlife and humans whether un-cultivated or cultivated anthropogenic environments (Lai et al., 2019; Anguluri & Narayanan, 2017). Green areas can consist of conserved areas, parks, gardens, forests, woodlands, coastal areas, remnant patches of native vegetation and patches of vegetation within modern or historically built environments (Lai et al., 2019; Taylor & Hochuli, 2017). Non-green spaces are areas in which green spaces do not occur, urban areas such as cities sometimes do not have any green spaces incorporated within them (Ventriglio et al., 2020).

Urban areas and green spaces

Urbanisation is rapidly increasing worldwide as the human population grows; by 2050, it is predicted that 68% of the world's population will live in urban areas (United Nations, 2018). Due to the increase in urbanisation, there are changes in species richness and species composition; the lowest species richness is found in the urban core (McKinney, 2002). There are two main reasons that green spaces should be incorporated within urban areas: local wildlife conservation and the preservation of human-wildlife experiences (Goddard et al., 2010). Wildlife conservation is crucial for the survival of the world's biodiversity system (Zhou et al., 2016). Wildlife conservation is not only about conserving animals and wildlife in their natural environment anymore; due to the future of urbanisation, urban areas must consider local conservation and include areas for wildlife and biodiversity to live alongside the human population (Anguluri & Narayanan, 2017). Introducing green spaces in urban areas has been found to help the local wildlife and biodiversity (Anguluri & Narayanan, 2017). Another positive impact of urban green spaces is the effect that human-wildlife encounters have on individuals. Wildlife encounters and green spaces have been found to have four types of human-wildlife wellbeing experiences: social, immersive, symbolic and achievement-oriented (Bell et al., 2017). For those looking to connect with others, green spaces provide a social setting that encourages interaction and community building (social) (Bell et al., 2015). Others may seek the immersive qualities of green spaces, losing themselves in the peaceful tranquillity of nature (immersive) (Bell et al., 2015). Some may find personal significance in the cultural or symbolic representations of green spaces (symbolic), while others may utilize them to reach personal goals such as physical exercise or

mental well-being (achievement-oriented) (Bell et al., 2015). These four connections with nature are known to positively affect the wellbeing of individuals, specifically through pleasure and enjoyment (Bell et al., 2017). This highlights that more green spaces are needed in urban areas, particularly in the upcoming years, for the future preservation of wildlife and the positive wellbeing aspects for individuals living in urban settings.

The importance of wildlife on wellbeing

The opportunity to have direct contact/interactions with wildlife and plants could become more difficult and less common, with the leading causes of this decline being urbanisation and biodiversity loss (Miller, 2005). Other reasons for reduced engagement with nature include technological advancements and sedentary pastimes (television and computer games) (Soga & Gaston, 2016). The loss of wildlife and plants in individuals' lives negatively affects their wellbeing and can affect their emotions toward nature, including their interest to care, protect and love natural areas and wildlife (Bell et al., 2017; Soga & Gaston, 2016). Research suggests that more involvement with nature, such as hiking or fishing, positively influences pro-environmental behaviours and has made individuals more environmentally conscious (Nord et al., 1998). To support both biodiversity conservation and individual wellbeing, the areas where individuals live should include opportunities for meaningful interactions with nature (Miller, 2005). This will not only help local biodiversity thrive but also could help enhance local wellbeing, especially in an urban setting.

Sustainability and its importance

The United Nations defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Even with this definition dating back to 1987, it is still used today by the United Nations to define sustainability (Resolution, 2015; United Nations, 2022). This led to the development of a program to help meet the goals required to enable the world to be sustainable. This program is called the sustainable development goals (or SDG's), which is comprised of 17 objectives that highlight “peace and prosperity for people and the planet, now and into the future” (Resolution, 2015). Each year the United Nations release a report explaining the progress and future goals. There is still a long way to go to complete these goals as explained in the most recent report; COVID-19 alone has erased years of progress (United Nations, 2022). Sustainability has not always been related to environmental issues; this association only started during the 1970s (Giovannoni & Fabietti, 2013). Conservation is related to sustainability through maintaining and preserving natural resources (Kuhlman & Farrington, 2010). If the needs of the current generation are not met sustainably, then the needs of future generations will be compromised (Giovannoni & Fabietti, 2013). Sustainable actions can be completed on a broad scale, and they can also be completed locally (Leach et al., 2012). Urban agriculture has become more popular since COVID-19 due to the difficulty of accessing shops and the shortage of products on the shelves (Khan et al., 2020). Certain urban agricultural practices, such as home-grown fruit and vegetables, became a popular hobby during COVID-19. Such practices are sustainable and reduce an individual's carbon footprint while allowing access to fresh food (Khan et al., 2020).

Conservation and its importance

Five decades ago (1972 Sweden, 82 in Nairobi, 92 Rio), the first Earth summit was held with most of the world's nations to discuss how humans' actions were destroying the global environment, threatening ecosystems and species (Cardinale et al., 2012). There are many causes of biodiversity and ecosystem loss, some of which are habitat loss – due to urbanisation or, deforestation, pollution, invasive species and wildlife trade (Symes et al., 2018); all of these causes are due to human actions. Conservation is essential for the future of not only wildlife but also future generations of humans. The Oxford Dictionary defines conservation as “the act of preventing something from being lost, wasted, damaged, or destroyed” (Oxford Dictionary, 2023). The word conservation can be used not only regarding nature but also with buildings and other forms of cultural heritage (Azizi et al., 2016). Another definition of conservation, which relates solely to nature, is “actions that are intended to establish, improve or maintain good relations with nature” (Sandbrook, 2015). This definition demonstrates that some acts of conservation require establishing new mitigating actions to counteract issues, whereas some acts of conservation require maintaining or improving the current presenting issue. Acts of conservation can be completed on large and small scales, and there are actions that each individual person can complete to help the conservation of their local natural environment.

Wildlife in gardens

Due to urbanisation, humans are encroaching onto areas which were once the habitats of wildlife. This is one of the reasons why there is ecosystem and biodiversity loss (Symes et al., 2018). One of the ways that humans can help conserve the local wildlife is to adapt their garden to support the wildlife around them (Holden & Abbott, 2023). A garden can be a ‘miniature ecosystem’ which can allow wildlife to thrive if it is maintained correctly; researching and putting in work to create a habitable area for local wildlife could help conserve wildlife and improve the mental wellbeing of the household (Holden & Abbott, 2023; Miller, 2005). In America, there is evidence that residential gardens support native threatened mammal species through access to vegetation (Van Helden et al., 2020). This can also be seen in the United Kingdom with bird species via access to bird boxes, bird feeders and water in residential gardens (Cannon, 1999; Holden & Abbott, 2023). At times, the global issue of biodiversity loss can seem overwhelming, and conservation can seem out of reach, especially to the average person. However, garden conservation is inclusive and allows anyone to participate in conservation on their own scale, which can make a meaningful contribution towards conserving biodiversity at large scales (Cannon, 1999; Holden & Abbott, 2023).

Gardening and conservation/sustainability

Gardens in urban areas not only conserve wildlife and biodiversity but they also help with localised sustainability (Holland, 2004; Holden & Abbott, 2023). Gardening is sustainable in many ways; it creates new ecosystem services and amenities, and encourages community building through food growth (Mancebo, 2018). Gardens can produce local organic food, reducing an individual's carbon footprint by using homegrown produce over supermarket produce (Mancebo, 2018). Another role of gardens in urban areas is reducing the effects of urban heat islands (Mancebo, 2018; Razwan et al., 2008). Urban heat islands are caused by concentrated urbanisation, so occur mainly within big cities (Mancebo, 2018). This is due to the amount of heat generated from large buildings and the amount of asphalt/pavements;

research suggests that heat levels in urban areas are much higher than in rural areas (Mancebo, 2018; Razwan et al., 2008). Therefore, reducing urban areas and creating more green spaces within cities could reduce the effect of urban heat islands, which will subsequently lower temperatures within cities and help mitigate climate change (Mancebo, 2018).

Education in gardening

Most learning within a garden, specifically a community garden, is informal and practical (Datta, 2016). Environmental knowledge can be gained at a community garden including knowledge on wildlife, conservation, sustainability, and gardening. Theoretically learning about pollination, for example, is one way of understanding nature; however, being within nature and witnessing a bee pollinate flowers provides a deeper and more practical level of understanding which demonstrates how vital individual species' roles are in nature (Datta, 2016). Research suggests that the addition of practical learning beyond theoretical learning is essential to enable a comprehensive understanding of the subject at hand (Entwistle, 1969). Furthermore, informally learnt knowledge in a community garden often occurs via intergenerational learning, whereby knowledge is shared and transmitted between generations (Hake, 2017). Intergenerational learning benefits both the younger and older generation in different ways; the older generation may feel proud of their contribution to the community, and the younger generation may experience increased self-esteem/confidence (Newman & Hatton-Yeo, 2008). As a result, all age groups feel more connected, valued, and respected by one another, which makes intergenerational learning a positive experience for all involved (Newman & Hatton-Yeo, 2008). Additionally, it has been found that there is high empathy development in relation to conservation and nature in informal environmental educational areas (Young et al., 2018). Empathy toward nature or a specific endangered species has been found to influence the likelihood of pro-environmental behaviours within individuals (Young et al., 2018). This demonstrates why individuals need access to green spaces and gardens, as they provide an area for informal learning and empathy development through intergenerational learning and individual observations.

Community gardens

What is a garden

The definition of a garden differs across a wide range of literature. The Oxford Dictionary defines a garden as “a piece of land next to or around your house where you can grow flowers, fruits, vegetables, etc., usually with a lawn” (Oxford Dictionary, 2023). However, the definition differs depending on the size of the garden and the function of it. Homegardens are defined as managed land usually adjacent to human dwellings, which often have borders of fencing, hedging or other materials (Huai & Hamilton, 2008; Finerman & Sackett, 2003). The term homegarden emphasises the domestic focus of a garden (Huai & Hamilton, 2008; Finerman & Sackett, 2003). Homegardens are known to be a type of agroecosystem with high biodiversity, complex structures and ecological sustainability (Huai & Hamilton, 2008; Finerman & Sackett, 2003). The origin of homegardens could be as early as prehistoric times when seeds were spread by hunters and gatherers, either on purpose or accidentally, around their camp sites (Soemarwoto, 1988). Some areas of the world rely on growing fresh fruit and

vegetables for food security and economic functions (Soemarwoto, 1988; Huai & Hamilton, 2008; Finerman & Sackett, 2003). Market gardening is a type of farm-garden that focuses on producing fresh fruits and vegetables on a small scale and is the sole source of income for some individuals (Reeves et al., 2013; Morel & Léger, 2016). This method of cultivation is often used by local farmers to provide locally grown, high-quality produce to their communities. The produce grown in market gardens is typically sold directly to consumers at farmers' markets, roadside stands, or through community-supported agriculture programs (Reeves et al., 2013).

Public gardens in the Western world have been around since the sixteenth century in Europe (Rakow, 2011). A public garden can include plant collections, buildings and infrastructure, and is usually managed by an organisation (Rakow, 2011). The modern purpose of public gardens is public enjoyment, with public gardens being an area for socialisation, relaxation, exercise, conservation and education (Rakow, 2011). Depending on the type of garden being referred to, gardens also have multiple functions and are not only a place to grow plants and food; they can be used as areas to socialise, relax or exercise (Buck, 2016). In summary, there is no singular definition of a garden as it depends on culture, the garden's function and size, and whether it is communal or private.

History

It is unknown when exactly the first 'garden' was created, however, horticulture, plant cultivation and gardens date back as far as domestication in the tropics (Piperno, 2011). The 'enclosure of outdoor space' dates back to 10,000 BC; this space, however, may not have been used as what we define as a 'garden' (Turner, 2005). The oldest known fruit and vegetable and domestic gardens were seen as early as 2920 BC in Egypt and were used for similar purposes as gardens today (Turner, 2005). Most historic gardens between 2000 BC and 1500 BC were found in Egypt; this included palace and temple gardens (Turner, 2005). Between 1500 BC and 500 AD, gardens were documented in Greece; including the hanging gardens of Babylon (600BC), this garden was created as a gift from the Babylonian King, Nebuchadnezzar II to his wife, the hanging gardens of Babylon is one of the seven ancient wonders of the Greek world (Brady, 2016). Between 600 AD and 1500 AD is when medieval gardens were documented (Turner, 2005; Thacker, 1979). During this time, there is evidence of herb gardens, flower and grass beds, trees, seats, moats, baths, dovecots and fishponds (Turner, 2005; Thacker, 1979). The first university botanical garden was created in Italy in 1545, and it wasn't until 1621 that one was built in Oxford, England (Thacker, 1979). These botanical gardens were specifically for the study and collection of plants. Between 1500 and the present time, there have been many garden developments and the literature suggests such developments are a continuous process (Turner, 2005; Thacker, 1979; Hadfield, 1985).

Allotments

An allotment is a garden, however, it is not the same as a garden attached to someone's private property (aka homegardens). Allotments are communal areas, however, they consist of rented sections of land in which individual plot holders typically grow fruit, vegetables, flowers and herbs (Wood et al., 2015; van den Berg et al., 2010). The first known allotment gardens in Europe date back to the 1800s, although there is evidence of their existence across the world prior to this (Irvine et al., 1999). During World War I and World War II, there was a spike in allotment gardens worldwide, including in the UK (Boswell, 1943; Bassett, 1979).

During this period, they were more commonly known as ‘victory gardens’, and were needed due to inadequate labour and lack of food supplies (Boswell, 1943; Bassett, 1979). In recent years, they have been used as more of a ‘want’ than a ‘need’ compared to the victory garden era; allotments are now seen as a creative, leisure and social activity (van den Berg et al., 2010; Crouch, 1993). The desire for allotment gardens has significantly increased since the 21st century: in 2011, the waiting list for an allotment plot in England totalled nearly 87,000 people and would have since likely increased as it changes by the day (Campbell & Campbell, 2011).

Community Gardens

Another garden that is similar to an allotment is a community garden. There are many definitions of community gardens, which is due to the uniqueness and varying size of each individual garden (Firth et al., 2011). Some are solely for gardening and producing fruit and vegetables either for personal consumption or to sell (Veen et al., 2015; Firth et al., 2011). When produce from a community garden is sold, it may be compared to a market garden. However, there are notable differences between the two. Market gardens are usually owned by a single person or a small group, and their main focus is on generating profits through selling produce (Reeves et al., 2013). On the other hand, community gardens are often not profit-oriented and are created and maintained by a group of people in a specific community. Thus, selling produce from a community garden is more about sharing the fruits of communal labour and less about making money (Reeves et al., 2013).

Some community gardens can contain wildlife and exist as more of a green space to support local wildlife and for the community to enjoy (Veen et al., 2015; Firth et al., 2011).

Community gardens originated in the early 1900s, however, the contemporary community garden movement started in the 1970s when they became much more common (Walter, 2013; Firth et al., 2011). Community gardens enable participants to connect to the living world and nature, and participants can also reap direct health benefits through the physical activity of gardening and access to fresh fruit and vegetables. Furthermore, community gardens offer a multitude of other benefits, including social, psychological, recreational, educational (Koay & Dillon, 2020; Keniger et al., 2013). Community gardens are not to be confused with communal gardens, which usually aren’t tended to by the people who have access to them, but rather just enjoyed by them, whereas the main purpose of a community garden is for the participants to tend to the garden (Butenschön & Säumel, 2011; Firth et al., 2011).

Communal gardens can be public (such as a public park) or private (for local residents or clubs) (Butenschön & Säumel, 2011).

Allotments vs Community Gardens

Allotments and community gardens differ in a few ways. They both allow the user to grow plants, fruit and vegetables; however, in an allotment, each user has sole use rights to a plot of land (Firth et al., 2011). In contrast, a community garden is a public/private garden where all participants have equal use rights, though there may be managers or organisers that have ultimate responsibility or oversight (Firth et al., 2011). Allotment gardens allow users to grow individual fresh produce, enable social interactions with fellow allotment users, provide contact with nature and enable self-development (through exercise and gardening skills) within an atmosphere which is stress-relieving (Kurtz, 2001; Genter et al., 2015; Dobson et al., 2020). However, there is less sociability, community building and activities, compared to

community gardens (Kurtz, 2001; Genter et al., 2015; Dobson et al., 2020). Allotment gardens are also commonly a lot older than community gardens; some allotments can be over a century old (Barthel, 2008). Joining an allotment is quite different to a community garden. Individuals are required to apply for an allotment formally and the waiting list can be years; however, with a community garden, you can usually start volunteering as soon as you wish, meaning community gardens are much more accessible (Bendt et al., 2013). This also allows less commitment and reduces pressure to participate regularly, as a community garden is constantly being tended to (in a best case scenario). However, it is the responsibility of the allotment owner to attend their own plot, hence missing a week or two could have detrimental effects on their crops and their neighbours crops too. It is important to note that both allotments and community gardens are green spaces for participants to achieve their social needs. However, social relationships on allotment sites emerge bottom-up, while community gardens organise shared activities more formally, usually with top-down governance over all activities, both social and practical (Kurtz, 2001; Genter et al., 2015; Dobson et al., 2020; Firth et al., 2011).

Psychological benefits of community gardens

Awareness of the connection to nature and its positive impact on wellbeing is growing (Coon et al., 2011). There are two types of contact with nature; firstly, there is indirect contact, for example living somewhere with a view of a meadow, watching a wildlife documentary or attending a community garden to sit and take in the surroundings. Secondly, there is direct contact, for example, walking in nature or gardening. There is evidence that exposure to views of a natural area improves an individual's health and wellbeing and can relieve stress (Coon et al., 2011). This demonstrates the positive influence on wellbeing through indirect contact with nature. Additionally, it has previously been found that gardening can improve mood, self-esteem, depression, anger and confusion (Wood et al., 2015). Therapy gardens are specific community gardens used within healthcare to help patients suffering from various illnesses or those who have greater support needs; examples include Alzheimer's gardens, senior community gardens, cancer gardens, sensory gardens and enabling gardens (Poonam Kumari et al., 2018). Therapy gardens tend to be highly sensory, with pleasant smelling and visually pleasing plants, and sometimes fruit and vegetables to eat (Poonam Kumari et al., 2018). There is also evidence that regular gardening activities can reduce the risk of dementia by 36% (Hope & Ellis, 2009). Gardening is direct contact with nature and supports the idea that natural areas are needed, especially within urban settings where there is a lack of green spaces. The physical and social benefits that community gardens provide also have a positive knock-on effect on psychological wellbeing (Soga et al., 2017).

Physical benefits of community gardens

Many physical activities are involved in tending to a garden, including digging, planting, weeding, raking, carrying heavy items, and more. Similarly, gardening is a physical activity which promotes an active and healthy lifestyle (van den Berg et al., 2010). Research suggests that 30 minutes of gardening can equal the number of calories burnt during 30 minutes of aerobic exercise (Hope & Ellis, 2009). This supports another study which compared the BMI 136 allotment gardeners to 133 nongardener controls and found that 68% of the non-gardeners were overweight or obese, compared to only 47% in the gardener group (Wood et al., 2015). A greater BMI can reduce life expectancy, increasing the risk of cardiovascular

diseases, diabetes, cancer and other diseases, compared to a ‘normal’ BMI (Ahima & Lazar, 2013; Coon et al., 2011). Community gardens allow people to garden frequently, often weekly, allowing users to participate in regular physical activity, which could reduce the risk of mortality and chronic diseases (Soga et al., 2017).

Reaping produce from community gardens

Fresh produce is readily accessible in community gardens and is usually available for users to help themselves. Evidence suggests that people with access to homegrown food will likely eat more fruit and vegetables (Hope & Ellis, 2009). Vegetable consumption is part of a healthy lifestyle and is associated with lower risk of mortality and chronic illnesses (Soga et al., 2017; Ahima & Lazar, 2013; Coon et al., 2011). In previous studies on community gardens, frequent access to fresh fruit and vegetables was one of the more important and common reasons that users attended the garden (Armstrong, 2000; Hope & Ellis, 2009). Community gardens could be implemented in countries where food shortages are common and food security is lacking to help mitigate starvation and malnutrition (Nkosi et al., 2014). A case study conducted in Hammanskraal in South Africa on a community garden highlighted how beneficial the garden was for the locals to reap the benefits of food supplementation and income from selling the produce they sowed (Nkosi et al., 2014). Similarly, individuals with low income or poor food security can “double benefit” from community garden produce as such produce removes their dependence on unsafe food sources, but they also receive healthy home-grown produce and healthy activity (McIlvaine-Newsad & Porter, 2013). Although the UK has adequate food security, there are also issues which access to home-grown food could solve, such as the present day cost-of-living crisis and previous food shortages within supermarkets during COVID-19 (Williams & Dienes, 2022; O'Connor et al., 2020; Khan et al., 2020). This means that not everyone is food secure in the UK. Between April 2022 and March 2023, a single food bank charity based in the UK (The Trussell Trust) distributed nearly 3 million emergency food parcels to people in need, which is an increase of 37% from the previous year (The Trussell Trust, 2023). One of the contributors of food produce to The Trussell Trust is a community garden set up by the Salvation Army in Southport, UK (The Salvation Army, 2023). Community gardens donating to food banks is very common as there is usually a surplus of fruit and vegetables grown. Food bank donations from community gardens are also common in America and Canada (Buckingham, 2003; Vitiello et al., 2015).

Social benefits of community gardens

Members of a community garden tend to have more social interactions than those who own a plot within an allotment, due to community garden users attending and working together to care for a garden which provides a social setting where greater interaction can occur (Soga et al., 2017; Kurtz, 2001). Community garden users share the area, tools, produce, knowledge, stories, and culture; it brings people together and creates a small community within the garden (Wakefield et al., 2007). Increased social interaction is known to have multiple benefits, including positive psychological health (Soga et al., 2017). A previous study highlighted that participants who visited green spaces daily were more integrated with social networks and had a better-perceived health status than those who spent little time in green spaces (Enssle & Kabisch, 2020). This demonstrates why it is essential to have urban green spaces, since they play a significant role in social connection. Social connection is an

important factor for overall positive wellbeing, especially within the older generation (Enssle & Kabisch, 2020).

Access to nature within community gardens

A community garden can also be considered a communal area for access to nature, and one reason community gardens have a positive effect on wellbeing is frequent access to nature. The world is becoming increasingly urbanised every day, resulting in progressively fewer green spaces available for individuals to easily access (Wakefield et al., 2007). Research suggests that individuals are losing their connection to plants and wildlife due to a lack of access to green spaces (Bell et al., 2017; Soga & Gaston, 2016). Regular attendance to a community garden provides regular connection to nature, which many previous studies have found is a significant reason for participants to attend (Armstrong, 2000; van Holstein, 2017; Kingsley et al., 2009; Noone & Jenkins, 2017; Baur, 2020; Cleary et al., 2017; Ohmer et al., 2009). A frequent connection to nature and finding a hobby within nature is also associated with greater care for nature, leading to individuals having more pro-environmental behaviours (Nord et al., 1998).

Earth Community

In 1988, Thomas Berry broadened the meaning of the word ‘community’ within a nature-based area, describing it as an ‘earth community’. This encompasses a more extensive understanding that a community may be shared socially between individuals, with other species, and even with the earth itself (Berry, 1988). Due to the considerable abuse that humans have caused to the planet over the past centuries of industrial exploitation, an earth community is said to be essential for the survival of future generations (Berry, 1988). The concept of an earth community is encompassed within a community garden if the participants, wildlife and plants/earth are mutually benefitting from it (Berry, 1988; Ohmer et al., 2009). Research suggests that there are social, physical and psychological benefits for the individuals attending community gardens, however, fitting to the definition of an ‘earth community’, community gardens must not only be beneficial for the individuals who participate, but benefits must also be shared with the wildlife, plants and soil within the garden (Wakefield et al., 2007; Soga et al., 2017; van den Berg et al., 2010; Wood et al., 2015; Ohmer et al., 2009). This could be through human-environment relationships (nature connectedness), with such relationships becoming stronger with more frequent experience with nature, which is easily accessible within a community garden (Mayer & Frantz, 2004). Research suggests that nature connectedness is associated with personal growth and eudaimonic wellbeing of individuals (Pritchard et al., 2019). Moreover, there is also plenty of research on how gardens, a cultivated anthropogenic phenomenon, support wildlife and plants (Van Helden et al., 2020; Cannon, 1999; Holland, 2004; Holden & Abbott, 2023; Mancebo, 2018). Therefore, in theory, community gardens could be considered as an earth community.

Wellbeing

Wellbeing

The Oxford Dictionary defines wellbeing as “the state of being healthy, happy, or prosperous; physical, psychological, or moral welfare” (Oxford English Dictionary, 2023). However, each of these defining terms - happy, healthy, prosperous - is also complex and difficult to define. Some research suggests that the broad term ‘wellbeing’ includes not only physical and psychological aspects but also encompasses social and functional wellbeing (Cella, 1994). Physical wellbeing relates to an individual’s physical health; this could be negative, such as pain and fatigue, or positive physical health, which is when an individual is fit and able to do physical activities normally expected (Cella, 1994). The main definition of psychological wellbeing is typically related to an individual’s emotions and happiness level, although other research suggests that it can be deeper than that and include an individual’s confidence, affection and interest level (Huppert, 2009). Social wellbeing is the most difficult to define; social relationships can include family, friends or partners, but it can also include acquaintances and strangers (Cella, 1994). To maintain healthy social wellbeing, an individual could attend group activities or have regular contact with friends or family (Cella, 1994). Functional wellbeing relates to the individual’s ability to do something, such as walking and feeding oneself. This can be related to physical wellbeing, however, it relates more to the ability to function (to satisfy necessary activities) rather than the desire to do something (Cella, 1994). An individual’s overall wellbeing is very complex as it consists of all of the above and more. An individual’s wellbeing can also change over their lifespan, and it can happen quickly or gradually over time. Additionally, the social, economic and environmental conditions that individuals live within are further factors which can negatively or positively affect their overall wellbeing (WHO, 2023). So it is expected that working in a garden, or not, would have some impact on overall wellbeing.

Causes of negative wellbeing

Unfortunately, there are numerous factors around the world negatively affecting many individuals’ wellbeing. The number of suicides each year is increasing; in 2021 in England, 5219 suicides were registered, which was an increase of 6.3% from 2020 (4912 suicides) (Samaritans, 2021). Negative mental wellbeing may result from personal issues, however, currently many social issues within the UK are negatively affecting individuals’ wellbeing, including climate anxiety, the cost-of-living crisis, and lingering impacts from COVID-19 (Williams & Dienes, 2022; Ogunbode et al., 2022; O’Connor et al., 2020). It has been found that contact with natural areas including coastal and forest/meadow spaces (blue-green spaces) during the pandemic helped individuals cope better with the lockdowns, with nature being described as a ‘buffer’ against the negative effect on mental wellbeing (Pouso et al., 2021). However, due to the continuous increase in the human population, this will increase the number of people living in urban settings (Ventriglio et al., 2020). In 1950, only 30% of the world’s population lived in an urbanised environment, however, it is predicted that 66% of people will live in an urban setting by 2050 (Ventriglio et al., 2020). This means that it could progressively become more difficult to easily access green spaces unless there are more links between urban, suburban and rural areas, or more green spaces are incorporated into cities (Wakefield et al., 2007).

Importance of positive wellbeing

Positive wellbeing is fundamental to an individual’s life for a multitude of reasons. Positive wellbeing has been found to help individuals recover from illnesses faster and to have higher

resistance to some diseases/conditions, such as the common cold (Lamers et al., 2011; Cohen et al., 2003). It has also been found that positive wellbeing and happiness are shared with close contacts of the individual, so that being around people who are experiencing positive wellbeing positively affects others' wellbeing also i.e., positive wellbeing acts as a domino effect (Fowler & Christakis, 2008). Longevity is probably the most important outcome of positive wellbeing; it has been found that individuals who have better mental wellbeing tend to live longer, with it being estimated that an individual with positive wellbeing can live 4-10 years longer than someone with negative wellbeing (Diener & Chan, 2011).

Wellbeing and nature connection

Interactions with wildlife, plants and views of natural areas are known to improve physical and mental wellbeing (Cleary et al., 2017). With access to green spaces and nature, individuals have the freedom to physically exercise, which reduces obesity and the risk of cardiovascular and respiratory disease (Ellaway et al., 2005; Richardson & Mitchell, 2010). Additionally, experiences of nature is known to improve mental wellbeing; it has been found that during stress recovery, individuals recover faster and more efficiently when exposed to green spaces over urbanised/city environments (Ulrich et al., 1991). Similarly, contact with blue/green spaces has been found to help and act as a buffer to negative wellbeing effects on individuals during sudden changes in situations/environments (Pouso et al., 2021). There are also cases where individuals do not have to receive direct contact with nature to see a difference in wellbeing (Ulrich, 1984). A study by Ulrich in 1984 found that individuals had shorter postoperative hospital stays and fewer complications after surgery when they had a view of nature from their window compared to individuals who had a view of a brick wall. This indicates just how beneficial nature or a view of the surrounding environment can be for both physical and mental wellbeing.

In the UK, there are many organisations/charities which are deeply involved in promoting health and well-being through spending time in nature. One charity making a difference is Social Farms and Gardens. They improve health, wellbeing, and the environment through nature-based activities like education programs and nature therapy (Social Farms & Gardens, 2024). Another charity that aims to promote positive wellbeing with nature-based activities is The Royal Society for the Protection of Birds (RSPB). In 2023, the RSPB launched the Nature Prescription Project. Healthcare professionals can prescribe a 'nature prescription' with a leaflet and calendar of suggested nature-based activities (RSPB, 2024). According to recent data, an overwhelming majority of 74% of patients have reported experiencing positive outcomes from their nature prescriptions (RSPB, 2024). Additionally, 91% of healthcare providers who prescribe nature-based treatments have expressed their intent to continue offering this form of therapy to their patients. These findings highlight the growing recognition of the potential benefits of nature-based treatments in promoting overall health and well-being (RSPB, 2024).

Wellbeing and gardening

A previous study on allotment gardening found positive outcomes for both psychological and physical participant health: out of 121 gardeners 91% felt happier after attending the allotment, and 86% felt less stressed (van den Berg et al., 2010). There is an ongoing theme with allotment or community gardening and positive wellbeing. Participants in other studies have shared that gardening has helped with mental unwellness, low mood, depression and

anxiety, and allows higher levels of weekly physical activity (McGuire et al., 2022; Fieldhouse, 2003; Soga et al., 2017; van den Berg et al., 2010). Gardening is also known to have direct health benefits: research has found that gardening helps dementia patients develop their identity and selfhood, feel a sense of community, and reconnect to the natural environment (Noone & Jenkins, 2017).

Wellbeing and social/community engagement

Social relationships between partners, friends or acquaintances are important factors when considering wellbeing (Dolan et al., 2008). It has previously been found that the happiest people have strong personal relationships and spend more time socialising (Diener & Seligman, 2002; Teo et al., 2013). In 2013, Teo et al. found that the risk of depression was higher in people with less social support and low-quality social relationships. Therefore, these findings demonstrate that positive wellbeing is associated with social contact and the strength of an individual's social life. Poor social engagement can result in negative physical and mental wellbeing. In 2009, Cornwell and Waite outlined two forms of social isolation. The first is social disconnection, a long-term lack of social relationships (Necka et al., 2021). Social disconnection is linked to poor physical health in older adults due to isolation, which causes a lack of physical activity (Cornwell & Waite, 2009). The second form of social isolation is perceived isolation which is more subjective; this could make the individual feel lonely and lack intimacy (Santini et al., 2020). Perceived isolation is also common among older adults and can negatively affect their mental wellbeing (Cornwell & Waite, 2009). Consequently, social and community engagement is an important factor when considering positive wellbeing among people, particularly older adults.

Overview

Community gardens improve individuals' psychological, physical and social wellbeing (Coon et al., 2011; Wood et al., 2015; Soga et al., 2017). In addition, they have helped enable a connection to nature, leading to improved wellbeing and education on critical wildlife issues (Baur, 2020; Cleary et al., 2017; Ohmer et al., 2009). The state of mental health within the UK is an ongoing concern (Samaritans, 2021). Therefore, determining the community garden's overall significance to participants will be critically important and informative. Furthermore, another crucial concern is the state of the climate and biodiversity loss (Almond et al., 2020). One of the best ways to combat these issues is through education and awareness (Navarro-Pere & Tidball, 2012). Consequently, it will be of significance to determine whether community gardens, the plants and wildlife within them, or gardening in general enables an enhanced connection to nature for participants, despite community gardens being a cultivated anthropogenic environment. Additionally, understanding whether community gardens support humans, wildlife and plants could help determine whether community gardens can be defined as earth communities. Together, these aims could generate greater awareness of the importance of nature, wildlife and community gardens (Navarro-Pere & Tidball, 2012; Baur, 2020).

Methods

Aims and objectives of this study

This study aims to understand the significance that community gardens have on participants and if there is any environmental knowledge (including wildlife, conservation, sustainability and gardening knowledge) gained through attendance. This information may be helpful to fellow conservationists who are attempting to create more green spaces, such as community gardens, particularly within cities. The study focuses on three main objectives: why participants attend a community garden; how participants feel after attending the garden in relation to wellbeing; and whether participation in the garden provides a better understanding of wildlife, conservation and sustainability. A total of 95 participants from 46 different community gardens around the UK participated in a self-report questionnaire. It is important to note that the sample size for each of the 46 gardens is small and self-selected, and the demographics for each garden are not known. This should be taken into consideration when reviewing the data. Participants from one of the 46 community gardens (Kent Community Oasis Garden - KCOG) also participated in informal interviews, and the researcher conducted participant-observations at KCOG. KCOG is located on the University of Kent campus, so the majority of the participants are students, this should be taken into consideration when interpreting the data as the student demographic is higher relative to other community gardens around the UK. However, some staff from the university and other members of the community also participate. The garden was initially launched in 2008, however, the present iteration was established in 2017 and is run in partnership with The University of Kent and East Kent Mind (who joined in 2020/21). Analyses of the collected data are both quantitative and qualitative.

Hypothesis

It is expected that community gardens will increase participants' wellbeing and their knowledge on wildlife, conservation, sustainability and gardening.

Observations and Interviews

Out of the 46 community gardens who participated in this study, Kent Community Oasis Garden (KCOG) was studied in more detail, with personal observations of the gardening sessions along with some members participating in informal interviews. KCOG is a community garden which is located at the University of Kent campus, with most of the participants being students. However, there are some community members and university staff who also participate.

The researcher attended KCOG to observe the community garden once or twice a week for a total of 3-4 months. The researcher joined in with the gardening sessions as well as observing them in order to get a better understanding of how a community garden works and to become familiar with the participants for a more authentic interviewing experience. While observing participants, the researcher was able to collect information which helped create the interview questions. The researcher observed the activities individuals participated in, interactions between participants, changes in mood/wellbeing, the abundance of wildlife within the garden, and intergenerational knowledge gain.

A total of 14 interviews were conducted, 12 with students, 1 with a community member and 1 with a university staff member. The interviews were informal and semi-structured so that there was some level of consistency in questions asked across all of the interviews. Semi-structured interviews allow the interviewer to ask follow up questions, which could provide novel information that would otherwise not be gathered if a closed structure was being followed. This also enables a more natural dialogue, allowing the conversation to flow, which puts the participants at ease and better enables them to open up. The responses that the participants provided during these preliminary interviews informed an attitudinal survey included in the questionnaire distributed to community gardens around the UK.. This is a strength of the methodology because the researcher used the interviewees' own words and expressions when discussing community gardens, rather than the researcher's, which gives a better insight into the culture of participants as well as reduces researcher bias.

Questionnaire

A total of 95 participants from 46 different community gardens around the UK participated in a quantitative self-report questionnaire. Out of the 95 respondents, 58 identified as female, 34 as male and 3 as non-binary. The most common age group of the participants was 65-74 years old (26 out of 95 respondents), with the age of the respondents ranging from 18-84. Participants were asked if they believe they struggle with their mental health: 56 out of 95 participants responded no, 36 responded yes and 3 preferred not to say. The questionnaire then asked participants if they have been formally diagnosed with a mental health condition to which 68 out of 95 participants responded no, 26 out of 95 responded yes and 1 out of 95 preferred not to say. The majority of the 95 participants were retired (36 participants), 31 were employed, 9 were students, 5 were unemployed and 4 had other commitments. Overall population data from each of the 46 community gardens was not accessible.

The questionnaire was created on Qualtrix XM and consisted of 14 questions relating to the participants' community garden, their knowledge on wildlife, conservation and sustainability, and their agreement with statements taken from the interviews. There were also 6 demographic questions at the end of the survey, with all demographic questions allowing the participants to respond with 'prefer not to say'. To find community gardens around the UK, the researcher searched on Google and Facebook for community gardens/community garden groups and contacted them through email or Facebook messenger explaining the study and asking for consent to participate. Over 170 community gardens around the UK were contacted, however, some did not respond and some no longer exist. 45 community gardens responded positively and once they agreed to participate, the researcher sent the link to the study. The questionnaire was open for 3 months from the beginning of March 2023 to the end of May 2023.

The first aim of this study was to understand the reasons why participants attend their community garden. Questions 4, 5, 6, and 7 in the questionnaire asked participants the reasons they attend their community garden and the activities they enjoy there. Questions 5 and 7 asked participants to rank the reasons they gave in questions 4 and 6. This not only provides an understanding of the reasons for participation in the garden, but also the importance of these reasons for each participant.

The second aim was to understand the effect of attending the community garden on participants' wellbeing. Question 9 asked the participants how they felt before attending the

garden, while they were at the garden and after attending the garden. This helped display the progression of participants' feelings before, during and after attendance of their community garden.

The third aim was to investigate whether participation in the garden gives individuals a better understanding of the importance of wildlife, conservation and sustainability. Question 11 and 12 asked the participants to rate their knowledge on wildlife, conservation, sustainability and gardening before and after joining their community garden. Comparing the before and after ratings allowed the researcher to understand whether the participants feel they have gained knowledge from being involved in a community garden.

The final aim was to consider the results from the first three aims and determine whether community gardens could be regarded as earth communities. There could be significant evidence for an earth community within a community garden if there is an increase in social connection between participants, nature connectedness and participant wellbeing during attendance.

Data analysis

EXCEL was used to organise and analyse the questionnaire data. The data was examined across different declared mental health statuses, geological and demographic groups to determine whether there were any differences. The recordings of the interviews were transcribed by the researcher. The interviews were also coded and thematically analysed to see if there were any specific quotes that stood out, specifically relating to the aims of this study. Question 13 in the questionnaire also allowed respondents to write freely about the type of atmosphere they felt their garden had. These answers were also thematically analysed and divided into themes.

SPSS was used to determine whether there was a significant difference between males/females and adults/older adults in regards to environmental knowledge. A Kolmogorov-Smirnov test was used to determine whether the data was normally distributed to inform which statistical test should be used to analyse the data. Due to all data being skewed and not normally distributed, a Mann-Whitney U test was conducted. The p value result from the Mann-Whitney U tests will determine whether there is a statistical significant difference between male/female and adult/older adult respondents and their feelings towards conservation and sustainability.

Other demographics were investigated during the EXCEL data analysis to determine whether there were any differences. Ethnicity could not be analysed due to the small number of non-white participants (9 out of 95 participants) in comparison to the number of white participants (86 out of 95 respondents). There were no noticeable differences in employment status and attendance regularity regarding the aims of this project. The same was found with geological location: the community garden participants were divided into groups based on North/South of the UK (Dorling, 2010) and no significant differences were found. The researcher also separated the data from the community garden with the largest number of participants (KCOG) and there were no noticeable differences compared to participants in all other gardens. Therefore, no statistical analyses were conducted with these demographic variables.

Results and Discussion

Previous studies suggest that community gardens and green spaces improve individuals' wellbeing in multiple ways, including their mental, physical and social wellbeing (Pouso et al., 2021; Cleary et al., 2017; McGuire et al., 2022; Fieldhouse, 2003; Soga et al., 2017; van den Berg et al., 2010; Kurtz, 2001). Community gardens have also been found to promote knowledge regarding wildlife, conservation and sustainability, which could lead to greater care for the environment (Nord et al., 1998; Young et al., 2018; Hake, 2017). This study aimed to understand the significance that community gardens have on participants wellbeing and environmental knowledge. Preliminary interviews were conducted with participants from a single community garden to help design a questionnaire to be sent to participants from community gardens all around the UK. 95 participants from 46 different community gardens participated in a questionnaire which focused on answering the three main aims of this study. The hypothesis for this study was that community gardens will increase participants' wellbeing and their knowledge on wildlife, conservation, sustainability and gardening. It is important to note that the sample is self-selected, and therefore, the data are potentially subject to a degree of skew across a number of parameters (e.g. level of interest in the project, having time to complete the questionnaire, perceived impact of participation, level and form of mental wellbeing impact).

What are the reasons participants attend their community garden?

The results from the questionnaire found that the highest-voted **reason** that respondents attend their community garden was 'mental wellbeing' (81 respondents), closely followed by 'being around nature' (80 respondents) (Figure 1). Moreover, during the preliminary interviews, all 14 of the respondents answered 'yes' when asked if the community garden positively affected their wellbeing. This supports the idea that mental wellbeing is a significant reason for respondents to attend their community garden. Furthermore, when asking one of the respondents if the community garden positively affects them, they answered

"Yes definitely, coming here is like a little break from everything else, so yeah it helps me a lot. That's why I try to come regularly now".

Another respondent commented that their stress "kind of just melts away when I'm at the garden". This also supports and explains why 'mental wellbeing' was the highest voted reason for attending a community garden. Furthermore, there are previous papers which support the finding that community gardens positively affect mental wellbeing (McGuire et al., 2022; Fieldhouse, 2003; Soga et al., 2017; van den Berg et al., 2010).

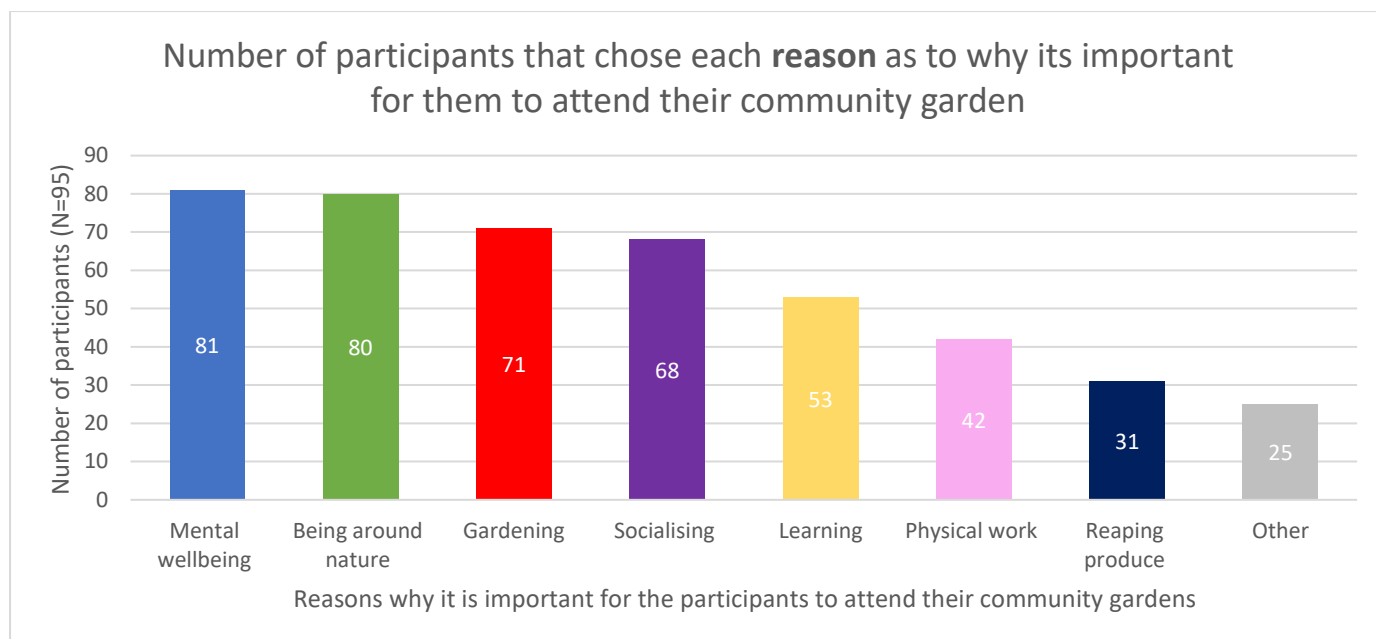


Figure 1 – A histogram representing the number of participants who chose each reason that is important for them to attend their community garden. Participants were allowed to choose more than one reason.

Respondents were then asked to rank these reasons from most important to least important for their attendance at their community garden. Despite ‘mental wellbeing’ being the most voted reason to attend, ‘being around nature’ was ranked the **most important** reason for respondents to attend their community gardens, with 21 respondents voting ‘being around nature’ as their most important reason and 16 respondents voting for mental wellbeing (Figure 2). These findings suggest that respondents may feel a sense of nature connectedness while at the garden, which may explain why they picked ‘being around nature’ as their most important reason for attendance. There are many previous studies which have found that being around nature is one of the more significant reasons for participants to attend their community garden (Armstrong, 2000; van Holstein, 2017; Kingsley et al., 2009; Noone & Jenkins, 2017; Baur, 2020; Cleary et al., 2017; Ohmer et al., 2009). Additionally, during the preliminary interviews all of the respondents answered yes to ‘Do you enjoy spending time in nature?’, with one respondent stating “just being out in nature makes me feel better”. This may suggest that being around nature is associated with and is a contributing factor of positive wellbeing, since ‘mental wellbeing’ was the highest-voted reason to attend community gardens and ‘being around nature’ was voted as the most important reason. In fact, research suggests that being around nature leads to improved wellbeing (Coon et al., 2011; Ulrich et al., 1991; Bell et al., 2017).

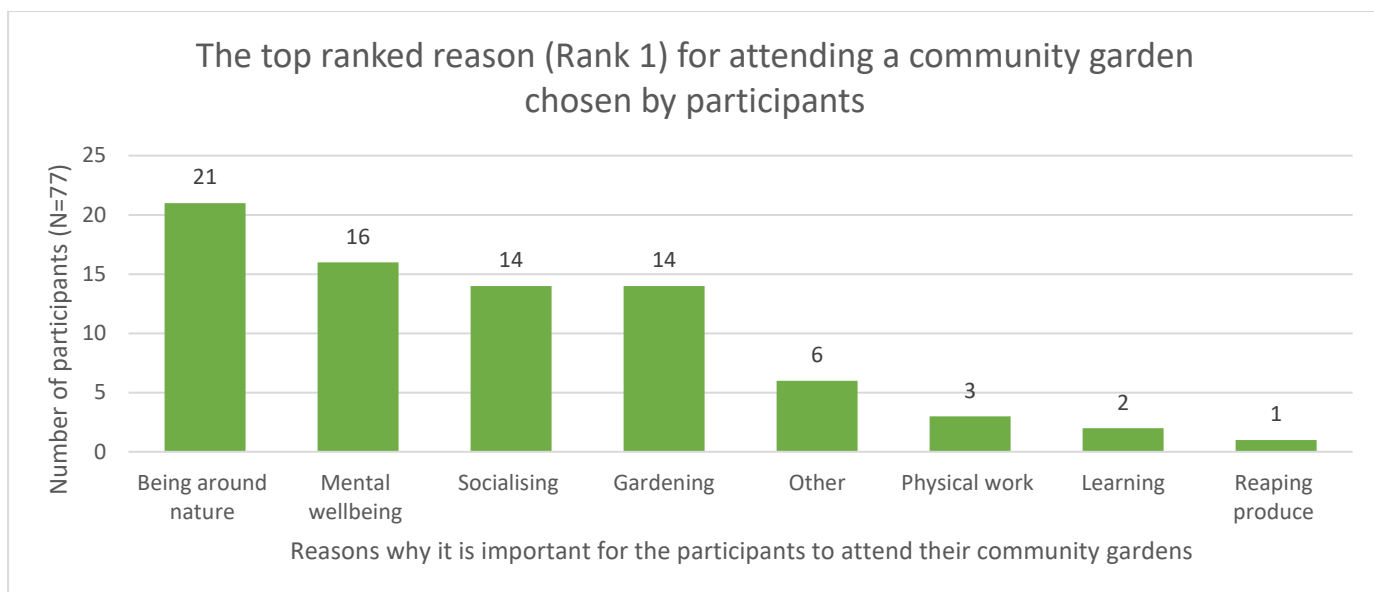


Figure 2 – A histogram representing the number of participants who chose each reason as their top-ranked reason for attendance to a community garden.

The questionnaire data was split into people who indicated that they struggle with their mental health (28 respondents) and people who said they do not (46 respondents), which revealed differences in the top ranked reason to attend their community garden. It should be noted that the number of respondents that indicated that they struggled with their mental health was relatively small. This should be taken into consideration when reviewing any of the findings regarding mental health. The top ranked reason for respondents who indicated that they struggle with their mental health to attend their community garden was ‘mental health’, with 12 out of 28 respondents choosing this as their top ranked reason (Figure 3), compared to only 4 out of 46 respondents who do not struggle with their mental health. This data suggests that people who struggle with their mental health are more likely to attend community gardens to help support their mental wellbeing. This is also backed up by the finding that 12 out of 46 respondents who indicated that they do not struggle with their mental health chose gardening as their top ranked reason to attend a community garden, with only 1 out of 28 respondents who indicated that they struggle with their mental health choosing this option (Figure 3).

This information supports the idea that community gardens contribute to positive mental wellbeing, and also provides support for community gardens to be used as a potential type of therapy, similar to therapy gardens, to improve the mental wellbeing of participants (Cleary et al., 2017; Soga et al., 2017; van den Berg et al., 2010; Poonam Kumari et al., 2018). In fact, during the preliminary interviews, when asked if the community garden positively affects their wellbeing, one respondent answered

“Yes it actually helps me a lot with my anxiety and social anxiety, it does help me a lot coming here”.

This is a quote from a respondent who feels they struggle with their mental health which demonstrates that the community garden directly effects their mental health difficulties in a positive way and has a therapeutic effect. Future research should examine these direct

benefits of community gardens specifically with respondents who struggle with their mental health.

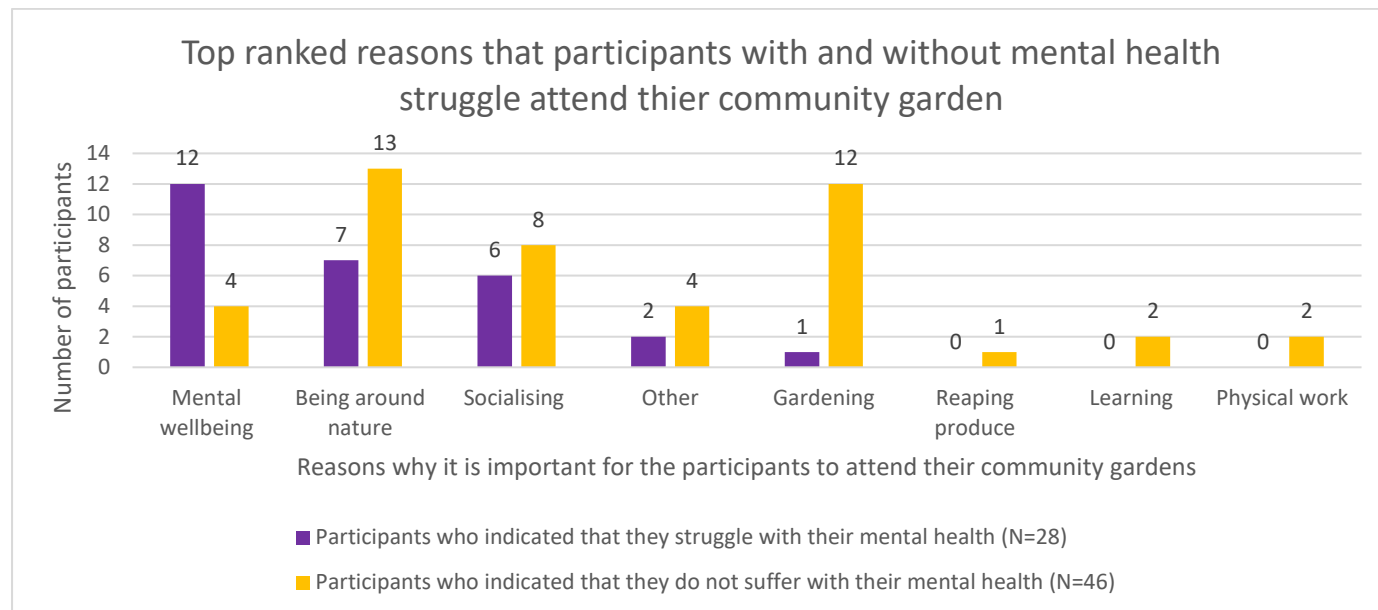


Figure 3 - A histogram representing the number of participants (who indicated that they struggle with their mental health – purple and who indicated that they do not struggle with their mental health – yellow) who chose each reason as their top-ranked reason for attendance to a community garden.

What activities keep participants attending their community garden?

Participants were then asked to pick the **activities** that were important for their attendance to their community garden. The most voted activity was ‘socialising’ (chosen by 81 of the 95 respondents), and ‘planting’ (chosen by 80 of the 95 respondents) was the second highest-voted activity (Figure 4). There could be a link between participants choosing mental wellbeing as their most-voted reason for attendance and socialising as their most voted activity. Increased social interaction has previously been linked to positive wellbeing; this could be one of the reasons why participants feel the garden positively affects their mental wellbeing (Soga et al., 2017). It was also evident when observing KCOG that socialising was an important part of a community garden. During the participants’ lunch break, they would gather under an outdoor shelter at the garden and socialise for an hour, where they would share knowledge and stories whilst talking, laughing and eating. Furthermore, during the preliminary interviews, participants often commented on how important the social interaction at the community garden was. When asked how they felt about socialising with the varied age range of participants, one interviewee answered,

“It’s so nice because you don’t often get a chance to interact with people who are different ages to you, it’s very calming and they often have a different outlook on life”.

Another respondent stated,

“When you are at the garden and start talking to people, it definitely effects my wellbeing”.

This suggests that while at the community garden, participants benefit from human-human interactions and relationships.

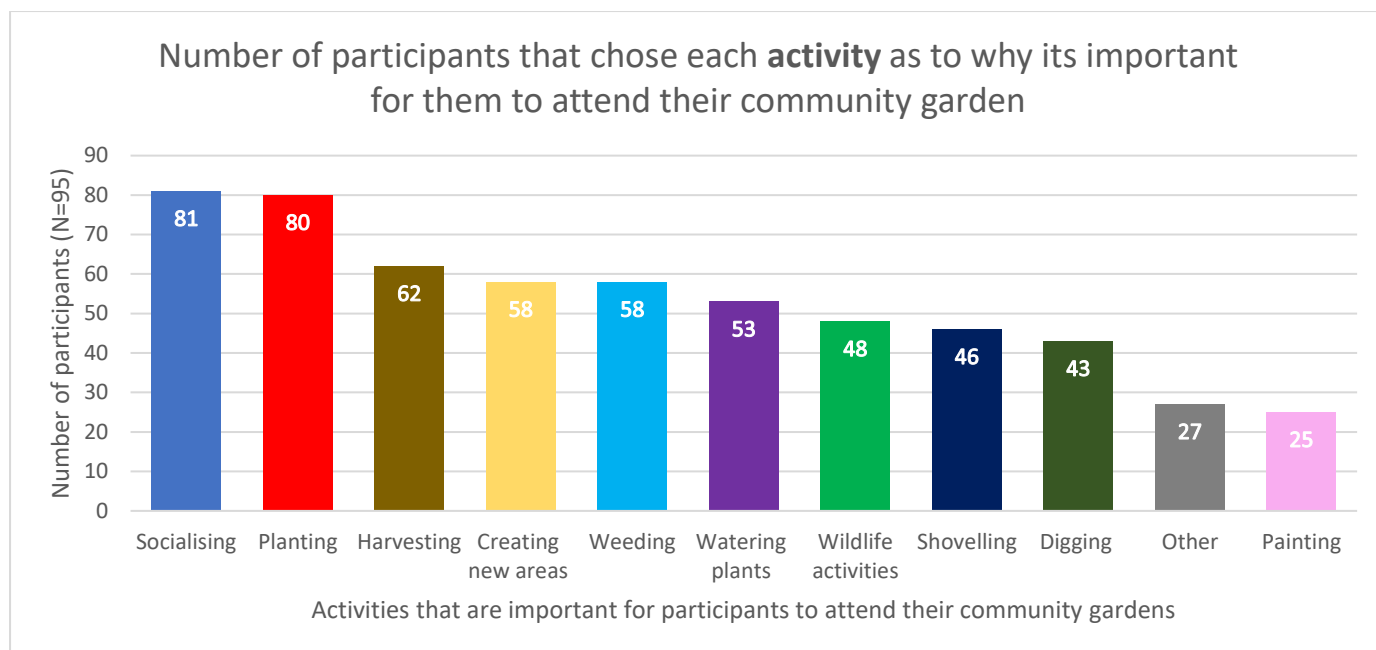


Figure 4 - A histogram representing the number of participants who chose each activity that they enjoyed while at their community garden. Participants were allowed to choose more than one activity.

Social connection has been found to be very important, specifically among older adults (Enssle & Kabisch, 2020). When splitting the questionnaire data into adults (under 65) and older adults (over 65), it was found that 34 out of 37 older adults chose socialising as an important activity for their attendance to their community garden, compared to 47 out of 58 adults (Figure 5). These findings demonstrate just how important socialising can be for older adults. Socialising is easily accessible in community gardens, as it consists of a regular group of individuals in a stress-free nature-based environment, creating plenty of opportunities for social interaction (Kurtz, 2001; Wakefield et al., 2007; Enssle & Kabisch, 2020).

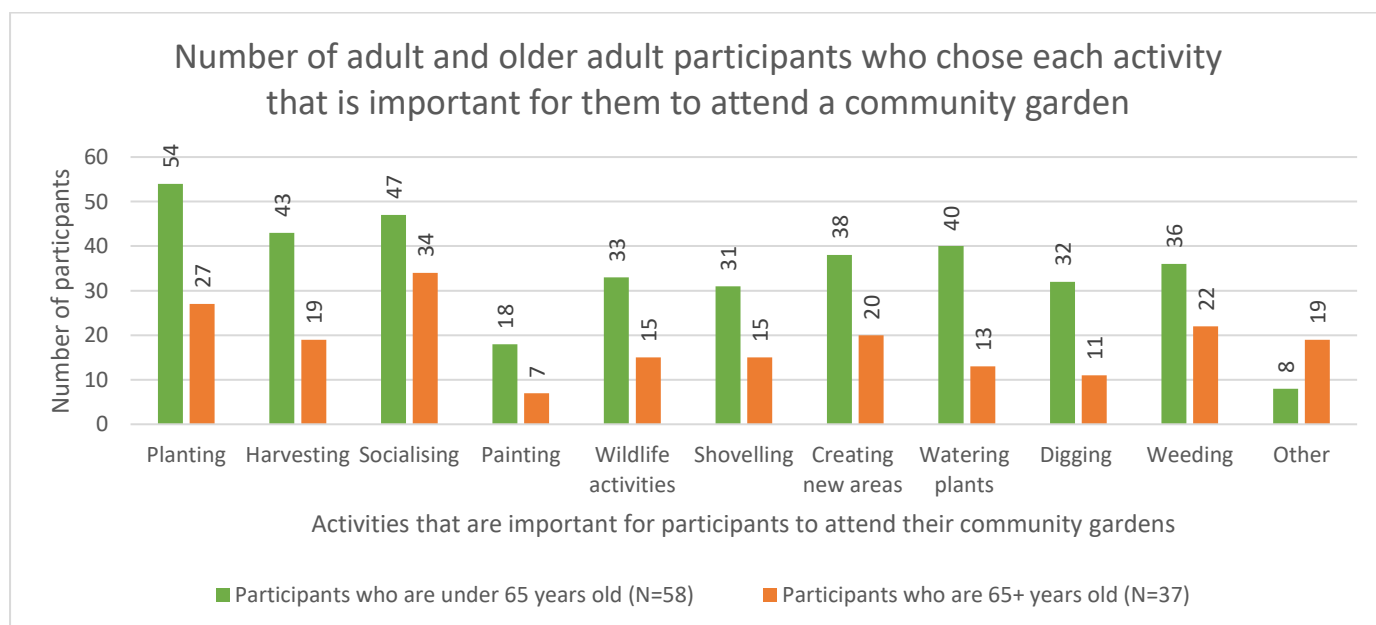


Figure 5 – A histogram comparing the number of under 65 year olds (adults) and 65 year olds and over (older adults) who chose each activity that is important for them to attend a community garden - participants could choose more than one activity.

To understand whether there were any differences between genders and their expressed views, the researcher examined male and female data individually. Although the study included an option for nonbinary/genderfluid/agender, this section will only look at the differences between male and female respondents. This is due to the small number of respondents who identified as nonbinary/genderfluid/agender (3 out of 95 participants), which would skew the data and likely be unrepresentative. It should be noted that there were relatively few male respondents. This should be taken into consideration when reviewing any of the findings regarding gender. Some differences were found between males and females in the activities that are important for them to attend a community garden. More male respondents chose physical work as an activity they enjoyed at the garden compared to females, specifically shovelling (24 out of 32 males and 19 out of 52 females) and digging (20 out of 32 males and 21 out of 52 females) (Figure 6). This could prove helpful when organising activities in community gardens.

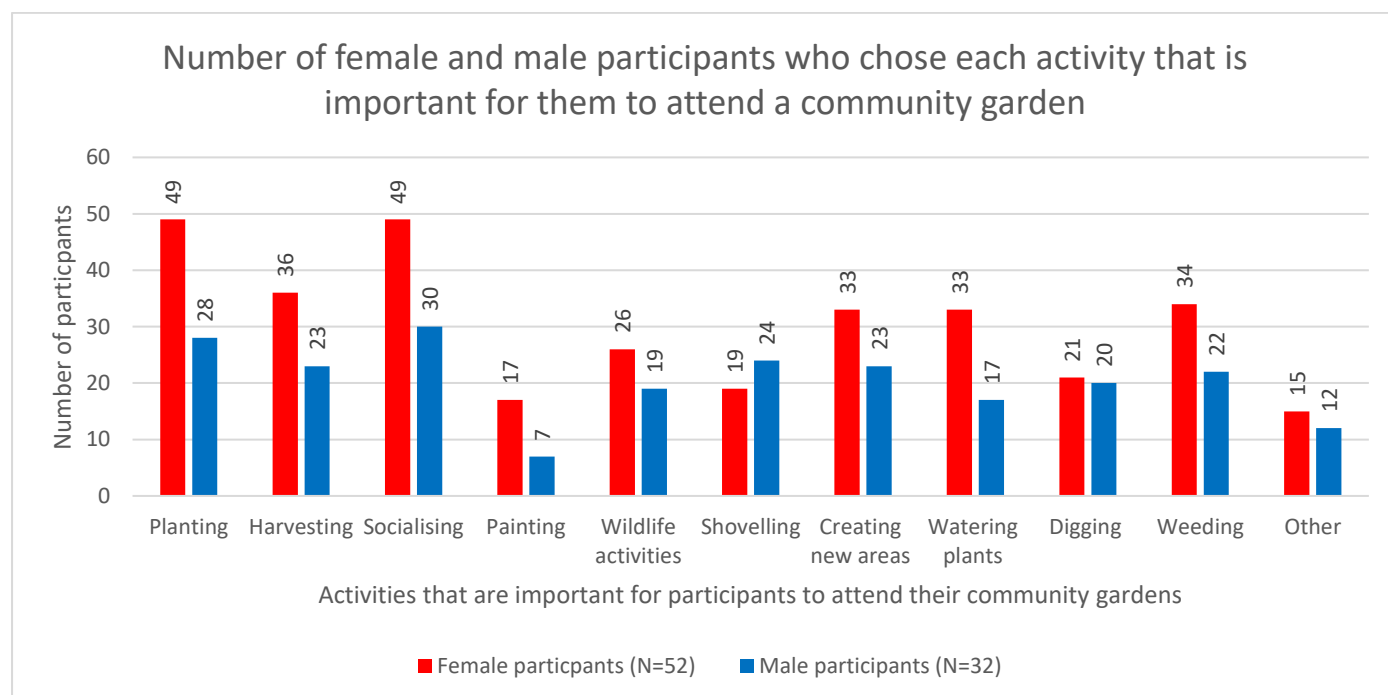


Figure 6 - A histogram comparing the number of female (red) and male (blue) participants who chose each activity that is important for them to attend a community garden (participants could choose more than one activity).

Participants were then asked to rank the activities from most important to least important for their attendance at their community garden. Although socialising was the most voted activity, respondents voted planting as the most important activity, with 28 out of 77 respondents choosing it as their top-ranked activity (Figure 7). Whilst observing KCOG, planting was one of the most common activities that individuals participated in, which may be why it is ranked as the most important activity. Therefore, planting is an important activity within gardening, and gardening can enable self-development and is a physical activity which can positively affect wellbeing (Kurtz, 2001; Genter et al., 2015; Dobson et al., 2020). Understanding the ratings and rankings of activities and reasons why individuals participate could help community gardens attract new participants and satisfy the participants that are currently involved in the garden.

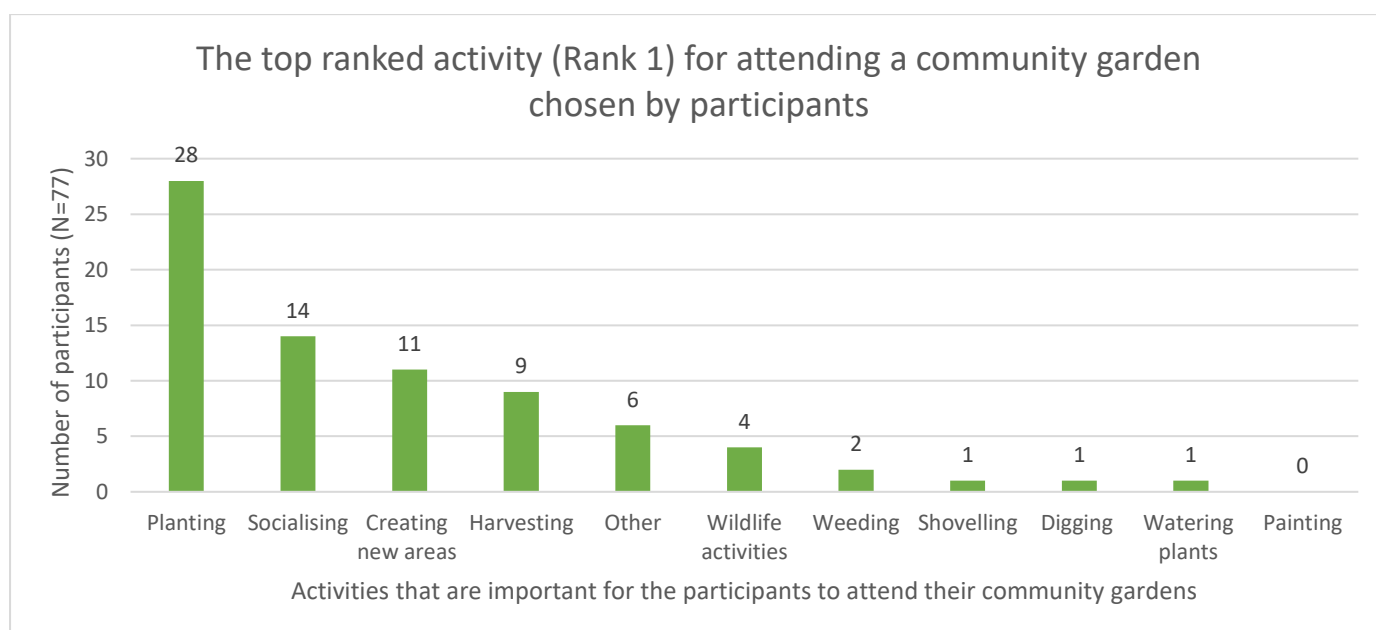


Figure 7 - A histogram representing the number of participants who chose each activity as their top-ranked activity while attending their community garden.

How do participants feel after attending a community garden in relation to wellbeing?

Participants were asked to rank how they felt before, during and after attending their community garden from extremely bad (1) to extremely good (5). It is important to note that this was not a before-and-after study, so there is no evidence of participants' feelings before or after coming to the garden. The results are only based on participants' self-rated feelings and statements. The average rated feeling declared before attending their community garden was 3.3, which corresponds to 'neither good nor bad'. Both 'during' and 'after' attending the garden, the average rated feeling was 4.4, which corresponds to 'somewhat good' (Figure 8). This increase indicates that the community garden is contributing towards positive wellbeing for participants while attending the garden, and it continues to make the participants feel good following attendance. Based on the participants' responses regarding the most important reasons/activities for them to attend their community garden, the physical act of gardening, socialising and connection to nature could be three main contributors to this change in wellbeing from before attending the garden to during/after attending.

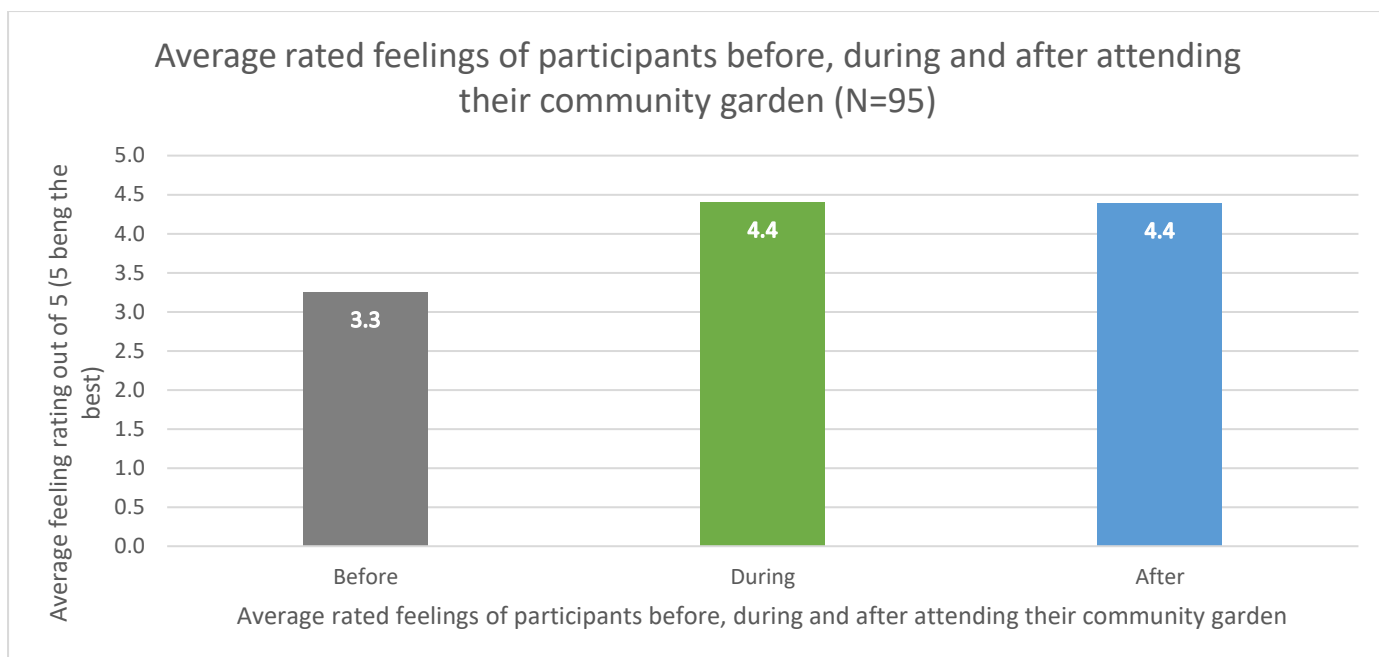


Figure 8 – A histogram that represents the average rated feelings of participants before, during and after attending their community garden. This is based on a Likert scale - 1 (extremely bad) to 5 (extremely good).

These results support previous findings regarding the positive effect that community gardens have on participants (Spano et al., 2020; Baur, 2020; Lampert et al., 2021; Wood et al., 2015; van den Berg et al., 2010; Soga et al., 2017; Kurtz, 2001). There was also a similar theme during the preliminary interviews, with all 14 interviewees answering ‘yes’ to the following questions: ‘Do you enjoy spending time in nature?’, ‘Do you feel that the garden positively affects your wellbeing?’ and ‘Do you feel less stressed whilst in the garden?’. Furthermore, one of the respondents stated,

“I definitely notice a difference between the weeks I do come here and weeks I don’t come here. It gives me a bit of a boost for the rest of the week.”.

This also supports the finding of how respondents felt after attending the community garden, since respondents rated their wellbeing higher during/following attendance. Another respondent stated, “Coming to the garden actually helps me feel more relaxed, plus, it’s sort of like a workout, so the physical work actually helps me relax, pretty much like exercise in a way.” Which supports the idea that the physical act of gardening contributes to positive wellbeing. Another significant quote from a respondent was,

“The garden gives a good sense of community, I love coming here, all the people are so lovely. We are all here for the same reasons, we learn new things together. We are all passionate about being outside and being in nature together, it’s a great feeling.”.

This further supports the idea that community gardens contribute to positive wellbeing through both socialising and a connection to nature.

To understand whether there were differences in respondents’ feelings when considering mental health, the data was split into respondents who feel they struggle with their mental health and respondents who feel they do not. The average rated feeling for respondents who indicated that they struggle with their mental health before attending the garden was 2.8, compared to 3.5 for respondents who indicated that they do not struggle with their mental

health (Figure 9). The feelings of respondents who indicated that they struggle with their mental health increased to 4.4 while at the garden and remained at this level after attending the garden, which is equal to the respondents who indicated they do not struggle with their mental health. This is despite the lower rated feelings of respondents who indicated that they struggle with their mental health before attending their community garden, which means there was a greater increase in mental wellbeing in this population following attendance. There is little research on the benefits of community gardens specifically for people who struggle with mental health issues, and therefore this should be researched further.

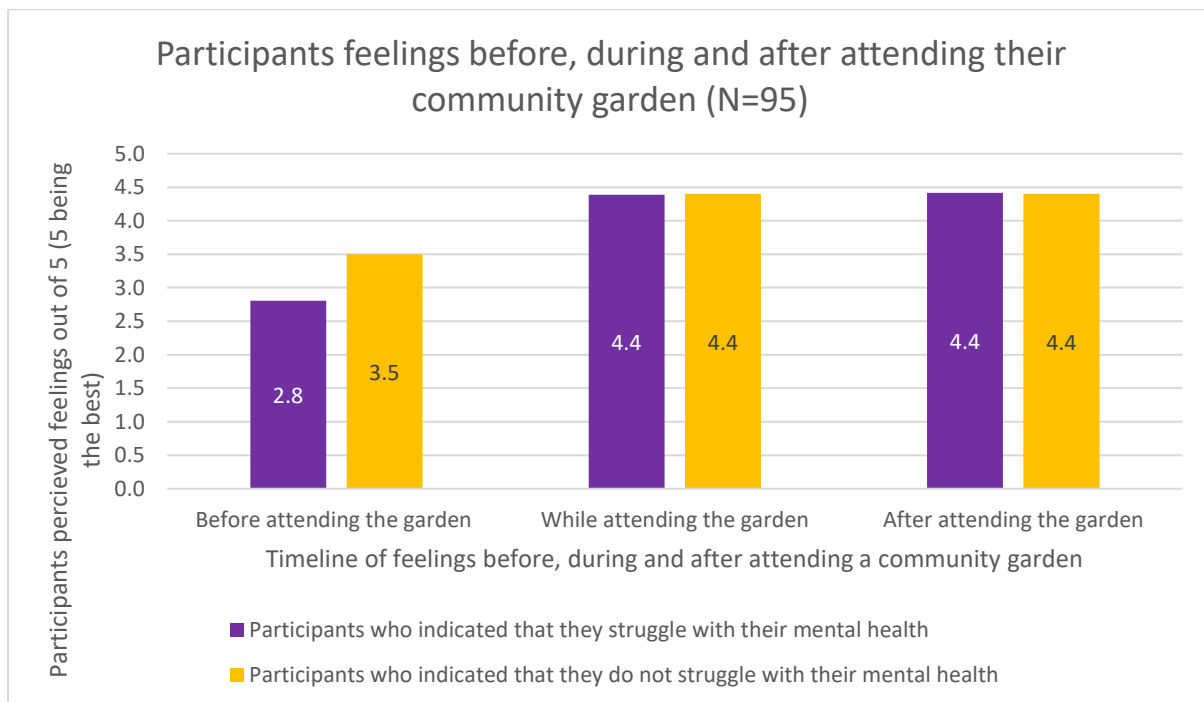


Figure 9 - A histogram that represents the average rated feelings of participants who indicated that they struggle with their mental health and participants who indicated that they do not struggle with their mental health, before, during and after attending their community garden. This is based on a Likert scale - 1 (extremely bad) to 5 (extremely good).

Participants in the questionnaire were also asked what atmosphere they felt their garden had. The most common theme to describe the atmosphere was ‘calming’, with 25% of respondents using this terminology (Figure 10). Being around nature has previously been found to relieve stress and calm individuals (Coon et al., 2011). ‘Friendly’ was a close second, with 23% of respondents using this terminology to describe the atmosphere of their community garden. This supports the idea that the social aspect of a community garden is an important factor for the individuals who attend (Soga et al., 2017). Some of the words used in the ‘other’ category were “safe”, “natural” and “special”.

THEMES GENERATED FROM WORDS USED TO DESCRIBE THE ATMOSPHERE WITHIN COMMUNITY GARDENS (N=95)

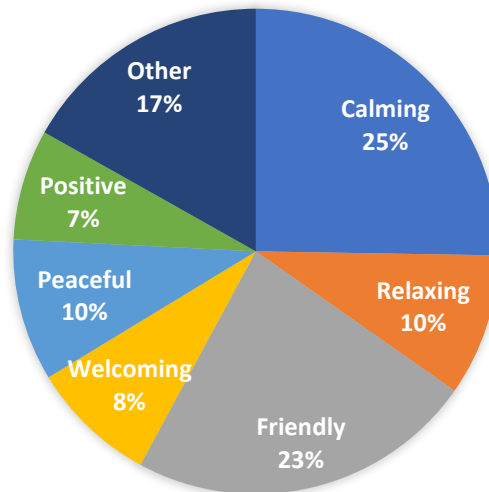


Figure 10 – A pie chart representing themes from the words used to describe the atmosphere within community gardens.

Does participation in the garden provide a better understanding of wildlife, conservation and sustainability?

Participants were asked to rank their knowledge on four subjects (wildlife, conservation, sustainability and gardening) before and after joining their community garden, from 1 (none-little) to 5 (a lot). On average, respondents ranked their knowledge higher after joining their community garden for all four of the subjects. Respondents' average self-ranked knowledge of wildlife increased from 3.4 to 3.9, conservation increased from 3.3 to 3.9, sustainability increased from 3.4 to 4, and gardening increased from 3.4 to 4.2 (Figure 11). However, it is important to note that this was not a before-and-after study, so there is no evidence of participants' knowledge before or after coming to the garden. The results are only based on participants' subjectively ranked knowledge and statements. These results suggest that community gardens could be educational, as well as an area to provide access to nature and improve wellbeing of participants. The reason that participants feel they gained knowledge of all four subjects whilst attending the garden could be due to practical learning whilst being within nature, which has been found to be a significant factor for an increase in knowledge (Entwistle, 1969; Datta, 2016). Participants' knowledge could also be shared and gained between members within the community garden via intergenerational learning (Hake, 2017; Newman & Hatton-Yeo, 2008). When observing KCOG, there were multiple occasions in which intergenerational learning occurred. Additionally, all 14 participants responded positively when asked in the preliminary interviews whether they enjoyed the variety of ages within the community garden. One respondent commented,

“The garden gives a good sense of community, I love coming here, all the people are so lovely. We are all here for the same reasons, we learn new things together.”

When observing KCOG, the participants would communicate with one another and ask each other questions to gain knowledge on the environment, animals and garden/plants around

them. Therefore, intergenerational interaction and learning within community gardens is a significant factor in the acquirement of knowledge regarding the environment. Furthermore, the informal learning which occurred within the community gardens could contribute to high empathy development in regard to the four subjects (Young et al., 2018). Moreover, high empathy towards environmental issues and wildlife has previously been found to increase the likelihood of pro-environmental behaviours (Young et al., 2018). When participants from the preliminary interviews were asked if they had learnt anything during their time at the garden, the majority of them replied yes. One respondent stated,

“I think I knew about nature in the sense that I could tell you, ‘that’s a tree’, but I could not tell you anything detailed about it, whereas now I know far more. I didn’t even know how to garden when I came here, I learnt how to garden here.”.

These findings suggest that important environmental and gardening knowledge can be acquired by attending a community garden. However, it is important to bear in mind that the knowledge gain data should be approached with caution, considering the possibility of bias due to its self-reported nature. This means that there may be a tendency for individuals to overestimate their level of knowledge gain, which could have an impact on the accuracy of the results. Therefore, it is advisable to take this factor into account when interpreting the data.

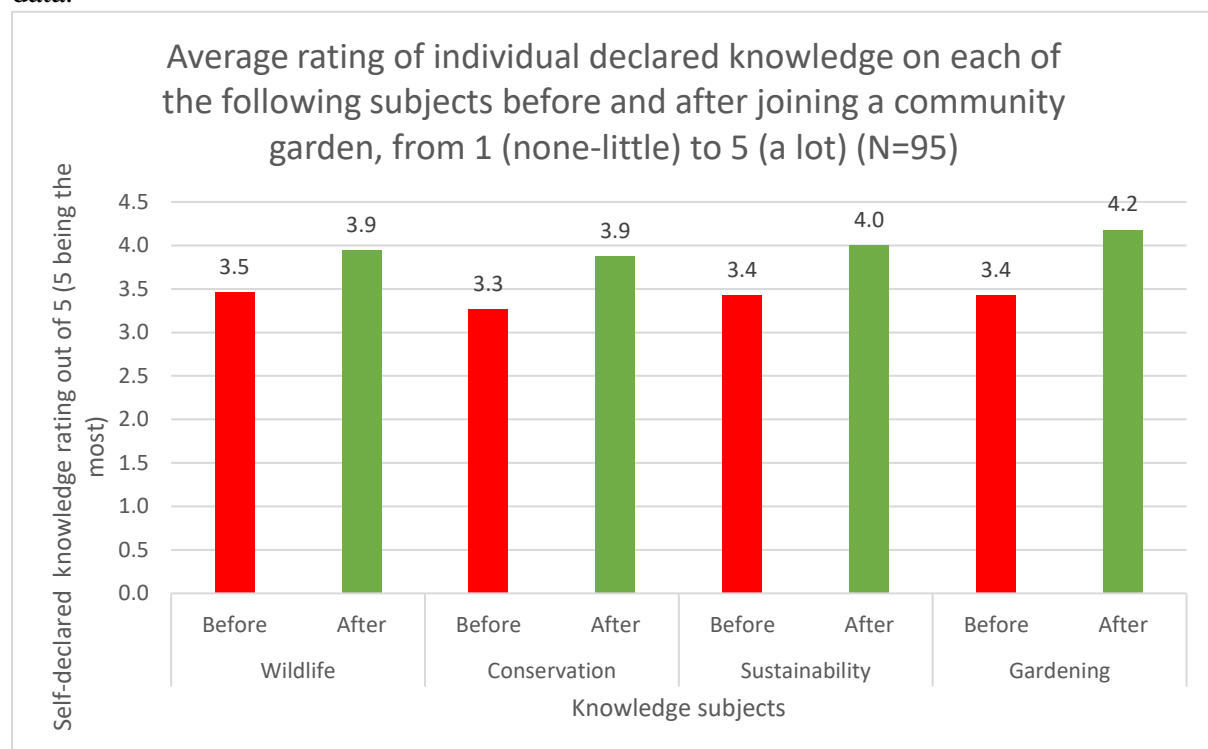


Figure 11 – A histogram representing the average rating of individual declared knowledge of each subject before and after joining a community garden. This is based on a scale of 1 (none-little) and to 5 (a lot).

How do participants view conservation and sustainability?

Although determining the perceived importance of conservation and sustainability was not included as an aim of this study, the researcher included a question regarding participants’ views on these subjects in the questionnaire. The question asked the participants to rate their views on conservation and sustainability from 1 (not important) to 5 (extremely important).

On average, respondents felt conservation and sustainability were very important/extremely important (4.6 out of 5 for both subjects).

However, when the data was divided by gender, a higher number of females said they felt that both conservation and sustainability were ‘extremely important’, compared to males (Figures 13 and 14). Nevertheless, this does not mean that male respondents feel that these subjects are not important, as there was still a high number of male respondents who selected conservation and sustainability as ‘very important’ and ‘extremely important’. This said, there are previous findings that women have more pro-environmental views when compared to men (Desrochers et al., 2019; Gifford & Nilsson, 2014; Milfont & Schultz, 2018). Therefore, this could be a significant finding and could be analysed further. The same difference was found between adults and older adults: a higher percentage of adults felt both subjects were ‘extremely important’, compared to older adults (Figures 15 and 16). However, the idea that the older generation cares less about the planet and environment is a common misconception, with studies finding mixed evidence regarding which age group cares more about the environment (Gifford & Nilsson, 2014; Milfont & Schultz, 2018).

A comparison of the percentage of male and female views of the importance of conservation

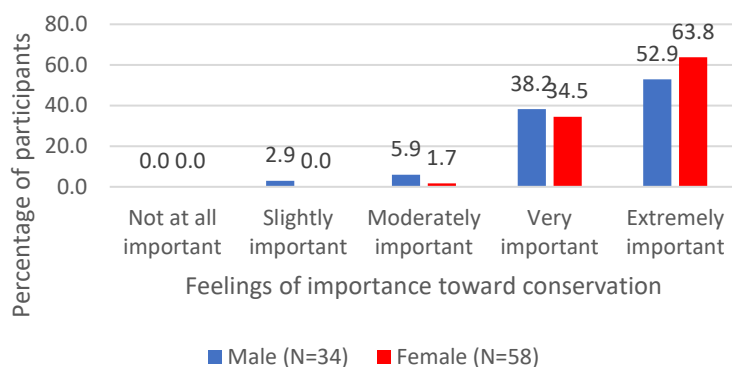


Figure 12 - A histogram comparing the percentage of male (blue) and female (red) participants and their views on the importance of conservation.

A comparison of the percentage of male and female views of the importance of sustainability

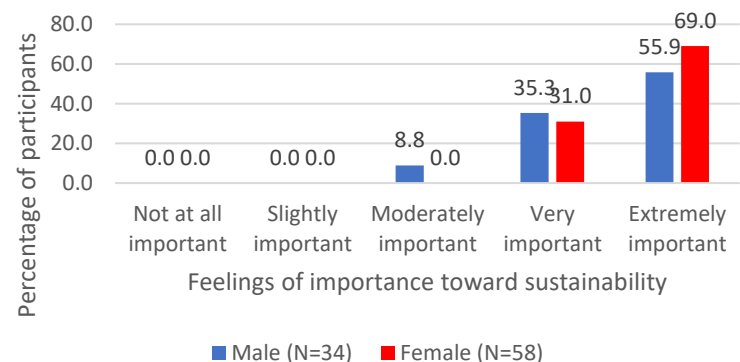


Figure 13 - A histogram comparing the percentage of male (blue) and female (red) participants and their views on the importance of sustainability.

A comparison of the percentage of adults and older adults views on the importance of conservation

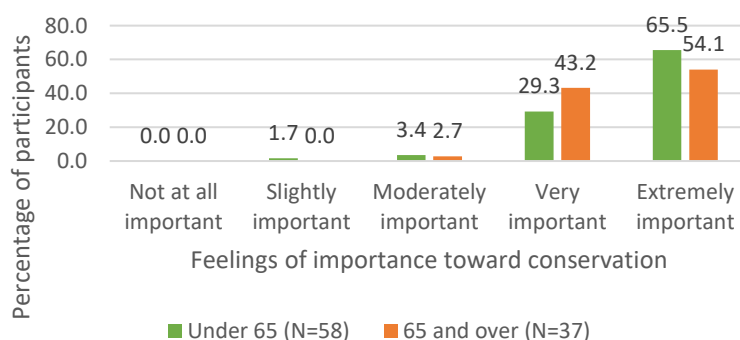


Figure 14 - A histogram comparing the percentage of adults (green) and older adults (orange) and their views on the importance of conservation.

A comparison of the percentage of adults and older adults views on the importance of sustainability

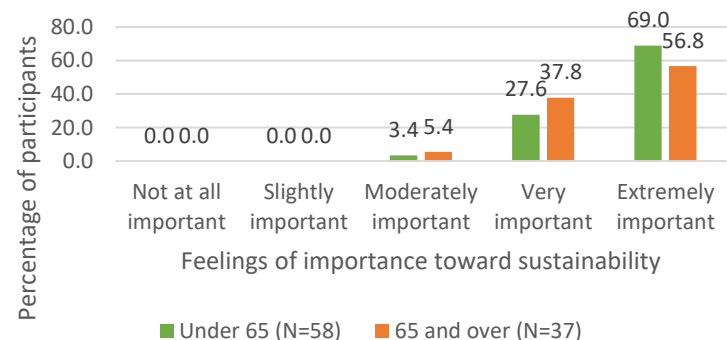


Figure 15 - A histogram comparing the percentage of adults (green) and older adults (orange) and their views on the importance of sustainability.

To understand whether these gender and age differences are statistically significant, statistical tests were conducted using SPSS. The same tests were used when comparing males to females and adults to older adults regarding their views on conservation and sustainability. First a Kolmogorov-Smirnov test was used to determine whether the data was normally distributed. For each of the comparisons, the p value was below 0.05 (<0.001 for all four test results – Table 1), meaning that the data is not normally distributed. Therefore, a Mann-Whitney U test was conducted on each of the comparisons. The p value for all four comparisons was higher than the significance level of 0.05 ($p=0.218$ and $p=0.132$ for male and female comparisons of conservation and sustainability respectively, and $p=0.339$ and $p=0.226$ for adult and older adult comparisons of conservation and sustainability respectively – Table 2). Therefore, no statistical differences were found between male and female respondents regarding their views on conservation and sustainability, with the same also being found for adults and older adults. However, as per the trend identified within the descriptive statistics that female and adult respondents have a higher number of votes for ‘extremely important’ in regards to conservation and sustainability compared to male and older adult respondents respectively, there was a difference in mean ranks within the Mann-Whitney U test (Table 3). Therefore, this was still a notable finding surrounding important environmental issues. Consequently, demographic differences regarding views on conservation and sustainability should be researched further on a broader scale.

Kolmogorov-Smirnov test results - Test of Normality		
	Conservation Sig. (p value)	Sustainability Sig. (p value)
Male	<0.001	<0.001
Female	<0.001	<0.001
Adult	<0.001	<0.001
Older Adult	<0.001	<0.001

Table 1 - A table representing Kolmogorov-Smirnov tests (tests of normality) that were conducted on male, female, adult and older adult participant data regarding their views on conservation and sustainability

Mann-Whitney U test results		
	Conservation Sig. (p value)	Sustainability Sig. (p value)
Male and female	$z = -1.23, p=0.218$	$z = -1.51, p=0.132$
Adult and older adult	$z = -0.96, p=0.339$	$z = -1.21, p=0.226$

Table 2 - A table representing Mann-Whitney U test that were conducted on male/female and adult/older adult participant data regarding their views on conservation and sustainability

Mann-Whitney U test – Mean differences		
	Gender/Age	Mean rank
Gender difference in views on conservation	Male	42.65
	Female	48.76
Gender difference in views on sustainability	Male	41.91
	Female	49.19
Age difference in views on conservation	Adult	49.84
	Older adult	45.11

Age difference in views on sustainability	Adult	50.29
	Older adult	44.41

Table 3 - Mann-Whitney U test results for mean differences of male/female and adult/older adult participants regarding their views on conservation and sustainability

Other important findings

Fourteen statements were developed based on the preliminary interviews, which were included in the questionnaire. Due to these statements being based on preliminary interview quotes, they may not be neutrally written, following the write up of report the researcher recognised that they should have been rephrased. This should be taken into consideration when interpreting the data. Participants rated the statements using a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The most agreed with statement was, ‘The garden attracts wildlife.’, with an average rating of 4.7 (Table 4). This is extremely important, particularly from a conservation perspective. If wildlife is attracted to the garden, then it is not only the participants and plants that are gaining something from community gardens, wildlife is too, making it an ‘earth community’ (Berry, 1988; Ohmer et al., 2009). Creating an area which encompasses an Earth community could be the first step towards conservation within gardens (Van Helden et al., 2020; Cannon, 1999; Holden & Abbott, 2023). Further research is needed regarding how well community gardens attract wildlife, and which species the gardens attract. The second highest-rated statement was, ‘Coming to the garden makes a positive difference to my day.’, with an average rating of 4.6 (Table 4). The fact that this statement was highly agreed with supports the finding of this study that attending a community garden positively affects participants’ wellbeing.

Average rating of questionnaire statements, from 1 (strongly disagree) to 5 (strongly agree)	Average rating
The garden attracts wildlife	4.71
Coming to the garden makes a positive difference to my day	4.58
The garden is a relaxing place	4.55
I feel the garden is a safe space where there is no judgement	4.41
I feel I have made friends coming to the garden	4.39
It’s nice to have the option to attend a regular group with no commitment	4.22
The community at the garden takes me out of my ‘normal’ social bubble	4.15
I feel more in touch with nature since attending the garden	4.12
Being at the garden helps me take a break from my phone/social media	4.04
Participating in the garden has given me a better understanding of the importance of nature and sustainability	3.98
I notice a positive difference in myself during the weeks I visit the garden compared to the weeks that I do not	3.92
Being at the garden is an escape from ‘real life’	3.91
I appreciate nature more since attending the garden	3.88
Taking the fresh produce home from the garden has given me more of an incentive to make a healthy meal	3.61

Table 4 – A table representing the average rating of questionnaire statements from 1 strongly disagree to 5 strongly agree. The table is in order of most agreed with statement (top) to least agreed with (bottom).

The results from this research demonstrate that community gardens positively affect participant wellbeing, specifically through overall feeling increase from before attending the garden to during/after (from 3.3 to 4.4 out of 5). Furthermore, the results from the

questionnaire, interviews and observations demonstrate that community gardens promote positive and social relationships between participants while at the garden; this was highlighted by the most voted activity being ‘socialising’ (81 out of 95 respondents). Nature connectedness gained from community gardens was also demonstrated by respondents selecting ‘being around nature’ as the top voted reason to attend their community garden, with participants from the interviews also commenting on how the nature aspect of attending the community garden is important to them. Together, the results found in this study along with research from previous studies demonstrating how important gardens are for wildlife (Van Helden et al., 2020; Cannon, 1999; Holland, 2004; Holden & Abbott, 2023; Mancebo, 2018) supports the idea that community gardens incorporate an earth community. An earth community is the optimal situation for all parties as it supports individual wellness, human-human relationships, human-environment relationships (nature connectedness) and nature/wildlife communities (Berry, 1988; Ohmer et al., 2009). However, due to this study not directly measuring the benefits that community gardens provide to wildlife/plants/earth, further research is needed.

Conclusion

The main objective of this study is to delve deeper into the role that community gardens play in the lives of their participants. It seeks to investigate the extent to which these gardens contribute to the participants' well-being, and whether there is any significant knowledge gained about the environment as a result of their involvement in these gardens and intergenerational learning. Due to the increase in urbanisation, the negative state of the environment and the increase in negative wellbeing within the UK, specifically in the UK, including cost-of-living crisis and the aftermath of COVID-19 which could also be reasons for the rise in suicides over the last few years (Samaritans, 2021; Williams & Dienes, 2022; Ogunbode et al., 2022; O'Connor et al., 2020). It can be important for individuals to access green spaces, specifically those which will improve wellbeing and educate individuals on environmental issues.

It is important to note that this study has some limitations. Firstly, the participants who took part in the study were self-selected, which means that the results may not be representative of the general population. Additionally, the number of participants in each community garden was relatively small. When comparing sub-groups, such as gender, there was a small number of male participants, which could have influenced the results. It is also important to mention that this study did not measure knowledge before and after attendance, but rather knowledge gain was subjectively ranked by participants based on their memory, which means that there may be some bias in the results. Based on the assumption that the data analysis represents the entire study population of community garden participants, the following conclusions may be applicable.

The current study's findings suggest that community gardens improve individual wellbeing and increase knowledge about conservation, sustainability, wildlife and gardening. More specifically, this study suggests that community gardens improved wellbeing in the following ways: social (demonstrated by socialising being the highest-voted activity), physical (demonstrated by planting being the most important activity) and mental (demonstrated by mental wellbeing being the highest-voted reason). Furthermore, since 'mental wellbeing' was the highest-voted reason to attend community gardens and 'being around nature' was voted as the most important reason for the respondent sample, this suggests that being around nature is a contributing factor of positive wellbeing. In fact, participants' self-reported wellbeing improved during attendance at the garden and was maintained following attendance, compared to before attending the garden. Additionally, qualitative data from participant interviews also suggested that one of the significant reasons for this increase in wellbeing is due to the connection to nature which community gardens provide. It is also important to note that there was a greater increase in positive feelings in respondents who indicated that they struggle with their mental health from before attending the community garden to during and after attending, compared to respondents who indicated that they do not struggle with their mental health. Further research is needed regarding the effect that community gardens have specifically on participants with mental health struggles.

These results suggest that community gardens do positively affect participant wellbeing, specifically relating to connection to nature and socialising. Therefore, these findings along with the research that gardens benefit and support wildlife and plants (Van Helden et al., 2020; Cannon, 1999; Holland, 2004; Holden & Abbott, 2023; Mancebo, 2018), demonstrates

that earth communities are possible within community gardens. That being so, one reason why community gardens are significant is that they encompass an earth community, which is essential for the survival of future generations. Consequently, it is important to keep community gardens thriving and attract new people whilst keeping the current participants happy. However, it is important to note that this study did not directly address the benefits that gardens have for wildlife, so this should be studied further.

According to the findings of this study, the participants' self-assessed environmental knowledge related to gardening, wildlife, conservation, and sustainability improved after joining the garden. The study suggests that community gardens provided a conducive environment for the participants to learn and enhance their knowledge and awareness of the environment. As previously mentioned, the detrimental impact of climate change and urbanisation on the environment is expected to worsen in the coming years. To combat this, it is essential to raise awareness and cultivate empathy towards our surroundings. By doing so, individuals are more likely to feel compelled to make a difference. Participating in a community garden is a rewarding and meaningful way to contribute towards this cause.

Overall, the results from this study suggest that community gardens did have a positive impact on participant wellbeing, in line with findings of other studies (Soga et al., 2017; van den Berg et al., 2010; McGuire et al., 2022; Fieldhouse, 2003). This study also suggests that community gardens increased participants' knowledge on all four environmental subjects: wildlife, conservation, sustainability and gardening, similarly to previous research (Nord et al., 1998; Young et al., 2018; Hake, 2017). Additionally, this study suggests that there were differences between both ages and genders in relation to perceived importance of sustainability and conservation. Such gender differences have previously been found, with women being more pro-environmental than men (Desrochers et al., 2019; Gifford & Nilsson, 2014; Milfont & Schultz, 2018).

In conclusion, this study has investigated the ranking and ratings of activities and reasons participants enjoy/come to community gardens which could help attract future participants and continue to keep current majority of participants enjoying the garden. This study also found through subjectively ranked knowledge, that community gardens can improve environmental knowledge, which can be extremely important when considering the importance of the awareness of environmental issues. By providing opportunities for individuals to engage with the natural world and learn about sustainable practices, community gardens can serve as powerful tools for promoting environmental education. Finally, the results from this study suggest that differences in mental health and demographics such as age and gender may effect which activities and reasons are most important to participant engagement. Therefore, the findings of this study illustrate the importance of community gardens in the UK in order to increase wellbeing and educate the public about environmental issues. Furthermore, this research can serve as a means of discussing the significance of community gardens and green spaces, particularly in light of the growing trend of urbanisation and housing developments. The government initiated a project called "Making Space for Nature" in 2010, which included a section recommending the reconnection of people to nature by improving ecological networks in urban environments (Lawton, 2010). This study suggests that community gardens are a perfect fit for this recommendation and should be taken into consideration as a way of incorporating green spaces into urban settings.

References

- Ahima, R.S. and Lazar, M.A. (2013) "The health risk of obesity—Better Metrics Imperative," *Science*, 341(6148), pp. 856–858.
- Almond, R.E.A., Grooten, M. and Petersen, T. (2020) "Living planet report 2020," *Bending the curve of biodiversity loss*, pp. 1–83.
- Anguluri, R. and Narayanan, P. (2017) 'Role of green space in urban planning: Outlook towards smart cities', *Urban Forestry & Urban Greening*, 25, pp. 58–65. Doi:10.1016/j.ufug.2017.04.007.
- Armstrong, D. (2000) "A survey of community gardens in upstate New York: Implications for Health Promotion and Community Development," *Health & Place*, 6(4), pp. 319–327.
- Azizi, N.Z. *et al.* (2016) 'Recurring issues in historic building conservation', *Procedia - Social and Behavioral Sciences*, 222, pp. 587–595.
- Barthel, S. (2008) "Recalling urban nature-linking city people to ecosystem services," *PhD Dissertation. Stockholm University*, pp. 1-33
- Bassett, T.J., 1979. "Vacant lot cultivation: community gardening in America 1893–1978," *Unpublished Master's Thesis*, pp. 1-200.
- Baur, J. (2020) "Campus Community Gardens and student health: A case study of a campus garden and student well-being," *Journal of American College Health*, 70(2), pp. 377–384.
- Bell, S.L. *et al.* (2015) 'Seeking everyday wellbeing: The coast as a therapeutic landscape', *Social Science & Medicine*, 142, pp. 56–67.
- Bell, S.L. *et al.* (2017) "Everyday Green space and experienced well-being: The significance of wildlife encounters," *Landscape Research*, 43(1), pp. 8–19.
- Bendt, P., Barthel, S. and Colding, J. (2013) "Civic Greening and Environmental Learning in public-access community gardens in Berlin," *Landscape and Urban Planning*, 109(1), pp. 18–30.
- Berry, T. M. (1988). *The dream of the earth*. San Francisco: Sierra Club Books.
- Boswell, V. (1943) "Victory gardens," *U.S. Department of Agriculture*, (483), pp. 1–16.
- Brady, S. (2016) 'Engineering the Hanging Garden of Babylon', *The Structural Engineer*, pp. 40–42.
- Brundtland, G.H. (1987) *Report of the World Commission on Environment and Development: 'Our common future.'* New York: United Nations.
- Buck, D. (2016) "Gardens and health," *Implications for policy and practice*, pp. 1–62.
- Buckingham, S. (2003) 'Allotments and community gardens: a DIY approach to environmental sustainability', *Local Environmental Sustainability*, pp. 195–212.
- Butenschön, S. and Säumel, I. (2011) 'Between cultural and ecological processes: Historical plant use in communal parks in Berlin, Germany', *Journal of Landscape Architecture*, 6(1), pp. 54–67.
- Campbell, M. and Campbell, I. (2011) "Allotment waiting lists in England 2011," *National Society of Allotment and Leisure Gardeners*, pp. 1–8.
- Cannon, A. (1999) 'The significance of private gardens for bird conservation', *Bird Conservation International*, 9(4), pp. 287–297.
- Cardinale, B.J. *et al.* (2012) 'Biodiversity loss and its impact on humanity', *Nature*, 486(7401), pp. 59–67.
- Cella, D.F. (1994) 'Quality of life: Concepts and definition', *Journal of Pain and Symptom Management*, 9(3), pp. 186–192.
- Cleary, A. *et al.* (2017) "Exploring potential mechanisms involved in the relationship between eudaimonic wellbeing and nature connection," *Landscape and Urban Planning*, 158, pp. 119–128.
- Cohen, S. *et al.* (2003) "Emotional style and susceptibility to the common cold," *Psychosomatic Medicine*, 65(4), pp. 652–657.

- Coon, J.T. *et al.* (2011) “Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review,” *Journal of Epidemiology & Community Health*, 65(2), pp. 1761–1772.
- Cornwell, E.Y. and Waite, L.J. (2009) “Social disconnectedness, perceived isolation, and health among older adults,” *Journal of Health and Social Behavior*, 50(1), pp. 31–48.
- Cronon, W. (1996) ‘The trouble with wilderness: Or, getting back to the wrong nature’, *Environmental History*, 1(1), pp. 7–28.
- Crouch, D. (1993) “Commitment, enthusiasms and creativity in the world of allotment holding,” *World Leisure & Recreation*, 35(1), pp. 19–22.
- Datta, R. (2016) “Community garden: A Bridging program between formal and informal learning,” *Cogent Education*, 3(1), pp. 1–14.
- Desrochers, J.E. *et al.* (2019) ‘Does personality mediate the relationship between sex and environmentalism?’, *Personality and Individual Differences*, 147, pp. 204–213.
- Diener, E. and Chan, M.Y. (2011) “Happy people live longer: Subjective well-being contributes to health and longevity,” *Applied Psychology: Health and Well-Being*, 3(1), pp. 1–43.
- Diener, E. and Seligman, M.E.P. (2002) “Very happy people,” *Psychological Science*, 13(1), pp. 81–84.
- Dobson, M.C. *et al.* (2020) “‘My little piece of the planet’: The multiplicity of well-being benefits from allotment gardening”, *British Food Journal*, 123(3), pp. 1012–1023.
- Dolan, P., Peasgood, T. and White, M. (2008) “Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being,” *Journal of Economic Psychology*, 29(1), pp. 94–122.
- Dorling, D. (2010) ‘Persistent North-South Divides’, *The Economic Geography of the UK*, pp. 12–28.
- Ellaway, A., Macintyre, S. and Bonnefoy, X. (2005) “Graffiti, greenery, and obesity in adults: Secondary Analysis of European Cross Sectional Survey,” *British Medical Journal*, 331(7517), pp. 611–612.
- Ellen, R., 2020. *Nature wars: essays around a contested concept* (Vol. 27). Berghahn Books, pp. 1-8
- Enssle, F. and Kabisch, N. (2020) ‘Urban green spaces for the social interaction, health and well-being of older people— an integrated view of Urban Ecosystem Services and socio-environmental justice’, *Environmental Science & Policy*, 109, pp. 36–44.
- Entwistle, H. (1969) ‘Practical and Theoretical Learning’, *British Journal of Educational Studies*, 17(2), pp. 117–128.
- Fieldhouse, J. (2003) “The impact of an allotment group on mental health clients' health, Wellbeing and Social Networking,” *British Journal of Occupational Therapy*, 66(7), pp. 286–296.
- Finerman, R. and Sackett, R. (2003) ‘Using home gardens to decipher health and healing in the Andes.’, *Medical Anthropology Quarterly*, 17(4), pp. 459–482.
- Firth, C., Maye, D. and Pearson, D. (2011) “Developing ‘community’ in Community Gardens,” *Local Environment*, 16(6), pp. 555–568.
- Fowler, J.H. and Christakis, N.A. (2008) “Dynamic spread of happiness in a large social network: Longitudinal analysis over 20 years in the Framingham Heart Study,” *British Medical Journal*, 337, pp. 1–9.
- Genter, C. *et al.* (2015) ‘The contribution of allotment gardening to health and wellbeing: A systematic review of the literature’, *British Journal of Occupational Therapy*, 78(10), pp. 593–605.
- Gifford, R. and Nilsson, A. (2014) ‘Personal and social factors that influence pro-environmental concern and behaviour: A Review’, *International Journal of Psychology*, pp. 141–157.
- Giovannoni, E. and Fabietti, G. (2013) “What is sustainability? A review of the concept and its applications,” *Integrated Reporting*, pp. 21–40.
- Goddard, M.A., Dougill, A.J. and Benton, T.G. (2010) “Scaling up from gardens: Biodiversity conservation in urban environments,” *Trends in Ecology & Evolution*, 25(2), pp. 90–98.

- Hadfield, M. (1985) *A History of British Gardening*. Harmondsworth, Middlesex: Penguin Books.
- Holden, P. and Abbott, G. (2023) *RSPB Handbook of Garden Wildlife*. London: Bloomsbury Wildlife.
- Holland, L. (2004) 'Diversity and connections in community gardens: A contribution to local sustainability', *Local Environment*, 9(3), pp. 285–305.
- Hope, N. and Ellis, V. (2009) "Can you dig it?," Meeting community demands for allotments London: New Local Government Network, pp. 1-32.
- Huai, H. and Hamilton, A. (2008) 'Characteristics and functions of traditional Homegardens: A Review', *Frontiers of Biology in China*, 4(2), pp. 151–157.
- Huppert, F.A. (2009) 'Psychological well-being: Evidence regarding its causes and consequences', *Applied Psychology: Health and Well-Being*, 1(2), pp. 137–164.
- Irvine, S., Johnson, L. and Peters, K. (1999) "Community Gardens and Sustainable Land Use Planning: A case-study of the Alex Wilson Community garden," *Local Environment*, 4(1), pp. 33–46.
- Keniger, L. et al. (2013) "What are the benefits of interacting with nature?," *International Journal of Environmental Research and Public Health*, 10(3), pp. 913–935.
- Khan, M.M. et al. (2020) 'Urban Horticulture for food secure cities through and beyond covid-19', *Sustainability*, 12(22), pp. 1–21.
- Kingsley, J. 'Yotti', Townsend, M. and Henderson-Wilson, C. (2009) 'Cultivating Health and Wellbeing: Members' perceptions of the health benefits of a Port Melbourne Community garden', *Leisure Studies*, 28(2), pp. 207–219.
- Koay, W.I. and Dillon, D. (2020) "Community gardening: Stress, well-being, and resilience potentials," *International Journal of Environmental Research and Public Health*, 17(18), p. 1-31.
- Kuhlman, T. and Farrington, J. (2010) "What is sustainability?," *Sustainability*, 2(11), pp. 3436–3448.
- Kurtz, H. (2001) "Differentiating multiple meanings of garden and community," *Urban Geography*, 22(7), pp. 656–670.
- Lai, H. et al. (2019) 'The impact of green space and biodiversity on health', *Frontiers in Ecology and the Environment*, 17(7), pp. 383–390.
- Lamers, S.M. et al. (2011) "The impact of emotional well-being on long-term recovery and survival in physical illness: A meta-analysis," *Journal of Behavioral Medicine*, 35(5), pp. 538–547.
- Lampert, T. et al. (2021) 'Evidence on the contribution of community gardens to promote physical and mental health and well-being of non-institutionalized individuals: A systematic review', *PLOS ONE*, 16(8), pp. 1–19.
- Lawton, J. (2010) 'Making Space for Nature: A review of England's Wildlife Sites and Ecological Network ', *Making Space for Nature*, pp. 1–119.
- Leach, M. et al. (2012) 'Transforming Innovation for Sustainability', *Ecology and Society*, 17(2), pp. 1–6.
- Mancebo, F. (2018) 'Gardening the city: Addressing sustainability and adapting to global warming through Urban Agriculture', *Environments*, 5(3), pp. 1–11.
- Mayer, F.S. and Frantz, C.M. (2004) 'The connectedness to nature scale: A measure of individuals' feeling in community with nature', *Journal of Environmental Psychology*, 24(4), pp. 503–515.
- McGuire, L., Morris, S.L. and Pollard, T.M. (2022) "Community Gardening and wellbeing: The understandings of organisers and their implications for gardening for health," *Health & Place*, 75, pp. 1–7.
- McIlvaine-Newsad, H. and Porter, R. (2013) 'How does your garden grow? environmental justice aspects of community gardens', *Journal of Ecological Anthropology*, 16(1), pp. 69–75.
- McIntyre, N., Knowles-Yáñez, K. and Hope, D. (2000) "Urban ecology as an interdisciplinary field: Differences in the use of 'urban' between the Social and Natural Sciences," *Urban Ecosystems*, 4(5), pp. 5–24.
- McKinney, M.L. (2002) "Urbanization, Biodiversity, and Conservation: The impacts of urbanization on native species are poorly studied, but educating a highly urbanized human population about these impacts can greatly improve species conservation in all ecosystems," *BioScience*, 52(10), pp. 883–890.

- Milfont, T.L. and Schultz, P.W. (2018) 'The role of attitudes in environmental issues', *The Handbook of Attitudes: Applications*, pp. 1–28.
- Miller, J.R. (2005) "Biodiversity Conservation and the Extinction of Experience," *Trends in Ecology & Evolution*, 20(8), pp. 430–434.
- Morel, K. and Léger, F. (2016) 'A conceptual framework for alternative farmers' strategic choices: The case of French organic market gardening microfarms', *Agroecology and Sustainable Food Systems*, 40(5), pp. 466–492.
- Navarro-Pere, M. and Tidball, K.G. (2012) "Challenges of Biodiversity Education: A Review of Education Strategies for Biodiversity Education," *International Electronic Journal of Environmental Education*, 2(1), pp. 13–30.
- Necka, E.A., Rowland, L.M. and Evans, J.D. (2021) "Social disconnection in late life mental illness – commentary from the National Institute of Mental Health," *The American Journal of Geriatric Psychiatry*, 29(8), pp. 727–730.
- Newman, S. and Hatton-Yeo, A. (2008) 'Intergenerational Learning and the Contributions of Older People', *Ageing Horizons*, (8), pp. 31–39.
- Nkosi, S. *et al.* (2014) 'Community Gardens as a Form of Urban Household Food and Income Supplements in African Cities: Experiences in Hammanskraal, Pretoria', *AISA Policy brief*, 112, pp. 1–7.
- Noone, S. and Jenkins, N. (2017) "Digging for dementia: Exploring the experience of community gardening from the perspectives of people with dementia," *Aging & Mental Health*, 22(7), pp. 881–888.
- Nord, M., Luloff, A.E. and Bridger, J.C. (1998) 'The Association of Forest Recreation with Environmentalism', *Environment and Behavior*, 30(2), pp. 235–246.
- O'Connor, R.C. *et al.* (2020) "Mental health and well-being during the COVID-19 pandemic: Longitudinal analyses of adults in the UK COVID-19 mental health & wellbeing study," *The British Journal of Psychiatry*, 218(6), pp. 326–333.
- Ogunbode, C.A. *et al.* (2022) "Climate anxiety, wellbeing and pro-environmental action: correlates of negative emotional responses to climate change in 32 countries," *Journal of Environmental Psychology*, 84, pp. 1–14.
- Ohmer, M.L. *et al.* (2009) "Community Gardening and Community Development: Individual, social and community benefits of a community conservation program," *Journal of Community Practice*, 17(4), pp. 377–399.
- Oxford Dictionary (2023) *Conservation - Definition, Oxford dictionary*. Available at: https://www.oxfordlearnersdictionaries.com/definition/american_english/conservation (Accessed: 09 June 2023).
- Oxford Dictionary (2023) *Garden - Definition, Oxford Advanced Learner's Dictionary*. Available at: <https://www.oxfordlearnersdictionaries.com/definition/english/garden>
- Oxford English Dictionary (2023) *Well-being definition, Oxford English Dictionary*. Available at: <https://www.oed.com/viewdictionaryentry/Entry/227050>. (Accessed: 06 June 2023).
- Piperno, D.R. (2011) 'The origins of plant cultivation and domestication in the new world tropics', *Current Anthropology*, 52(4), pp. 453–470.
- Poonam Kumari, T., Sharma, R. and Anandrao Sahare, H. (2018) 'Therapeutic Gardens in Healthcare : A Review', *Annals of Biology*, 32(2), pp. 162–166.
- Pouso, S. *et al.* (2021) "Contact with blue-green spaces during the COVID-19 pandemic lockdown beneficial for mental health," *Science of The Total Environment*, 756, p. 1–12.
- Pritchard, A. *et al.* (2019) 'The relationship between nature connectedness and eudaimonic well-being: A meta-analysis', *Journal of Happiness Studies*, 21(3), pp. 1145–1167.
- Rakow, D.A. (2011) 'Public Garden Management: A Complete Guide to the Planning and Administration of Botanical Gardens and Arboreta', *What is a public garden?*, pp. 3–14.
- Razwan, A.M., Dennis, L.Y.C. and Liu, C. (2008) 'A review on the generation, determination and mitigation of Urban Heat Island', *Journal of Environmental Sciences*, 20(1), pp. 120–128.

- Reeves, J. et al. (2013) 'Quantifying soil health and tomato crop productivity in urban community and Market Gardens', *Urban Ecosystems*, 17(1), pp. 221–238.
- Resolution, G.A. (2015) 'Transforming our world: The 2030 agenda for sustainable development', *UN Doc*, pp. 1–35.
- Richardson, E.A. and Mitchell, R. (2010) "Gender differences in relationships between urban green space and health in the United Kingdom," *Social Science & Medicine*, 71(3), pp. 568–575.
- RSPB (2024) RSPB Nature Prescriptions, Using the power of nature to boost health and Wellbeing. Available at: <https://www.rspb.org.uk/about-us/annual-report/nature-boosts-health-and-wellbeing> (Accessed: 05 March 2024).
- Samaritans (2021) "Suicides in England," *Suicides in England 2021*, pp. 1–3.
- Sandbrook, C. (2015) 'What is conservation?', *Fauna & Flora International*, 49(4), pp. 565–566.
- Santini, Z.I. et al. (2020) "Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis," *The Lancet Public Health*, 5(1), pp. 62–70.
- Social Farms & Gardens (2024) Social Farms & Gardens. Available at: <https://www.farmgarden.org.uk/about-us> (Accessed: 02 March 2024).
- Soemarwoto, O. (1988) 'Homegardens: a traditional agroforestry system with a promising future', *Agroforestry: A decade of development*, 16(4), pp. 157–170.
- Soga, M. and Gaston, K.J. (2016) "Extinction of experience: The loss of human-nature interactions," *Frontiers in Ecology and the Environment*, 14(2), pp. 94–101.
- Soga, M. et al. (2017) "Health benefits of urban allotment gardening: Improved physical and psychological well-being and social integration," *International Journal of Environmental Research and Public Health*, 14(1), p. 71.
- Spano, G. et al. (2020) 'Are community gardening and horticultural interventions beneficial for psychosocial well-being? A meta-analysis', *International Journal of Environmental Research and Public Health*, 17(10), pp. 1–12.
- Symes, W.S. et al. (2018) 'Combined impacts of deforestation and wildlife trade on tropical biodiversity are severely underestimated', *Nature Communications*, 9(4052), pp. 1–9.
- Taylor, L. and Hochuli, D.F. (2017) "Defining greenspace: Multiple uses across multiple disciplines," *Landscape and Urban Planning*, 158, pp. 25–38.
- Teo, A.R., Choi, H.J. and Valenstein, M. (2013) "Social relationships and depression: Ten-year follow-up from a nationally representative study," *PLoS ONE*, 8(4), pp. 1–8.
- Thacker, C. (1979) *The History of Gardens*. Beckenham, Kent: Croom Helm Publishers Ltd.
- The Salvation Army (2023) *Community garden grows fruit and veg for Food Bank*, The Salvation Army. Available at: <https://www.salvationarmy.org.uk/news/community-garden-grows-fruit-and-veg-food-bank> (Accessed: 26 July 2023).
- The Trussel Trust (2023) *The Trussel Trust - End of year stats*, The Trussell Trust. Available at: <https://www.trusselltrust.org/news-and-blog/latest-stats/end-year-stats> (Accessed: 15 July 2023).
- Turner, T. (2005) *Garden history: Philosophy and design, 2000 BC--2000 AD*. London: Spon Press.
- Ulrich, R.S. (1984) "View through a window may influence recovery from surgery," *Science*, 224(4647), pp. 420–421.
- Ulrich, R.S. et al. (1991) "Stress recovery during exposure to natural and Urban Environments," *Journal of Environmental Psychology*, 11(3), pp. 201–230.
- United Nations (2018) *68% of the world population projected to live in urban areas by 2050*, United Nations Department of Economic and Social Affairs. Available at: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html> (Accessed: 06 June 2023).

- United Nations (2022) 'The Sustainable Development Goals Report 2022', *The Sustainable Development Goals Report*, pp. 1-68.
- Van den Berg, A.E. *et al.* (2010) "Allotment Gardening and health: A comparative survey among allotment gardeners and their neighbours without an allotment," *Environmental Health*, 9(1), pp. 1–12.
- Van Helden, B.E., Close, P.G. and Steven, R. (2020) 'Mammal conservation in a changing world: Can urban gardens play a role?', *Urban Ecosystems*, 23(3), pp. 555–567.
- Van Holstein, E. (2017) 'Relating to nature, food and community in Community Gardens', *Local Environment*, 22(10), pp. 1159–1173.
- Veen, E.J. *et al.* (2015) 'Community Gardening and social cohesion: Different designs, different motivations', *Local Environment*, 21(10), pp. 1271–1287.
- Ventriglio, A. *et al.* (2020) "Urbanization and emerging mental health issues," *CNS Spectrums*, 26(1), pp. 43–50.
- Verhoef, M.J. and Casebeer, A.L. (1997) "Broadening horizons: Integrating Quantitative and Qualitative Research," *Canadian Journal of Infectious Diseases*, 8(2), pp. 65–66.
- Vitiello, D. *et al.* (2015) 'From commodity surplus to food justice: Food Banks and local agriculture in the United States', *Agriculture and Human Values*, 32(3), pp. 419–430.
- Wakefield, S. *et al.* (2007) "Growing urban health: Community gardening in South-East Toronto," *Health Promotion International*, 22(2), pp. 92–101.
- Walter, P. (2013) 'Theorising community gardens as pedagogical sites in the Food Movement', *Environmental Education Research*, 19(4), pp. 521–539.
- Williams, S.N. and Dienes, K. (2022) "The 'cost of living crisis' and its effects on health: A qualitative study from the UK."
- Wood, C.J., Pretty, J. and Griffin, M. (2015) "A case–control study of the health and well-being benefits of allotment gardening," *Journal of Public Health*, 38(3), pp. 1–9.
- World Health Organization (2023) *Promoting well-being, World Health Organization - Promoting wellbeing*. Available at: <https://www.who.int/activities/promoting-well-being>. (Accessed: 06 June 2023).
- Zhou, X.-H. *et al.* (2016) 'Concept of scientific wildlife conservation and its dissemination', *Zoological Research*, 37(5), pp. 270–274.

Appendix

Tables

Number of participants who chose each reasons for attending a community garden in order of importance, from rank 1 (most important) to rank 8 (least important) (N=77)								
	Socialising	Physical work	Mental wellbeing	Being around nature	Gardening	Reaping produce	Learning	Other
Rank 1	14	3	16	21	14	1	2	6
Rank 2	13	12	17	12	12	3	4	3
Rank 3	19	6	17	12	9	6	4	2
Rank 4	7	6	9	15	13	5	9	2
Rank 5	5	8	7	8	9	2	10	2
Rank 6	1	3	3	1	4	6	8	2
Rank 7	0	0	0	0	1	6	10	0
Rank 8	0	1	0	0	0	0	0	5
Average ranking	2.6	3.5	2.8	2.7	3.1	4.6	4.8	4

A table representing the number of participants who ranked in order of importance the reasons for attending a community garden. Rank 1 being the most important reasons and rank 8 being the least important reason.

Number of participants who chose each activity that is important for attending their community garden in order of importance, from rank 1 (most important) to rank 11 (least important)											
	Planting	Harvesting	Socialising	Painting	Wildlife activities	Shovelling	Creating new areas	Watering plants	Digging	Weeding	Other
Rank 1	28	9	14	0	4	1	11	1	1	2	6
Rank 2	18	13	13	3	6	2	9	5	1	4	3
Rank 3	10	11	12	5	9	5	4	7	4	5	0
Rank 4	4	6	16	1	8	3	9	3	3	10	2
Rank 5	4	5	5	3	6	11	4	5	6	5	1
Rank 6	1	1	5	0	5	10	6	6	2	7	5
Rank 7	1	3	2	3	3	4	2	9	6	3	1
Rank 8	0	2	1	1	1	1	4	6	5	7	1
Rank 9	0	1	0	2	1	2	1	3	4	2	4
Rank 10	0	0	0	4	1	0	0	1	5	3	0
Rank 11	0	0	0	0	0	0	0	0	1	1	2
Average ranking	2.2	3.3	3.2	5.8	4.2	5.2	3.8	5.5	6.5	5.5	5.1

A table representing the number of participants who ranked in order of importance the activities they enjoyed participating in the most while attending a community garden. Rank 1 being the most enjoyed activity and rank 11 being the least enjoyed activity.

The number of participants that chose each response option regarding how they felt before, during and after attending their community garden			
	Before	During	After
Extremely bad (1)	1	0	0

Somewhat bad (2)	17	0	0
Neither good nor bad (3)	44	4	5
Somewhat good (4)	23	49	48
Extremely good (5)	10	42	42

A table representing the number of participants that chose each response option regarding how they felt before, during and after attending their community garden. This is based on a Likert scale - 1 (extremely bad) to 5 (extremely good).

Participant rankings of individual knowledge before and after joining the garden in relation to each subject, from 1 (none-little) to 5 (a lot)								
	Wildlife		Conservation		Sustainability		Gardening	
	Knowledge before	Knowledge after	Knowledge before	Knowledge after	Knowledge before	Knowledge after	Knowledge before	Knowledge after
1	2	0	3	0	3	0	6	0
2	8	1	14	7	10	1	14	3
3	41	25	43	20	39	21	26	15
4	32	47	25	46	29	50	31	39
5	12	22	10	22	14	23	18	38

A table that represents participants' rankings of individual knowledge before and after joining a community garden in relation to each subject. 1 being none-little and 5 being a lot of knowledge.

Interview guide

1. What made you want to come to the garden?
2. What is your favourite thing to do in the garden?
3. How do you feel before, during and after attending the gardening?
4. Do you enjoy spending time in nature/green space?
5. Did you have much knowledge about nature/sustainability before joining the garden?
6. Do you feel you know more about nature or sustainability since attending the garden?
7. Do you feel the garden has any effect on wildlife?
8. Do you feel the garden has affected your wellbeing?
9. Do you feel less stressed while in the garden?
10. Do you enjoy being around a community of varied ages?
11. Do you take any of the fresh produce home and cook with it?

Questionnaire

Community Gardens UK

Title of project: Significance of Community Gardens within the UK

Researcher name and email: Courtney Rogers (cnr5@kent.ac.uk)

Information sheet -

The following information will provide details of the study so you can make an informed decision on participation.

Why am I doing the project?

I am currently completing my Master's degree at the University of Kent. I would like to invite you to participate in this project, which aims to understand the significance that community gardens have on participants and wildlife. This information may be useful to fellow conservationists that are trying to create more green spaces and community gardens on a broader scale, particularly within urban areas.

What must you do if you agree to participate, and how long will it take?

You will need to complete a questionnaire about your participation in the community garden which should take around 20 minutes to complete. Most questions are multiple-choice or tick boxes.

Will your participation remain confidential?

Yes, all data collected for this research will be kept confidential. No names will be included in the study, and no personal information will be held. Once the research has ended, the data will be analysed and submitted for peer review. The data will be available for future research. However, the participant data will be anonymised for your confidentiality and protection. Please ensure you are completely comfortable with how your data will be used and are confident that strict measures are in place to protect your identity. You are welcome to receive a copy of my findings once the data has been analysed; contact me using the email above.

Do you have to take part in the study?

No, your participation in the study is entirely voluntary, and you are not obligated to participate. If you want to retract your data at any point, use the contact email above, and your data will be removed. If you have any other questions, please contact me before, during or after participation.

What are the advantages and disadvantages of participating in this study?

I hope you find this project interesting to be a part of. Once all of the data has been collected, it could be very useful in understanding the significance of community gardens and green spaces in general, which could therefore help wider conservation efforts. There are no disadvantages to participating in this study, and you are welcome to stop or withdraw from the study at any point.

Consent -

By continuing to the questionnaire, I confirm that:

I have read and understood the information sheet.

I understand that my participation is voluntary and that I am free to withdraw at any point for any reason.

I understand that my data will be treated confidentially, and any publication resulting from this work will report only data that does not identify me. My anonymised responses, however, may be shared with other researchers or made available in online data repositories.

KCOG Questions The following questions will ask you about your time at the Community Garden you participate in, the effect the garden has on you and your views on wildlife and conservation

Q1 What is the name of the community garden that you participate in?

Q2 How did you find out about the garden?

☐ Social media

☐ Finding the community garden by chance

☐ Community garden website

☐ Through a friend

☐ Other (Please Specify) _____

Q3 How often do you attend the garden?

☐ Twice a week

☐ Once a week

☐ Every couple of weeks

☐ Once a month

☐ Every couple of months

☐ Other (Please Specify) _____

Q4 Which of the following are important reasons to you for attending the garden? (Tick all that apply)

- ☐ Socialising
 - ☐ Physical work
 - ☐ Mental wellbeing
 - ☐ Being around nature
 - ☐ Gardening
 - ☐ Reaping produce
 - ☐ Learning
 - ☐ Other (Please Specify) _____
-

Q5 Please rank the items in order of importance for attending the garden (1 being most important)

- _____ Socialising
 - _____ Physical work
 - _____ Mental wellbeing
 - _____ Being around nature
 - _____ Gardening
 - _____ Reaping produce
 - _____ Learning
 - _____ Other (Please Specify)
-

Q6 Which of the following activities do you enjoy in the garden? (Tick all that apply)

- ☐ Planting
 - ☐ Harvesting
 - ☐ Socialising
 - ☐ Painting
 - ☐ Wildlife activities (bird feeders/boxes etc)
 - ☐ Shovelling and dispersing soil/compost/bark chippings around the garden
 - ☐ Creating new areas
 - ☐ Watering plants
 - ☐ Digging
 - ☐ Weeding
 - ☐ Other (Please Specify) _____
-

Q7 Please rank the activities in order of enjoyment (1 being most enjoyable)

- _____ Planting
 - _____ Harvesting
 - _____ Socialising
 - _____ Painting
 - _____ Wildlife activities (bird feeders/boxes etc)
 - _____ Shovelling and dispersing soil/compost/bark chippings around the garden
 - _____ Creating new areas
 - _____ Watering plants
 - _____ Digging
 - _____ Weeding
 - _____ Other (Please Specify)
-

Q8 On average, how much time do you spend in nature weekly (including the garden)?

- ☐ Under 1 hour
 - ☐ 1-3 hours
 - ☐ 3-5 hours
 - ☐ 5-10 hours
 - ☐ 10 hours +
-

Q9 Please rate how you feel on average in these three scenarios

	Extremely bad	Somewhat bad	Neither good nor bad	Somewhat good	Extremely good
In the morning before coming to the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
While at the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After attending the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10 How important do you feel the following are?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Conservation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 **Before** joining the garden, how would you rate your knowledge on the following on a scale of 1-5 (1 being none at all and 5 being a lot)?

	1	2	3	4	5
Wildlife	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conservation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gardening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 **After** joining the garden, how would you rate your knowledge on the following on a scale of 1-5 (1 being none at all and 5 being a lot)?

	1	2	3	4	5
Wildlife	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conservation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gardening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 What kind of atmosphere do you feel the garden has?

Q14 How much do you agree or disagree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Being at the garden is an escape from 'real life'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's nice to have the option to attend a regular group with no commitment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more in touch with nature since attending the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I appreciate nature more since attending the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participating in the garden has given me a better understanding of the importance of nature and sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the garden is a safe space where there is no judgement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coming to the garden makes a positive difference to my day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The community at the garden takes me out of my normal 'social bubble'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Being at the garden helps me take a break from my phone/social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I notice a positive difference in myself during the weeks I visit the garden compared to the weeks that I do not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The garden is a relaxing place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The garden attracts wildlife	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking the fresh produce home from the garden has given me more of an incentive to make a healthy meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I have made friends coming to the garden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographic Information - The following section will collect some information about yourself

Q15 What is your age?

- ☐ Under 18
 - ☐ 18 - 24
 - ☐ 25 - 34
 - ☐ 35 - 44
 - ☐ 45 - 54
 - ☐ 55 - 64
 - ☐ 65 - 74
 - ☐ 75 - 84
 - ☐ 85 or older
 - ☐ Prefer not to say
-

Q16 What gender do you identify with?

- ☐ Male
 - ☐ Female
 - ☐ Non-binary / genderfluid / agender
 - ☐ Prefer not to say
-

Q17 What is your ethnicity?

- ☐ White
 - ☐ Black or African American
 - ☐ American Indian or Alaska Native
 - ☐ Asian
 - ☐ Native Hawaiian or Pacific Islander
 - ☐ Other
 - ☐ Prefer not to say
-

Q18 What is your current status?

- ☐ Employed
 - ☐ Unemployed
 - ☐ Retired
 - ☐ Student
 - ☐ Prefer not to say
 - ☐ Other _____
-

Q19 Do you struggle with any mental health problems?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Q20 If so, what do you struggle with? (if you would prefer not to say just put 'N/A' in the text box)

Q21 Have you been formally diagnosed with any mental health conditions?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Q22 If so, what have you been diagnosed with? (if you would prefer not to say just put 'N/A' in the text box)

We thank you for your time spent taking this survey.

Your response has been recorded.

If you have any questions, please email the researcher at:

cnr5@kent.ac.uk