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Growing Food in a Growing City: Analysing the Potential to Integrate Sustainable Urban Agriculture with Urban Planning in Manchester

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CONTENTS

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ABSTRACT

Urban planning as a field is largely unconcerned with food systems. Despite this, food poverty is primarily an urban issue. With more and more of the world's population moving to cities, and increasing pressure to improve the environment, food needs to become more integrated with urbanism. One avenue for this may be to incorporate sustainable urban agriculture into planning systems. While there is much literature on the benefits of urban agriculture, there is little focused on how urban agriculture can be practically integrated into planning systems. This is particularly true in the context of the United Kingdom. This study aims to explore this problem through the lens of Manchester, a rapidly growing city in the North of England. It uses a methodological triangulation research methodology to analyse spatial data and policy data. Using Geographical Information Systems, the current extent of urban agriculture in Manchester was discovered, and potential areas for new development explored. A review of Manchester's planning policy, alongside case studies of three other cities which have incorporated urban agriculture were also employed. It was found that allotments make up the majority of Manchester's current urban agriculture, for which there are long waiting lists. This indicates a baseline desire amongst the population for more growing space in the city, which could be expanded through more exposure to and education about food systems. This, in conjunction with planning policies intended to get developers to include growing spaces in their proposals, and spatial strategies to ensure sustainable urban agriculture provisions are equitably accessible, could increase the extent of urban agriculture in Manchester considerably.

DECLARATION

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LIST OF ABBREVIATIONS

UA – Urban Agriculture

SUA – Sustainable Urban Agriculture

TOADS – Temporarily Obsolete, Abandoned, or Derelict Sites

GIS – Geographic Information Systems

IMD – Index of Multiple Deprivation

PAN – Planning Advice Notes

SO – Spatial Objective

UAD – Urban Agriculture Department

FHS – Future Housing Supply

SHL – Strategic Housing Location

CNI – Critical National Infrastructure

UK – United Kingdom

USA – United States of America

LIST OF FIGURES AND TABLES

FIGURES

TABLES

CHAPTER 1: INTRODUCTION

1.1 Background

In an increasingly uncertain global world, questions about the UK's food systems and security are becoming more and more relevant, especially with pressures to improve the environment, increase biodiversity, and reach net zero goals (Lang, Neumann, and So, 2025). Additionally, many people have no say over where their food comes from (Patel, 2009). With cities projected to house a larger percentage of the world's population in the future (Ritchie, Samborska, and Roser, 2018), the key to solving these issues may be in changing the way in which we view the divide between urban and rural land uses.

By utilising urban agriculture, the practice of growing of edible crops in an urban environment, the divide between urban populations and where their food comes from starts to shrink (Deelstra and Girardet, 2000). This could become a sustainable method for increasing biodiversity, food security, and access to urban green space (Eigenbrod and Gruda, 2014).

Within the context of Manchester, food prices have increased by 150% in real terms since 1988 (Sow the City, 2020). There are now over 130 food banks in Greater Manchester and there has been a 72% increase in the number of takeaway restaurants (Sow the City, 2020). This information all points to a lack of affordable, healthy food options in Manchester. In particularly deprived areas, people therefore have very little choice over the food they eat and where it comes from.

On the flip side, Manchester is a rapidly growing city and there are many new developments currently being built. Questions of both sustainability and equitable access to healthy food then become more important. This presents a unique opportunity for Manchester. Utilising a food-sensitive approach to urban planning strategies, urban agriculture hubs could be created throughout the city. This could improve sustainability and food security in Manchester.

1.2 Scope of the Study

This study aims to examine the roles of both urban planning and urban agriculture in addressing the issue of food security in Manchester. Due to time constraints, only the Central Manchester region will be considered in data analysis. The location and extent of this area can be seen in the figure below.

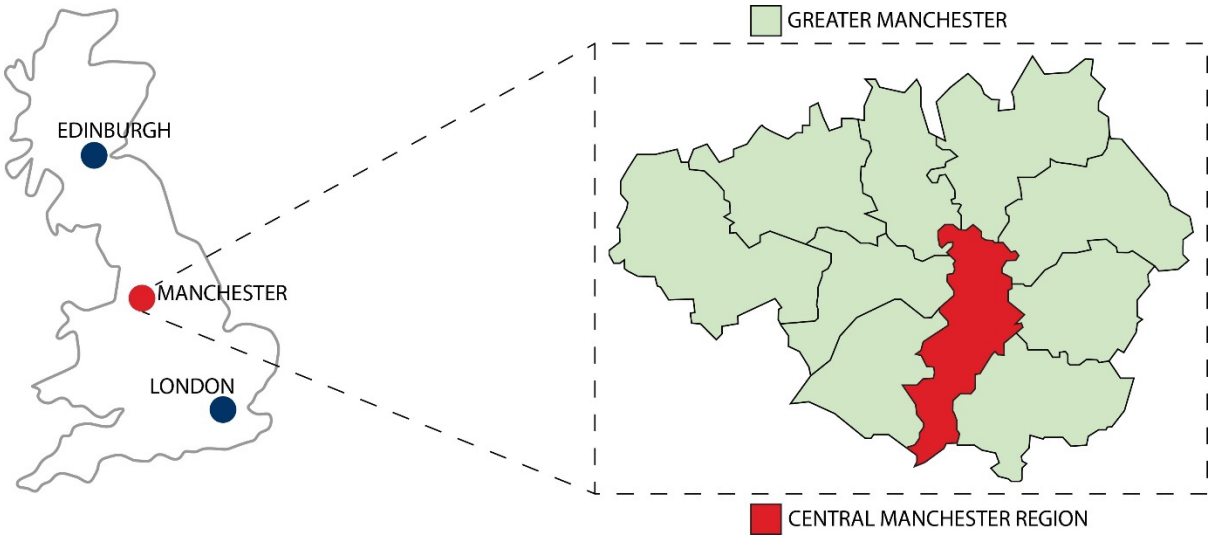

Figure 1: Contextual Map of Central Manchester (Author, 2025)

The aim of this study can be broken down into four research objectives that together will form an overall understanding of the issue. These are:

1. Understand the benefits of urban agricultural practices.
2. Measure the current extent of urban agriculture spaces in Manchester.
3. Identify areas across Manchester that have both the required space and the need for urban agriculture.
4. Explore ways in which urban agriculture can be effectively integrated into Manchester's urban planning framework.

This paper hopes to add to the literature on both food security and urban planning. While there is plenty of literature on both of these topics and on urban agriculture, there is little about combining the two, especially in a UK context. This study attempts to address this gap. An additional hope is that this paper will help to demonstrate that urban agriculture is a legitimate potential solution to food security issues and that it

may be necessary for addressing future climate concerns in cities across the world, especially in a western context.

1.3 Structure of the Study

Chapter 2 of the study is a critical review of the current literature about urban agriculture, specific agricultural methods, and food security issues in the UK and Manchester. Understanding these topics will help to build a picture of current issues and potential solutions related to the study. This chapter ends with a thematic analysis of the literature, picking out key trends and themes.

Chapter 3 outlines the methodology of the study undertaken, with justification for the chosen research methods.

Chapter 4 examines Manchester's current planning policies, in addition to three chosen case studies. This analysis aims to demonstrate urban agricultural best practices, understand if these align with Manchester's planning goals, and examine the potential for Manchester to adopt similar practices.

Chapter 5 presents the results of the undertaken research.

Chapter 6 discusses findings from the case studies, literature, and research, aiming to analyse all the data and answer the objective questions. The findings will be synthesised into cohesive planning recommendations that can inform future urban agriculture implementation into Manchester's planning framework.

Chapter 7 will summarise the previous chapters. Research limitations for this dissertation will be discussed, alongside further research suggestions for future study.

CHAPTER 2: LITERATURE REVIEW

2.1 The Urban-Rural Divide

With urban dwellers already making up over 50% of the global population, and this number set to rise in coming years, it is important to ask the question of how self-reliant cities can be (Ritchie, et al. 2018) (Núñez, 2024) (Górna and Górny, 2020). There is a currently a disconnect between cities where most people consume food, and rural areas, where most food is produced on farms (Garcia-Sempere, et al. 2016) (Murphy, 1999). The current food model is one of two areas. The first area is the "food production area" and the second is the "food consumption area". Cities, being where the majority of the planet live, are the consumption areas. Food is brought in, people buy it in supermarkets, consume it, then the waste is disposed of by the city (Deelstra and Girardet, 2000). In farmland, the production areas, large areas of land are used to produce food for cities. This set up has destroyed ecosystems by setting aside large swathes of land for monocultures (Garcia-Sempere, et al. 2016). As cities grow in population and expand outwards, farms also have to be moved further and further out. This destroys more and more ecosystems and means there are fewer natural landscapes (Garcia-Sempere, et al. 2016).

An additional concern is that food waste is not returned to food production sites to be used in the natural cycle (Henao, 2022). It often becomes part of landfills. This means less nutrients go into the soil, reducing soil health and fertility (Monbiot, 2022). As a result, more land has to be used for farming to reach production goals (Garcia-Sempere, et al. 2016).

As a result of this divided food system, there is simultaneously rising poverty and food insecurity in the UK, as well as rising obesity levels. This points to increased access to unhealthy foods and less access to healthy, fresh foods across the population (Lingham, et al. 2025). One concern raised with the current UK food system is that a "two tier system" seems to be developing, in which UK-produced foods are being exported, and low-quality foods are being imported into the UK for citizens to consume (Lingham, et al. 2025). Transport costs are reflected in prices, meaning food costs more

for the consumer (Murphy, 1999). All this is being done in the name of profits. The Neo-liberal values of current UK politics mean that food is treated as a commodity rather than as a human right (Lingham, et al. 2025).

This was a concern discussed by Marx, who argued that capitalism commodifies the natural world (Burkett, 1999). Landowners are able to own enough land and to employ people to work on it that they can produce more than they need. There is a surplus of production which provides capitalists more money at the expense of workers' time (Burkett, 1999). This division of labour between urban and rural areas divides peoples' connection with nature, and reduces peoples' food sovereignty (Burkett, 1999).

Food sovereignty is defined as the right of people to choose what food they eat and to have control over where that food comes from (Pimbert, 2009). In the Western world today, we have access to a lot of different food, but little knowledge or say over where that food comes from (Deelstra and Girardet, 2000). Food sovereignty requires a reconnection between people and nature, in addition to policy reforms and citizen involvement (Garcia-Sempere, et al. 2016). Social movements are required to shift the paradigm away from traditional agriculture and towards more sustainable forms of agricultural practices (Garcia-Sempere, et al. 2016). This implies a need for more citizen access to food growing spaces.

2.2 Urban Agriculture

In order to bridge the gap between the rural and urban food divide, a potential solution is the implementation of urban agriculture (UA). This is the practice of growing food crops within a city (Dona, et al. (2021). UA may be a way to improve both sustainability and food security in urban areas (Eigenbrod and Gruda, 2014).

In order to understand urban agriculture, it is helpful to understand the forms which it can take and the benefits these can provide.

2.2.1 Allotments

Allotments first appeared in 18th century Denmark and the UK (Kwartnik-Pruc, and Droj, 2023). They became very popular during the Second World War, when they were known as "victory gardens". They were used during this period as a way for people to grow food to support themselves while rationing was in place (Herrmann, 2015).

Allotments can be defined by the three key dimensions (Kwartnik-Pruc, and Droj, 2023). The first of these is the environmental dimension, as they can provide green spaces and means of organic food production. The second is the social dimension. Allotments can act as social meeting places and improve community development. Finally, there is an urban dimension. They can improve the sustainability and the aesthetics of the city to which they belong (Kwartnik-Pruc, and Droj, 2023).

Allotments as a form of UA are unique in the fact that small plots belong to or are rented by individuals or families. These people have complete control over what they grow in that plot and the rights to do what they want with the produce they grow (Kwartnik-Pruc, and Droj, 2023).

2.2.2 Community Gardens

Community gardens are commonly defined as open spaces in which community members grow food and flowers (Pudup, 2008) (Guitart, et al. 2012) (Kingsley et al., 2020). These differ from back gardens, which are privately owned and managed, and allotments, in which plots of land are rented and privately managed (Guitart, et al. 2012). The community garden is defined by its communal management.

One issue pointed out by the literature is that community gardens can all be run differently. It is unclear by name whether a garden is run by a community, for a community or is simply located within a certain community (Pudup, 2008). Most community gardens tend to be run by a community group, but they can have ties to external organisations as well (Firth, et al. 2011).

Community gardens can differ in their hierarchical structures, being run by either representatives of a community or by external professionals. This can result in being either bottom-up or top-down hierarchies respectively (Firth, et al. 2011).

For the purposes of this dissertation, community gardens can be understood as food growing spaces which are used by certain communities and run communally, whether via a community organisation or jointly by members of a community.

Amongst the literature, community gardens are shown to have the benefits of social development, enhanced health, access to fresh foods, saving money, education, reduced crime and increased safety, environmental sustainability and equity, improving cultural heritage, and increasing biodiversity (Guitart, et al. 2012) (Glover, et al. 2005). Among the most important benefits of community gardens is the development of social capital. This is the idea that social connections have value, whether that be civic, cultural, economic or health value (Glover, et al. 2005). Strong social networks and relationships are beneficial to both the individuals and society as a whole. Social capital is a topic which appears in the literature surrounding urban planning and urban design as well (Osbourne, et al. 2014). The idea is that in a well-functioning city and society, there are large "amounts" of social capital. It therefor stands to reason that providing spaces which improve social capital is in the interest of urban planners.

2.2.3 Urban Orchards

Urban orchards are green spaces in which fruit trees are grown (Núñez, 2024) (Kachanova et al. 2025). These provide food for users of the orchards. Fruit bearing trees can also be grown as street trees. In these cases, they are not classified as a green space. Rather they are acting as part of a street or path. These can provide the same food producing benefits as dedicated orchards (Núñez, 2024), however for the purposes of this study, only dedicated orchard spaces will be classified as urban orchards.

Orchards can be beneficial as means to improve food security and improve food sovereignty, particularly in areas of food shortage as they provide food readily accessible to anyone (Núñez, 2024). Additionally, studies have found that orchard soil can hold more water than other urban soil, and more earthworms were found in it (Kachanova et al. 2025).

2.2.4 Urban Farms

Technically, any kind of growing space could be called a farm. For the purposes of this study, a differentiation was made between urban farms and other types of growing spaces based on the criteria that they rear livestock as well as growing plants.
These tend to be community run, non-profit organisations with access to a wider array of tools and facilities than other types of growing spaces (Badami and Ramankutty, 2015). While most of the information regarding urban agriculture is based on crop cultivation, the farming of small livestock is also possible in an urban setting (Badami and Ramankutty, 2015).
A concern about urban farms is that animals are dependent upon feed. This can be less sustainable than other forms of UA as feed needs to be brought in, so the supply chain is less local (Monbiot, 2022). Animals also produce manure, which in an urban environment increases the risk environmental hazards if not disposed of correctly (Braamhaar et al. 2025).

2.3 Sustainable Urban Agriculture and Permaculture Design

To ensure environmental benefits, sustainable urban agriculture (SUA) is recommended in the city. This can be differentiated from UA, a term used in this paper as a catch-all for farming in urban settings. SUA has a narrower definition, including only farming practices that use organic products and sustainable farming methods.
Exemplifying this, a common form of SUA found in the literature is permaculture. The term “permaculture” was first coined by Mollison and Holmgren, who aimed to create a system of both food production and lifestyle that was as in accordance with the natural landscape as possible (Mollison and Holmgren, 1978). The idea is that through using existing biological ecosystems and perennial crops (crops that stay year-round, rather than being harvested and replanted), both soil and plants are healthier, and the food is better (Mollison and Holmgren, 1978).
Permaculture is based around a concentric ring design, in which crops that need the most management are found inside and directly surrounding the home, while less managed plants grow further away (Mollison and Holmgren, 1978) (Babac, and Belic, 2018). Hemenway argues that permacultural ring zoning can be implemented into

urban planning practices, perhaps through existing zoning systems (Hemenway, 2015). This may be more difficult in a UK setting, as a zoning system is not used. This ring design will be taken into consideration in chapter 6, in conjunction with urban planning considerations.

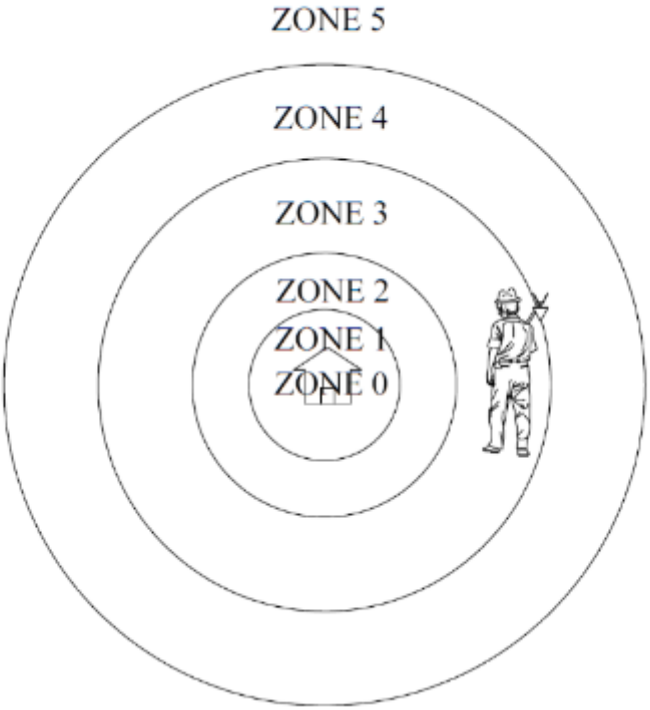

Figure 2: Permaculture Ring Design (Babac and Belic, 2018)

Traditional forms of agriculture grow crops in monocultures, using large swathes of land for growing one crop. The problem with this method is that due to only having one type of plant, the root systems are more susceptible to diseases and pests (Mollison and Holmgren, 1978). Because of this, pesticides and fertilizers are necessary to ensure the crops can grow. These products can be harmful to the soil, reducing soil health and making the ground less suitable for agriculture. Additionally, run-off from these products can contaminate waterways, negatively affecting animal and plant life in these environments (Monbiot, 2022).

Permaculture, alternatively, involves multiple species of edible plants that are grown side by side in a way which mimics natural environments. This style of growing strengthens root systems and improves soil health (Mollison and Holmgren, 1978). Additionally, the biodiverse nature of permaculture spaces allows ecosystems to

naturally occur and thrive. This can decrease or even remove the need for fertilisers and pesticides due to good soil health and allowing species to live in these environments which act as pest control.

Permaculture is perhaps more suited to urban environments than other forms of agriculture, as it uses less land to produce the same amount of food as traditional agriculture (Janse van Rensburg, 2020) (Korsunsky, 2019).

These benefits are elucidated in Korsunsky's case study of Kailash Ecovillage in Portland, Oregon, USA (Korsunsky, 2019). On an average sized American plot, members of the ecovillage planted a permaculture growing space. Two pictures, 10 years apart, show how a relatively small amount of unused land can become productive growing space.

Figure 3: Kailash Ecovillage, 2007 (Korsunsky, 2019)

Figure 4: Kailash Ecovillage, 2017. (Korsunsky, 2019).

This paper also points out the potential to plant permaculture spaces in derelict areas. Temporarily obsolete, abandoned, or derelict sites (TOADS), which include undeveloped brownfield sites, could benefit from permaculture due to its ability to improve soil health, and because it can easily be removed and built upon should new development be required in those places. (Németh and Langhorst, 2014) (Korsunsky, 2019).
Phytoremediation, the process in which plants clean up contaminated environments, can be used to get plants to soak up harmful materials in the soil, over time making it healthier and better for growing food (Schneider, et al. 2023).
Additionally, small “left-over” spaces, such as small patches of grass and buffer spaces, are ideal for permaculture planting as they are currently providing little value to residents and they cannot be used for much else (Korsunsky, 2019).

A caveat to permaculture’s benefits is that the lack of pesticide use may increase crop vulnerability, especially during early stages of permaculture practice (Didarali and Gambiza, 2019). Failed crop yields again question the effectiveness of the practice.
A rebuttal to this is that issues of crop vulnerability do theoretically reduce with time as permaculture systems become established, and farmers become more knowledgeable (Mollison and Holmgren,1978). Despite this, permaculture design hasn't been studied enough to have accurate data on how well it would work if its use was more widespread (Krebs and Bach, 2018) (Hirschfeld and Van Acker, 2022).
For these reasons, many ideas and lessons from permaculture research are deemed useful for making UA as sustainable as possible, but other forms of UA must not be discounted if urban food growing is to become as effective and widespread as possible, especially during early stages of its adoption.

2.4 The role of Urban Planning

Food is recognised as one of 13 Critical National Infrastructure (CNI) sectors in UK policy, but little is done about it in urban planning circles (Lang, et al. 2021). To better address food related issues, planning systems must start to include these considerations in their frameworks.

The planning system in the UK is a discretionary system. These kinds of planning systems are centred on general plans or guidelines based on political policies (Sykes, et al. 2023). These guidelines inform development decisions but do not necessitate strict rules on what can go where. This is in juxtaposition to regulatory systems, which use zoning. This is a planning method which prescribes different uses (such as commercial or residential) to demarcated lots of land (Sykes, et al. 2023).

A benefit of discretionary systems over regulatory systems is that they allow each proposed development to be judged on its own merits, rather than having to conform to pre-decided land use patterns. This system also places planning guidelines at the centre of development decisions. Clear guidelines can point developers in certain directions with their designs (Sykes, et al. 2023).

Manchester presents a clear example of this already. The UK government's policy is to greatly increase housing supply (Rayner, 2024). Manchester has taken this policy on board and specifies in its planning guidelines that it wants high-density housing across much of the city region (Manchester City Council, 2012). Developers are then incentivised to create designs that fulfil this density requirement, as they are more likely to have their designs approved to be built.

This is all important because it lays out the potential for the UK planning system to facilitate urban agriculture. If guidelines specify that growing spaces are desired, developers would be incentivised to provide these kinds of spaces in their proposed designs. However, the existing requirement for increased density may pose a challenge in justifying the allotment of UA space in new developments.

Another consideration to ponder is that of the 15-minute city. This concept has become prominent in urban design and planning circles. It stipulates that all, or most, of the amenities that one needs to live day to day should be within a 15-minute walk or bike ride from their home (Moreno, 2021). The goal here is to create sustainable

neighbourhoods which promote active travel and provide public spaces for people to socialise and interact (Moreno, 2021). While this is in line with many of the goals of SUA, it presents a further challenge for a potential future UA minded Manchester. Planners must be spatially considerate to ensure equitable access to UA across the city. More consideration will be given to these topics in chapters 4 and 6.

2.5 Shifting Public Consciousness

Education is a key aspect in making SUA work in an urban environment. Education and raising awareness are important to its use, spread, and continuation (Janse van Rensburg, 2020). People need to be better informed about food production for them to really have the ability to choose where their food comes from (Morales, et al. 2018).
For these reasons, education must go alongside a shift in the public consciousness for UA to be widely accepted and adopted across cities.
During the world wars, the UK needed to change its food systems to ensure food went to the frontlines, as well as everyone at home being able to eat. As a result, widespread rationing was adopted. In addition, allotments became a key tool in helping to provide enough food for the country during the world wars (Kwartnik-Pruc, and Droj, 2023). This sets a precedent for their ability to improve food security in the future also.
It should also be noted that during the COVID19 pandemic the public accepted radical change to daily activities (Alzueta, et al. 2021). Public acceptance of new food systems is also possible.

Alongside the benefits and potentials, expectations must be set. As has been explored, urban food growing has huge potential to grow social capital and improve ecological metrics, however, the volume of production is a weakness of UA. To expect UA to grow all the food a city needs is unrealistic, particularly when most UA grows only fruit and vegetables (Martellozzo, 2014). Some figures show that a UK city may need to devote around 3% of its land to produce enough daily vegetables for the urban poor (Badami and Ramankutty, 2015). While this is a small percentage of total land, this number is only concerned with feeding part of the population part of their daily food intake. Other figures estimate roughly 33% of global urban land would be needed to feed global urban population (Martellozzo, 2014).

Additionally, available land in urban areas can be scarce, and there are many other ways it can be used (Martellozzo, 2014). The literature makes a strong case that SUA is a worthy use of available land for a litany of reasons, many compelling from an urban planning perspective. This should, however, be taken with the understanding that the most obvious benefit, that of food production, may be limited in its scope of effectiveness.

2.6: Thematic Analysis

To summarise and understand these lessons gained from the literature review, a thematic analysis table was created (see Appendix 1). Thematic analysis is useful research method for identifying and analysing patterns in data (Braun and Clarke, 2006). Each paper was classified into different themes based on the ideas and benefits of UA they discussed. Some papers appear in multiple themes. From this, a mind map was produced, as seen in figure 5.

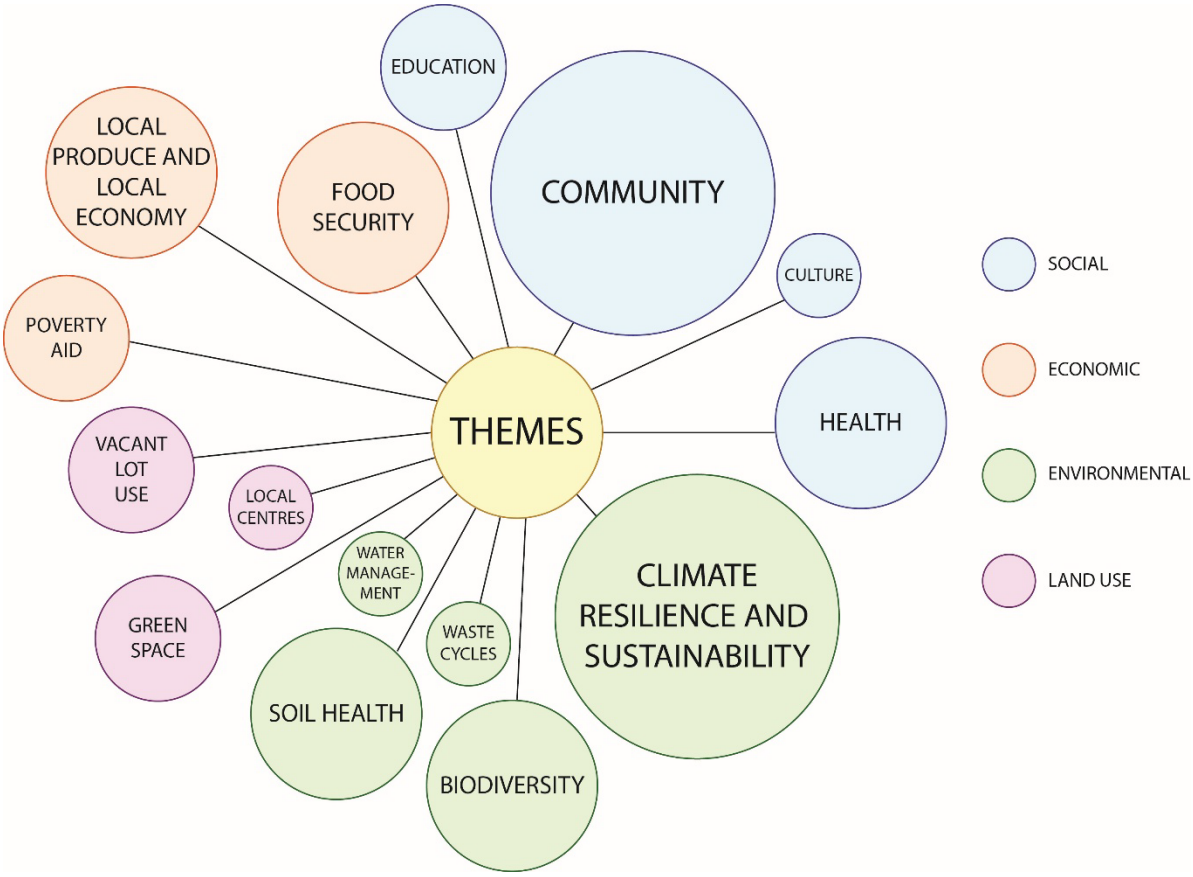

Figure 5: Thematic Analysis (Author, 2025)

A number of reoccurring themes arise in the literature. Circle size represents the frequency in which the themes appear in the literature. Larger circles appear more frequently while smaller circles appear less frequently.
Themes can be classified into four categories. These are social, economic, environmental, and land use. These are represented by blue, orange, green, and purple respectively. These themes will now be examined more specifically.

2.6.1 Social

Perhaps the most discussed benefit of UA is its ability to facilitate community growth. It increases social capital and creates locations in which people can meet and interact with other community members (Garcia-Sempere, et al. 2016) (Miller, 2018).
Education is another theme found across the literature. Growing spaces are beneficial in the sense that they can be used as educational spaces for people to learn about nature and food growing, but conversely they have an educational barrier to entry (Haluza-DeLay and Berezan, 2014). Education is needed in order to teach people how to grow food, but also on a more primary level, that the current food system is wasteful, damaging to the environment, and that food is not currently as nutritious as it could be (Eigenbrod and Gruda, 2014).
Culture is another theme that appeared in the literature, although less frequently than other themes. Urban agricultural spaces can enhance the culture and character of an area. If somewhere features a lot of growing spaces, and many people congregate around them and use them, then they inevitably become part of the character of the area and the become a form of cultural expression for residents (Leahy, 2022) (Holmer and Drescher, 2005).
Discussion of health benefits from UA are also found in the literature. Fresh, local produce can be more nutritious than imported goods (Sonnino, 2014) (Haysom, 2021). Providing outdoor green spaces is also beneficial for both physical and mental health (Rigolon, et al. 2021).

2.6.2 Economic

Food security is a primary concern of both previous literature and this piece of research. UA has been shown to improve food security in many South American cities, as well as in the UK during the world wars (Murphy, 1999) (Kwartnik-Pruc, and Droj, 2023).
Linked to this, UA can stimulate local economies and allowing people to consume local produce cheaply (Badami and Ramankutty, 2015) (Miller, 2018).
The ability of UA to aid those in poverty is another common theme. This is closely tied with food security and highlights the benefits UA can have on ensuring equitable access to fresh food for the urban poor (Lingham, et al. 2025).

2.6.3 Environmental

As a category, environmental benefits reoccur extremely frequently in the literature. Biodiversity is one such benefit. This is especially true of forms of SUA, such as permaculture (Hirschfield, 2021).
Climate resilience and sustainability is another benefit, with the provision of more green spaces acting as a way to cool cities down (Haluza-DeLay, and Berezan, 2014). Keeping supply chains small is also beneficial for the climate as less emissions are used transporting food to consumers (Henao, 2022).
Water management can also be improved with UA, as water can be saved and reused in agricultural practices (Henao, 2022). Additionally, flood risk is reduced as more rain can be soaked up by green spaces and plants (Lin, et al. 2015).
The literature also points to the fact that growing plants, especially in permacultural style, can improve soil health, making future crop growth easier (Krebs, and Bach, 2018).
Waste cycles are another key theme. If systems are set up correctly, much more waste can be recycled and used in agricultural and ecological systems (Hemenway, 2015).

2.6.4 Land Use

Linked to local economy and community, UA can help to provide local centres through the creation of communal spaces and destinations that people want to visit (Garcia-Sempere, et al. 2016).
Vacant lots can be used for UA, keeping land from being wasted and falling into disrepair (Németh and Langhorst, 2014) (Korsunsky, 2019).
Finally, UA spaces also provide quality green space, which is an important use of land in any city (Holmer, and Drescher, 2005).

Among all themes and categories, “locality” seems to be a common thread. Local centres facilitate community growth and cultural expression. Local produce is consumed, improving local economies and simplifying supply chains. This in turn improves both food security and makes waste cycles more manageable.

CHAPTER 3: METHODOLOGY

This chapter outlines this study's research methodology, first discussing the aim and objectives of the research. After, the research design is explained and justified, before detailing the methods in which data was collected.

3.1 Aim and Objectives

The ultimate goal of this research is to understand the potential benefits of integrating SUA with urban planning in Manchester, and the avenues by which this might be achieved. As mentioned in chapter 1, this aim is supported by four smaller research objectives. These are:

1. Understand the benefits of urban agricultural practices.
2. Measure the current extent of urban agriculture spaces in Manchester.
3. Identify areas across Manchester that have both the required space and the need for urban agriculture.
4. Explore ways in which urban agriculture can be effectively integrated into Manchester's urban planning framework.

3.2 Research Design

In order to successfully complete the four objectives of the study, a mixed methods approach was employed in order to build a holistic understanding of the topic (Almeida, 2018). A methodological triangulation model was chosen as a framework around which the research was designed.

Methodological triangulation is a practice which involves using more than one kind of research technique during the research process (Bekhet, and Zauszniewski, 2012). This kind of practice is beneficial as it can increase the validity of findings and provide a broader and greater understanding of the research topic (Bekhet, and Zauszniewski, 2012).

From this model, a combination of quantitative and qualitative data was collected. The quantitative data was collected from Geographic Information System (GIS) mapping and analysis. The qualitative data was collected from a literature review and subsequent thematic analysis seen in chapter 2. A policy analysis of both Manchester and three additional case studies also yielded qualitative data.

This resulted in a "three pronged" approach to the research, as visualised in figure 6. The literature review prong served to largely answer Objective 1. Objective 2, and Objective 3, were primarily completed by the GIS prong. The policy prong was used to answer Objective 4.

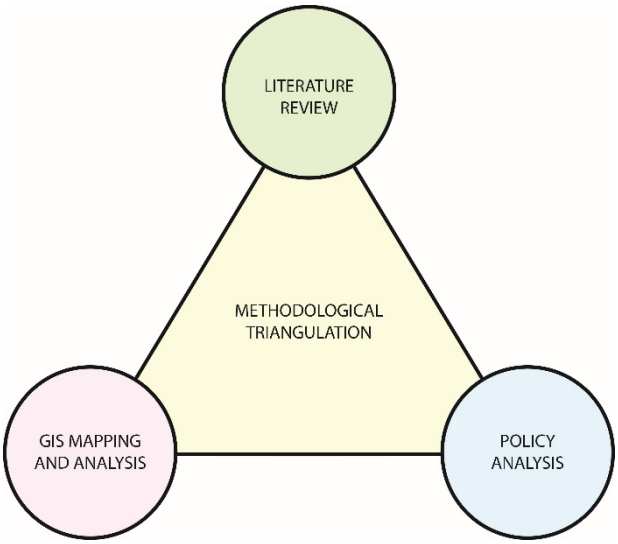

Figure 6: Methodological Triangulation (Author, 2025)

The research timeline was divided into three sections, being "data review", "data collection", and "data analysis". These sections represent general periods of time, during which different tasks were completed. These periods of time are indicative rather than strictly linear. Following in the advice of previous research, as the tasks were moved through, previous stages were returned to as new knowledge was uncovered (Easterday, et al. 2014). This served to build a broader, more holistic understanding of the topic.

The sections were differentiated by the way data was being handled. For example, all steps in the data review involved collecting and understanding information that is readily available online. Conversely, the data collection required the use of mapping tools to compile fragmented data into a spatial format. The data analysis was different

again, in that it involved the synthesis and interpretation of data, rather than its collection. Figure 7 shows a visual representation of this research timeline.

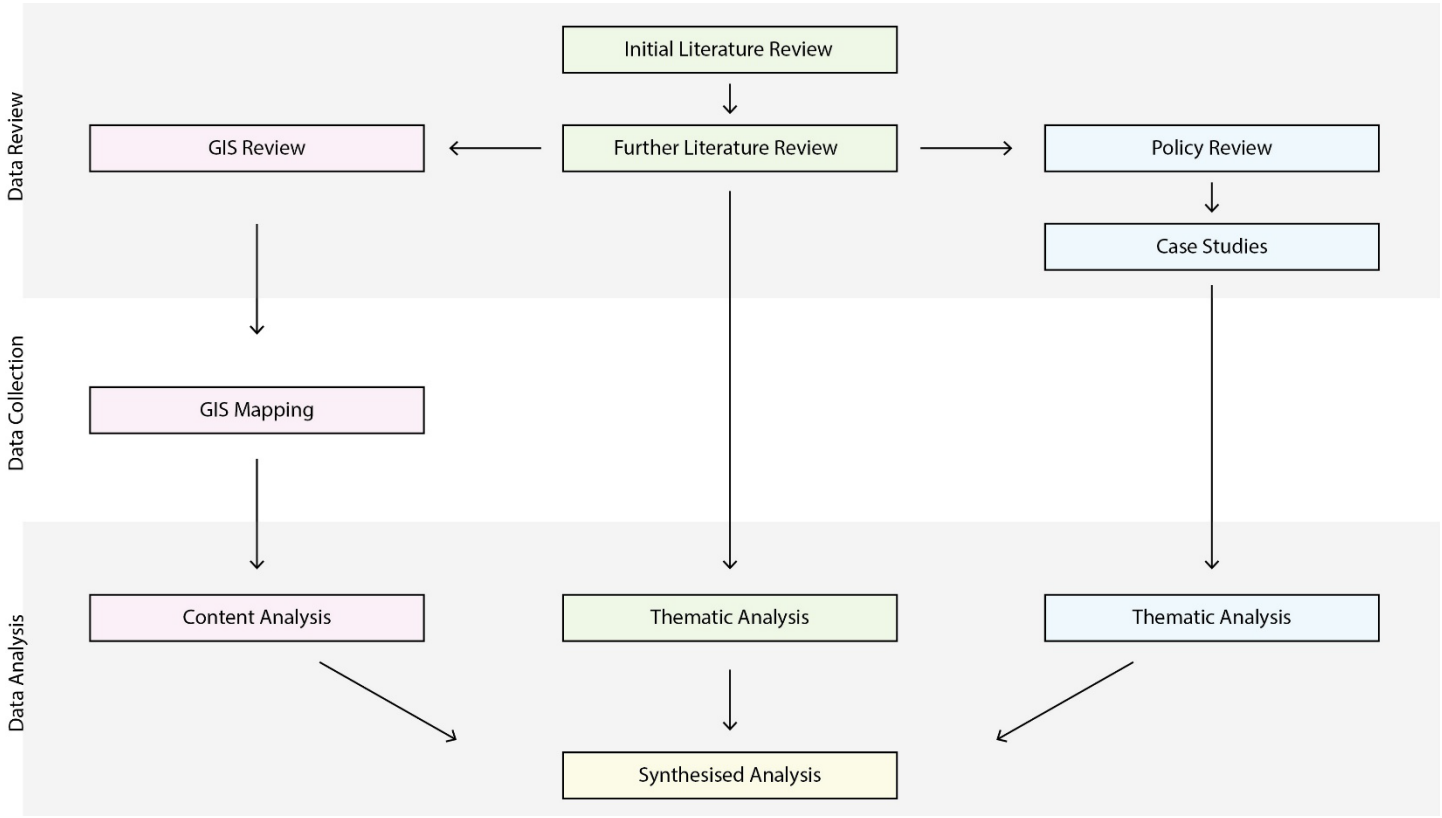

Figure 7: Research Timeline (Author, 2025)

3.2.1 Data Review

The purpose of the data review stage was to understand the existing data surrounding the research topic and lay the groundwork for further research. This stage involved five tasks. These were an initial literature review, a deep literature review, a GIS review, a policy review, and case studies.

The first task was the initial literature review, which aimed to provide a general understanding of urban agriculture, food security, and Manchester's planning system. During this stage, gaps in the current research were identified. While there was a lot of existing research about urban agriculture and permaculture, there was little in a UK context, with most papers being from the US. It was also found that there was no research aiming to identify all existing urban agricultural projects within Manchester. For this reason, creating a cohesive overview of urban agriculture in Manchester became a key aspect of the research.

A further literature review followed from the initial review. As new information was uncovered during subsequent tasks and stages, this task was returned to. Recursively supplementing this stage built a large depth and breadth of relevant knowledge and allowed different sources to be verified against each other (Easterday, et al. 2014).

Following the literature review, a GIS review was conducted. This involved looking through existing accessible GIS data. Specifically, demographic data for the Manchester area and data regarding food security in Manchester was searched for. Through this process, some key data was gained, which helped to build a greater understanding of Manchester, and contributed to research outputs.
Indices of multiple depravation and income rank were key fields to map in the Manchester region in order to understand the general areas of wealth and poverty in Manchester. Data on land supply and green spaces provided information on potential areas for future urban agricultural development.

In parallel with the GIS review, a policy review was conducted. This review's purpose was to understand how Manchester's current planning system functions. Relevant documents were consulted, these being the Manchester's Core Strategy 2012-2027, and the Places for Everybody (PfE) plan (Manchester City Council, 2012) (Manchester City Council, 2024). The purpose was to understand the current planning system in Manchester, how it functions, what it aims to achieve, and whether it is effective.

Subsequent to the Manchester policy review, other cities' planning policies were analysed. Cities were chosen to be case studies based on a criterion of whether they had UA policies that had been adequately documented and discussed. Three cities were chosen; these were Brighton, New York City, and Havana.
Brighton was chosen due to the fact that it is another UK city. This means it falls under the same national policy as Manchester, which makes it an incredibly relevant case study. New York City was chosen due to its international prominence, something Manchester has goals to emulate to some degree. Havana was chosen as it represents a city that has fully embraced UA and has a long history of its use (Górna and Górny, 2020). This makes it a good case study to analyse both the positive and negative effects this has had on the city.

3.2.2 Data Collection

The second section of the research timeline was the “data collection” stage. The purpose of this stage was to collect new data on the research topic which could later be analysed. This involved only one task, GIS mapping.

Mapping was completed to discover the extent of urban agriculture in Manchester. Research was done into existing urban agriculture projects in Manchester. In order to find these sites, a few methods were used. Firstly, google searches using the key words: urban agriculture, permaculture, and Manchester were used. Some results were found for the bigger projects in the region. These included Sow the City, and MUD projects (Sow the City, 2025) (Manchester Urban Diggers, 2025).

In order to make sure smaller projects were also considered, Good to Grow was used to search for relevant projects. This website provided a map of listed growing projects in the city (Good to Grow Network, 2025). Projects were checked that were within the Manchester council boundaries.

The Greater Manchester Green Spaces Fund project map was also searched in order to look for relevant projects which fit into an agricultural or food producing category (GMET, 2025). Following the example of previous research, Google earth was used to verify, where possible, whether these projects were currently in use (Górna and Górny, 2020).

The Manchester city council website was used to find a list of allotments across Manchester (Manchester City Council, 2025). These were found on Google Earth in order to discover their exact location and to verify their existence.

The measurement tool on Google Earth was used to measure the size of each growing space. This was done by drawing lines with the measurement tool to create an outline around each site. This yielded measurements of the areas of the spaces in square meters. These results were recorded for later analysis (see appendix 2).

Growing spaces were divided into four categories which best denoted their type of use. These categories were community gardens, allotments, urban farms, and urban orchards. Splitting the spaces into categories was deemed to be important because each type of space is used and run differently, as highlighted in chapter 2.

These projects were then mapped as points on a map using ArcGIS software. Each category of space was given a different colour on the map. Green was used for community gardens. Blue was used for allotments. Purple was used for urban farms. Orange was used for urban orchards. This allowed the distribution of spaces across Manchester to be visualised.

ArcGIS analysis software was then used to create buffers around each of the sites. The buffers were 1 kilometre in radius. This number was chosen as it represents a 10-to-15-minute walking distance. Following urban design principles, important amenities should be about a 15-minute walk or less from someone's home (Moreno, 2021). This helped to visualise areas of clustered growing spaces, and areas which lacked easy access to growing spaces.

Other GIS data gathered in the previous data collection stage could then be overlayed with these points in order to analyse demographic data of UA site locations.

A GIS layer featuring data of the indices of multiple deprivation in Manchester was used in conjunction with the points denoting growing spaces in Manchester (Geographic Data Service, 2025). This provided data on the deprivation levels where green spaces were located. Average Index of Multiple Deprivation (IMD) scores were taken for the different categories of growing spaces in order to compare whether there was a significant difference in deprivation levels between categories.

Finally, an additional layer, which denoted spatial areas, which have been demarcated for future housing development was added on top of the growing space location layer. This was done to distinguish key areas which could act as potential future sites of UA practices. The IMD layer was also used to discern whether areas of future housing development lined up with high IMD scores. High deprivation levels indicated areas which would most benefit from UA.

3.2.3 Data Analysis

The third section of the research was the data analysis stage. This represents the time in which collected information was analysed, formatted, and made sense of. There were four tasks in this stage. These were a thematic analysis of the literature, a thematic policy analysis, and a content analysis of the GIS data.

The thematic analysis of the literature involved creating a table and organising research papers into themes within a table (see Appendix 1). A mind map was then created for better visualisation (see Figure 5). This helped to clarify the overarching themes across all of the literature, and in turn pinpointed the main benefits of urban agriculture (Braun and Clarke, 2006).

Similarly, the thematic analysis of the policy review involved creating a list of the core policies found in case study examples of cities which prioritise urban agriculture. This clarified the key take aways from these examples and helped to show what Manchester could change about its own policies in order to improve urban agriculture within the city.

The content analysis of the GIS data meant turning the data into tables, graphs and charts for ease of understanding. This stage was all about understanding the current state of urban agriculture in Manchester and looking at what the potential could be for future development.

Lessons from these individual analyses were then compared to form a synthesised analysis. GIS data was compared with Manchester's current spatial planning policies. This, combined with lessons from the thematic analysis and case studies, formed the basis of proposed new policies and a theoretical spatial design strategy.

CHAPTER 4: POLICY REVIEW

This chapter features a review of Manchester's planning policy, followed by three case studies of cities with UA policies.

4.1 Manchester Urban Planning Policy

Manchester's core strategy for 2012 to 2027 highlights a number of spatial and economic policies that guide urban planning in the Central Manchester region. The policy document lays out six spatial objectives for the city. These can be summarised as follows:

> SO1: Use spatial principles to provide a sustainable development framework.
>
> SO2: Support economic growth and reduce economic disparities.
>
> SO3: Significantly increase the supply of housing across the city.
>
> SO4: Provide a network of distinct centres, focused on local identity and the provision of local amenities.
>
> SO5: Improve public transport networks to increase sustainability and connectivity.
>
> SO6: Protect and improve both the natural and built environment, with a focus on biodiversity, air, water and land quality, and the provision of high-quality green spaces and amenities.

(Manchester City Council, 2012)

There is an obvious focus on providing more housing, as is directly in line with the government's target of building 1.5 million homes by 2029 (Rayner, 2024). It is also clear that both economic growth as well as environmental considerations and improvements are priorities for the city.

As the thematic analysis of the literature highlighted, SUA excels at improving environmental metrics and increasing local economic growth. This indicates that SUA implementation would be in line with existing objectives of Manchester City Council.

Another important policy consideration from the 2012 core strategy is the identification of strategic housing locations. This policy sets out an indicative area in which a large number of new housing projects are hoped to be built. This area can be seen in the Figure 8.

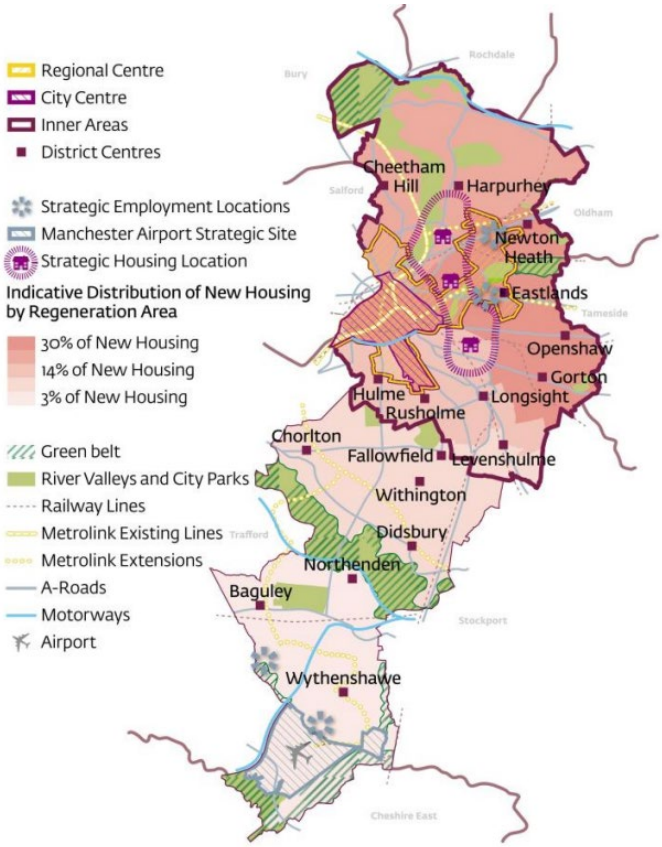

Figure 8: Manchester Strategic Housing Locations (Manchester City Council, 2012)

This represents an area in which new development is being prioritised. This presents an opportunity for UA growth, in that UA space can be created alongside new development, as will be further discussed in chapter 4.2.1. However, this area, East Manchester, is also defined by its post-industrial heritage, meaning much of the land is dominated by brownfield sites (Blakeley and Evans, 2009). These sites are polluted, and soil health is very poor, making them unsuitable for agricultural purposes (Wortman,

and Lovell, 2013).

One solution to this was discussed in the literature review. Phytoremediation can be used to get plants to soak up harmful materials in the soil and improve soil health (Schneider, et al. 2023). However, this process can take 2 to 3 years to complete, requiring monitoring and meaning the implementation of SUA is stalled (Black, 1995). Another, more immediate solution is discussed in chapter 4.2.3.

Evidently, there is a case to be made that Manchester is a suitable city for wider SUA adoption, as it aligns with its goals and can be feasibly incorporated into its current strategies. However, Manchester's drive for increased densification may conflict with the need to set aside land for food cultivation. This concern is allayed slightly by the Green Spaces Fund, discussed in chapter 4.2.2, which exemplifies that there is both funding and drive to create and improve green spaces in the city (GMET, 2025).

4.2 UA Policy Case Studies

A series of three case studies will now be presented. The goal in analysing these case studies is to understand the ways in which cities that have existing UA policies function, how these policies interact with urban planning, and the lessons that can be learned from them. The three cities that have been chosen are Brighton, in the UK, New York City, in the USA, and Havana, in Cuba. The rational for analysing these cities was discussed in chapter 3.

4.2.1 Brighton

The case study of Brighton highlights the effectiveness of planning frameworks in shaping developer proposals and increasing the amount of UA planning applications. The key to understanding how this is done is in Brighton's Planning Advice Notes 06 (PAN 06). PAN 06 is the local development framework of Brighton and Hove city council (Brighton and Hove Council, 2020). This framework is advisory, not statutory. However, it is consulted by planning officers during the decision-making process on whether to approve or deny proposed new developments (Halliday, et al. 2019). The framework includes information and advice about UA, such as where and how it can be included in

urban development designs. Additionally, it promotes its use as a way for developers to meet the council's sustainability requirements for new developments. Advice regarding optimal UA types for different developments can be seen in table 1.

Table 1: Development Advice (Brighton and Hove Council, 2020)

	Edible Landscape	Public realm	Edible hedgerows	Vertical walls	Integrated Gardens	Communal gardens	Roof gardens	Internal Atriums/ courtyards	Balconies	Private gardens	Orchards	Therapeutic gardens	School gardens	Meanwhile gardens
Large greenfield site	✓	✓	✓		✓	✓				✓	✓			✓
Residential urban fringe Major/minor	✓		✓	✓	✓	✓	✓			✓	✓			
Residential development on previously developed land Major/minor	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓
Care homes, sheltered/retirement units	✓		✓	✓		✓		✓				✓		
Health facilities	✓		✓			✓						✓		
Student Housing	✓		✓				✓		✓					
Mixed use development (including residential)) Major/minor	✓	✓	✓	✓		✓	✓		✓					
Education			✓	✓	✓						✓		✓	
Office development Major/minor	✓	✓	✓				✓	✓						
Industrial premises	✓		✓											
Retail, tourism and hospitality	✓	✓					✓	✓						
Hotels / Visitor Accommodation	✓	✓					✓	✓						

The council found that after the first two years of implementing this food development framework into planning recommendations, the amount of food related planning applications went from 1% of all applications to almost 40% (Halliday, et al. 2019). This marks a huge jump in food related development for the city and highlights how planning policy can bring awareness and incentive to developers to provide growing spaces. Manchester's own planning policy proves how developer incentives and guidelines can change the face of a city, as seen through its rapid development and densification. Brighton serves to show how the adoption of SUA planning guidelines in Manchester has the potential to promote swift propagation of SUA spaces and resources throughout in the city.

4.2.2 New York City

New York City acts as an interesting case study due to its use of both economic and transport policies to promote UA.

In terms of economic policies, the city has financial support funds for agricultural technology start-ups. This promotes urban agriculture investment in the city, which further promotes the use of urban agriculture in New York (Sonnino, 2014).

There are also financial support funds for low-income residents to support them in buying local produce from the city. One such fund is the Health Bucks program, which provides residents $2 for every $2 they spend at local farmers' markets, with a limit of $10 per day (Sonnino, 2014). This kind of policy ensures that those in deprived areas who struggle to afford healthy, fresh produce can access it. This improves the equitability of the food system in the city (Sonnino, 2014).

In Manchester, economic policies have already been used to improve green space access. The green spaces fund was launched in 2022. It is distributed by the Greater Manchester Environment Trust (GMET, 2025). The goal of the fund is to award money to eligible green space projects in order to get them off the ground. According to the Greater Manchester Environment Trust, over 28,000m^2 of new green space has been created since the fund has been set up and 400,000m^2 of already existing green space has been improved (GMET, 2025).

This shows how economic policies have already worked to improve green spaces in Manchester. Perhaps money could be set aside specifically for UA projects, to further promote their growth throughout the city. Developers may be able to use this existing fund to aid in the creation of new UA spaces.

In regard to transport related policies, New York City council also stipulates that farmers' markets should have adequate, high traffic, and stable space in which to operate (New York City Council, 2010).

This is indicative of the idea of "transit-oriented development". This is a concept found in urban planning, that argues key amenities should be situated close to multi-modal transport nodes, such as tram and bus stops (Ibraeva, et al. 2020). This is in order to promote sustainable transport use through making public transport the most convenient way of accessing amenities (Ibraeva, et al. 2020). This model of

development also improves equity, as public transport is cheaper than modes of private transport, such as cars (Ibraeva, et al. 2020).
Through using transit-oriented development to provide sustainable transport access to healthy grocery stores, there is potential to curb the effects of food deserts and provide access to fresh, local produce (Sonnino, 2014). This concept could also be adopted in terms of growing spaces. Providing transport nodes close to growing spaces would ensure equitable access to UA. This kind of spatial planning would align with Manchester's existing SO4 and SO5 spatial objectives (Manchester City Council, 2012).

4.2.3 Havana

Havana is globally renowned for its wide use of UA. As a case study, it highlights how vacant land can be quickly capitalised for UA use, and how specific farming methods can overcome the problem of a lack of suitable agricultural spaces. It also cautions against the issues that come from centralised, bureaucratic control of UA systems.

Urban agriculture has a long history in Havana starting in the 1990s. Its use became widespread during the famine and financial collapse caused by the fall of the Soviet Bloc. (Murphy, 1999) (Górna and Górny, 2020). The Cuban government passed policy reforms which worked to transform much of the city's unused land into growing spaces based on organic farming principles (Knoot, 2009) (Górna and Górny, 2020).
Legislative changes allowed residents to request the rights to use vacant land for UA. This led to rapid. widespread adoption of UA across the city (Górna and Górny, 2020).
In 1994, the government established the Urban Agriculture Department (UAD). The UAD offered citizens agricultural training and access to necessary tools, such as compost and seeds (Knoot, 2009).

Currently, UA in Cuba is organised at both national and municipal levels, with various private and state structures making up its policy framework. This means UA is both highly institutionalised, and highly controlled in terms of farming practices and supply of inputs, such as seeds and compost (Górna and Górny, 2020).
This is both a problem and a strength of Cuba's system. As UA is so ingrained in policy, bureaucracy often stands in the way of the spread of new growing spaces (Leitgeb, et al.

2016). Additionally, while the tight regulation of farming practices ensures high standards of production and sustainable practices are maintained, freedom and spontaneity are curtailed. These are core tenants of permaculture philosophy (Mollison, and Holmgren, 1978). In addition, people are often unable to get the resources they need to farm due to high costs and tight government controls (Leitgeb, et al. 2016).
This perhaps acts as a warning against tight control of UA. Most urban growing in Manchester is currently done by community groups or individuals (see chapter 5). If UA is implemented into planning policy, it runs the risk of becoming a centralised top-down sector, as it is in Havana.
To mitigate this concern, strong involvement with community groups is advised during the adoption and expansion of UA policies. Bottom-up, democratic planning is necessary for building strong community engagement and food sovereignty in Manchester (Patel, 2009).

Conversely to the current bureaucratic problems in Havana, political will and the strong role of government were indispensable to UA's initial successes in the city (Murphy, 1999). Cuba's UA policies led to a wide adoption and normalisation of UA in Havana. Over 35,000 hectares are devoted to UA in the city, from a mixture of back gardens, urban farms, and "organopónicos" (Knoot, 2009).

Organopónicos are an example of SUA, which was developed out of necessity and act as the predominant production technique in Havana (Górna and Górny, 2020). Much of the land in Havana has poor soil health, due to chemical leaks and building material contamination (Górna and Górny, 2020). Organopónicos use raised beds, with high ratios of organic compost in their soil (Murphy, 1999). This mitigates the obstacle of poor soil health and allows growing spaces to be created in areas that would otherwise be unfarmable (Górna and Górny, 2020) (Murphy, 1999).
This presents a potential avenue through which SUA spaces could be created in brownfield sites across Manchester. Organopónico-based farming methods could be employed to mitigate poor soil health and ground contamination.

4.4 Case Study Results

A summary of the case study findings are as follows:

1. Planning frameworks and design codes can be used to increase the frequency of UA related development proposals.
2. Economic policies can promote the purchasing of locally produced food and increase investment into agricultural technologies in a city.
3. New agricultural development should embrace a "transit-oriented development" pattern in order to ensure easy and equitable access to growing spaces.
4. Land use policies and subsidies can create public incentives to turn vacant land into productive growing spaces.
5. "Organopónico" style farming methods can circumvent the obstacles of poor soil health and ground contamination.
6. Strong involvement with community groups is required to ensure fair and democratic UA practices.

Themes that can be seen throughout these findings are that economic policies are a strong way to influence both public and private actors towards UA adoption, and strong emphasis must be placed on equitability. These findings, and how they can shape future Manchester policy, will be discussed further in chapter 6.

CHAPTER 5: RESULTS

This chapter presents all of the collected data from the GIS mapping and analysis. This data is presented via a series of maps, tables, and graphs.

5.1: Current Extent of UA GIS Results

Figure 9 shows all existing growing spaces in Manchester, providing a visual representation of where these amenities currently exist. Green dots indicate community gardens. Blue dots indicate allotments. The purple dot is an urban farm. The Orange dots are urban orchards. For convenience, this colour code is continued throughout the methodology.

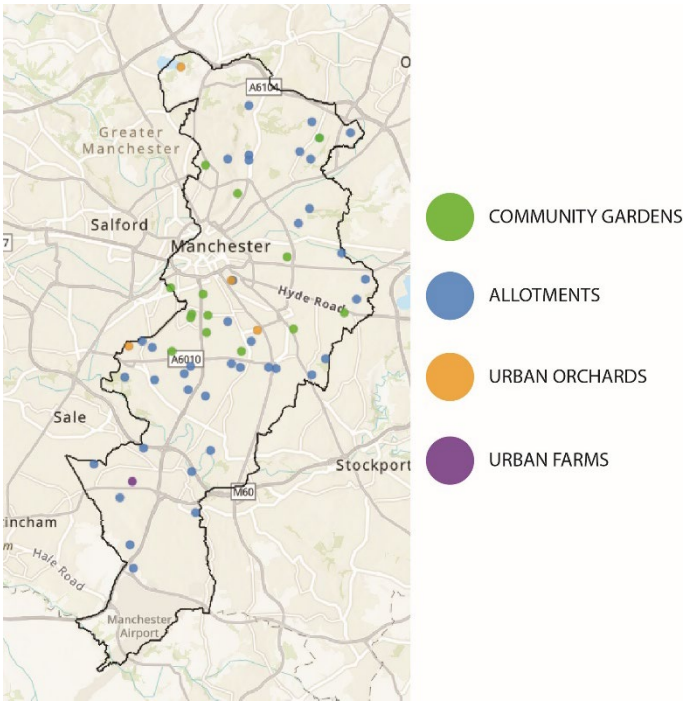

Figure 9: Growing spaces in Manchester (Author, 2025)

To better visualise both the locations of different space types and clustering of types, 1km buffers were added to these points. 1km buffers were chosen as that represents a 10-to-15-minute walk. Important amenities should be within a 15-minute walk of people's homes according to good urban design practice (Moreno, 2021). These have been represented in three separate maps. One is for only community garden buffers,

one is for only allotment buffers, and one features all buffers. The reason for this is twofold. Firstly, Figure 12 with all buffers included looks very busy, and discerning information from it can be difficult. Having the two other maps to compare it with clears up any confusions. The second reason is that viewing community garden buffers and allotment buffers separately better allows for clustering of the two types of spaces to be observed and identified.

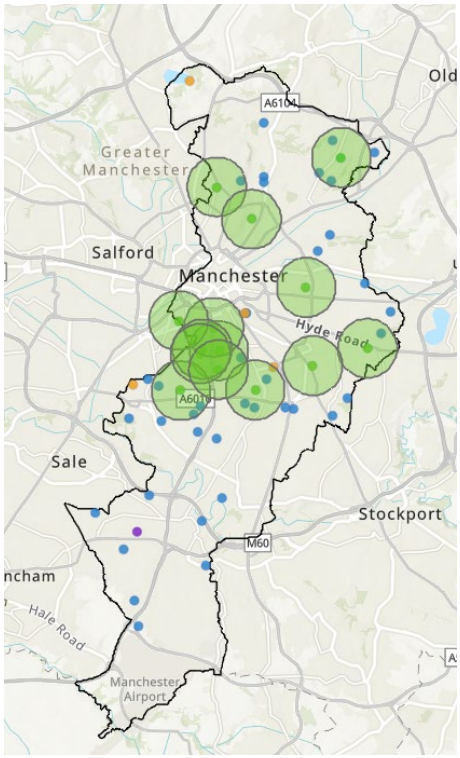

Figure 10: 1km buffers around community gardens in Manchester (Author, 2025)

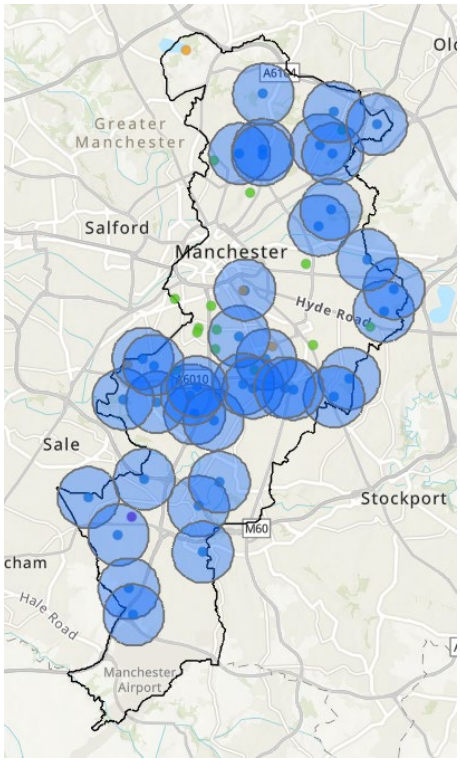

Figure 11: 1km buffers around allotments in Manchester (Author, 2025)

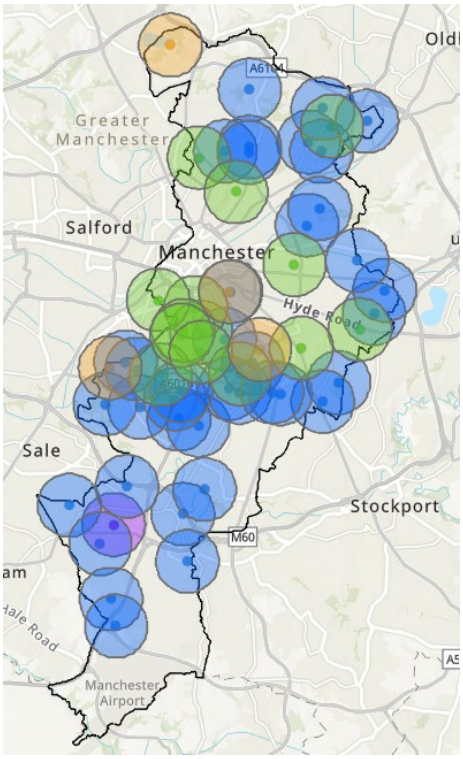

Figure 12: 1km buffers around all types of growing spaces in Manchester (Author, 2025)

From these maps, it is evident that there is a predominant clustering of both community gardens and allotments in the area directly south of the city centre. Growing spaces in the South of Manchester and the East of Manchester are more spread out, with gaps in the buffers. The North of Manchester has some clustering of growing spaces, but also with some notable gaps.

Indices of multiple deprivation scores were then overlayed beneath the mapped growing space points. This was done in order to visualise where growing spaces were located with relation to deprived areas.

Subsequently, a hot spot GIS analysis tool was used to visualise areas of deprivation

clustering. Hot spots represent clustering of high deprivation areas. Cold spots represent clustering of low deprivation areas. Neutral spots represent no strong clustering patterns.

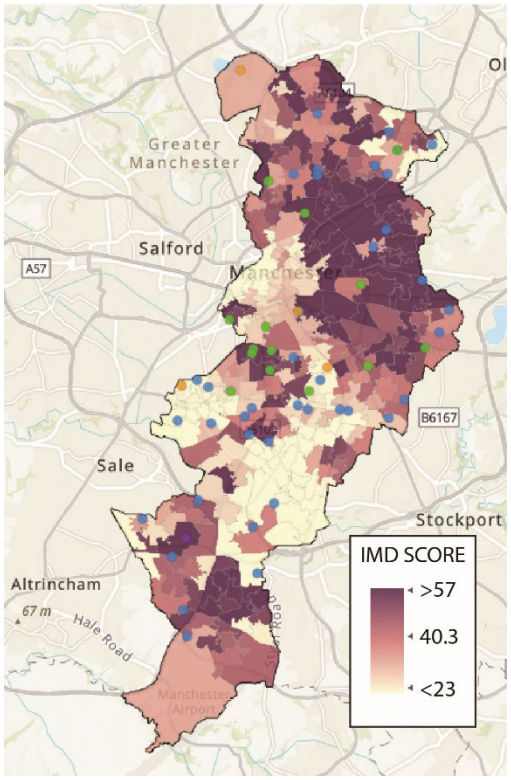

Figure 13: IMD scores with growing spaces (Author, 2025)

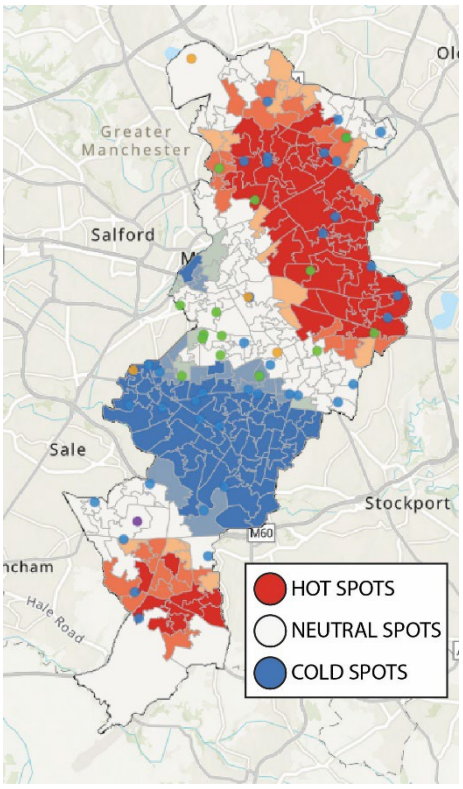

Figure 14: Depravation hot spots and cold spots with growing spaces (Author, 2025)

Table 2: Distribution of growing space categories amongst hot and cold spots (Author, 2025)

Type of Space	Number of Spaces in Hot Spots	Number of Spaces in Neutral Spots	Number of Spaces in Cold Spots
Community Gardens	5	7	2
Urban Farm	0	1	0
Allotments	14	11	13
Urban Orchard	0	3	1

The above table represents the mapped hot spot and cold spot data in table format. The representation of all types of growing spaces across hot spots, cold spots, and neutral spots was fairly even. There is a slight under-representation of community gardens in

cold spots. No strong pattern is discernible between growing space locations and deprivation levels. This data is visually represented in the bar chart in figure 15.

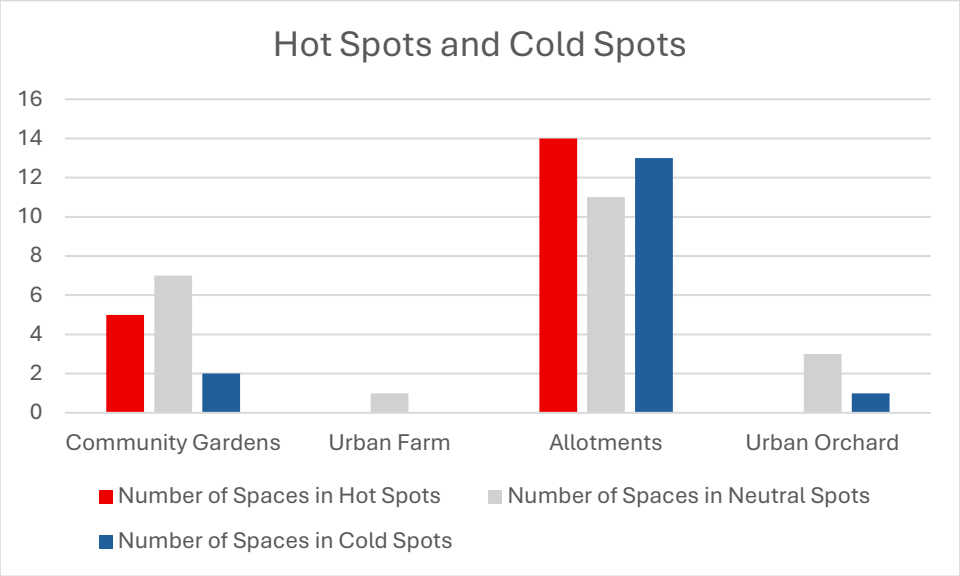

Figure 15: Distribution of growing space categories amongst hot and cold spots (Author, 2025)

5.2: Current Extent of UA Numerical Results

The information from the GIS mapping analysis was input into a table, along with growing space plot sizes. A further column was included, containing the IMD scores relating to each area in which the growing spaces were located (see figure 13). This data can be found in appendix 2.

To better present the data in the table, charts and graphs were created to visualise the data. The first metric that was analysed was the number of spaces of each category of growing space. Both a pie chart and a bar graph were created to represent this data.

Table 3: Number of spaces of each category of growing space (Author, 2025)

Type of Space	Number of Spaces
Community Gardens	14
Urban Farm	1
Allotments	38
Urban Orchard	4
Total	57

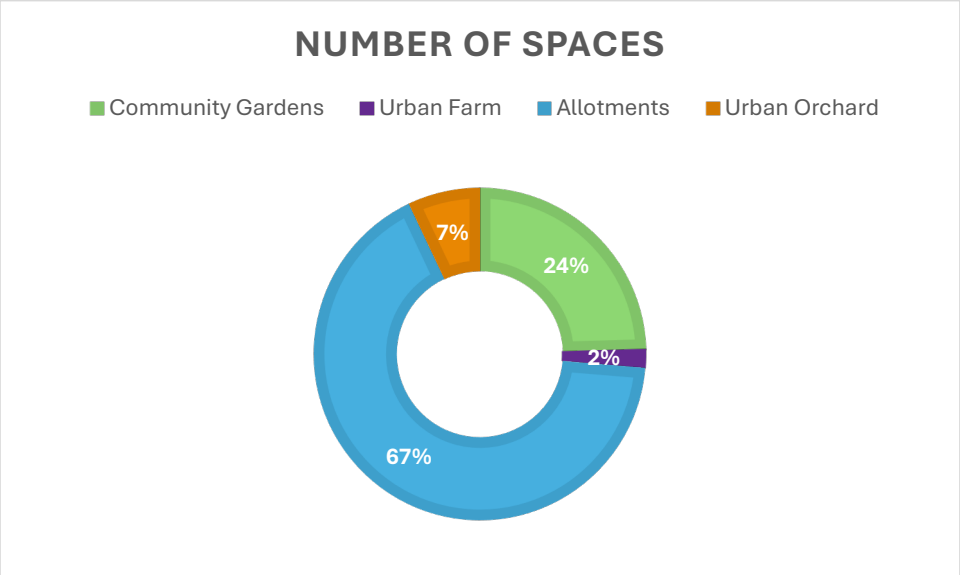

Figure 16: Percentages of each category of growing space (Author, 2025)

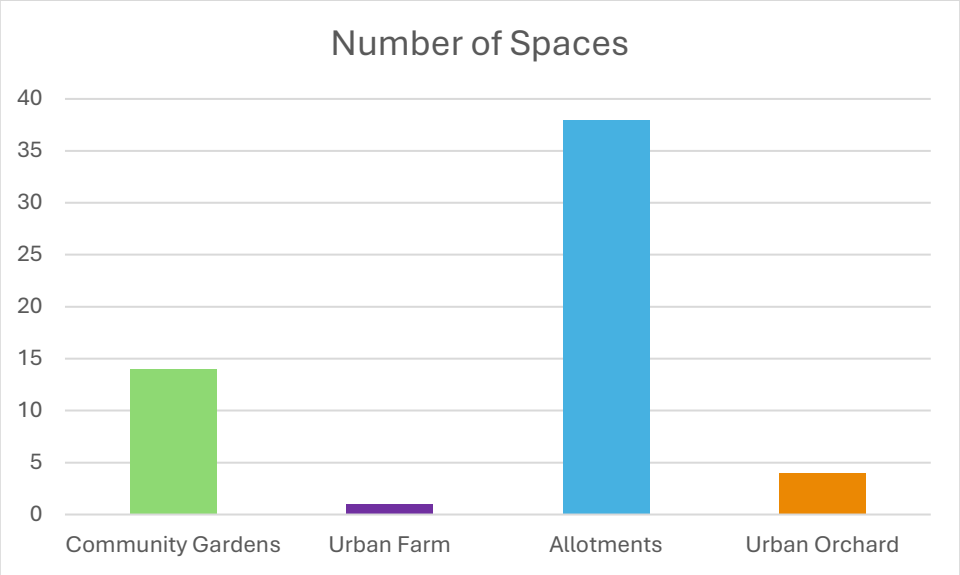

Figure 17: Number of spaces of each category of growing space (Author, 2025)

Next, taking the measurements of each growing space's plot, each category of growing space's total amount of land was calculated. These results were then represented in a pie chart and a bar graph.

Table 4: Amount of land each category of growing space has (Author, 2025)

Type of Space	Amount of Land (m^2)
Community Gardens	20,848
Urban Farm	5000
Allotments	474,150
Urban Orchard	6155
Total	506,153

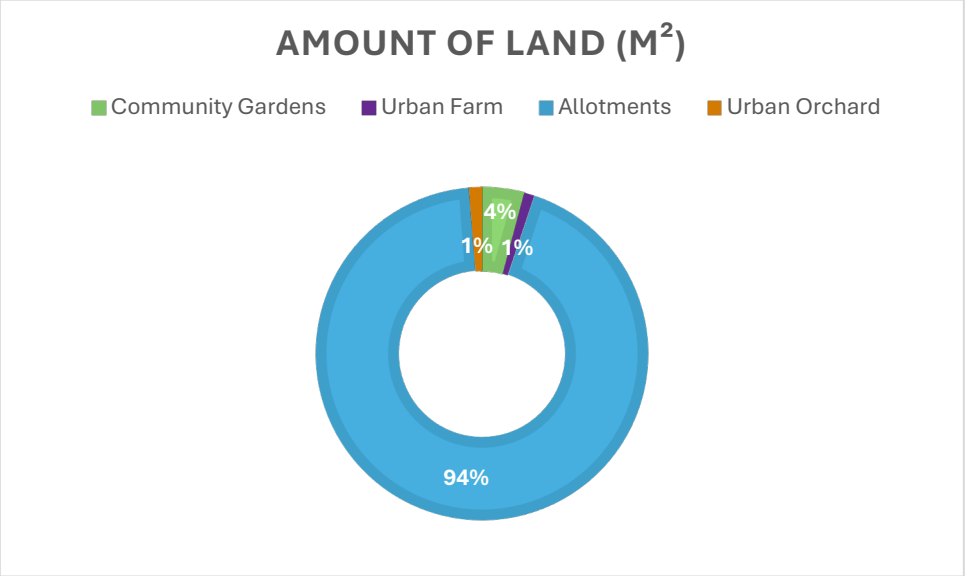

Figure 18: Percentages of the amount of land each category of growing space has (Author, 2025)

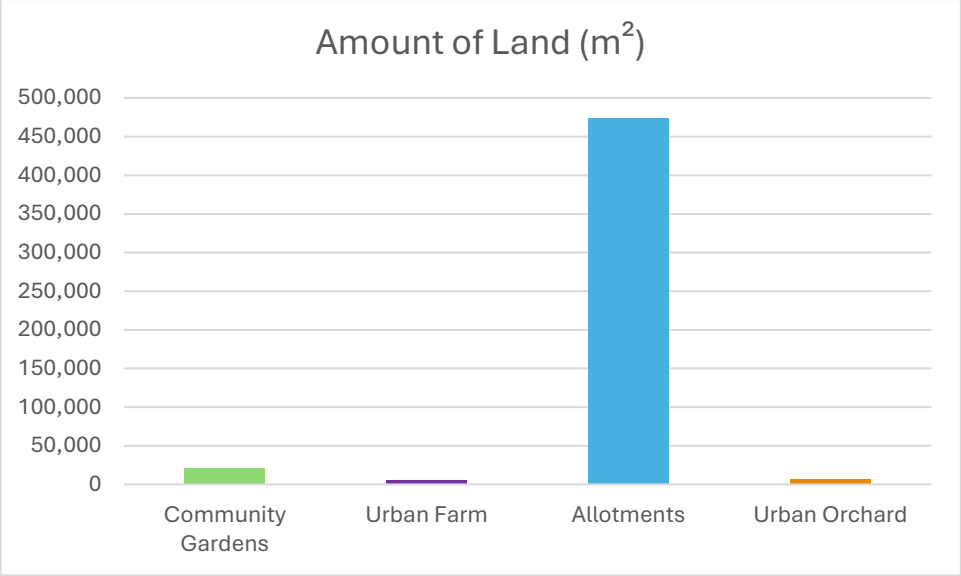

Figure 19: Amount of land each category of growing space has (Author, 2025)

Converting the total amount of growing space in meters squared into kilometres squared, there is 0.5km^2, or 50 hectares of total growing space in Manchester. The total

area of the city of Manchester is 116km^2 (Rodgers, 2025). This means that 0.58% of the total space in Manchester is used for growing food.

The number of spaces that were different sizes were then measured and put into tables. Pie charts were used to represent the percentages of each size firstly in all the growing spaces, then in community gardens, and finally in allotments. A colour coding system was implemented to improve legibility. A gradient is used in which lightness indicates smaller spaces, and darkness indicates larger ones.

Table 5: Number of all spaces in each size category (Author, 2025)

Size of Space (m^2)	Number of Spaces
Very Small (<1000)	9
Small (1000 – 3999)	20
Medium (4000 – 9999)	11
Large (10,000 – 21,999)	8
Very Large (>22,000)	9
Total	57

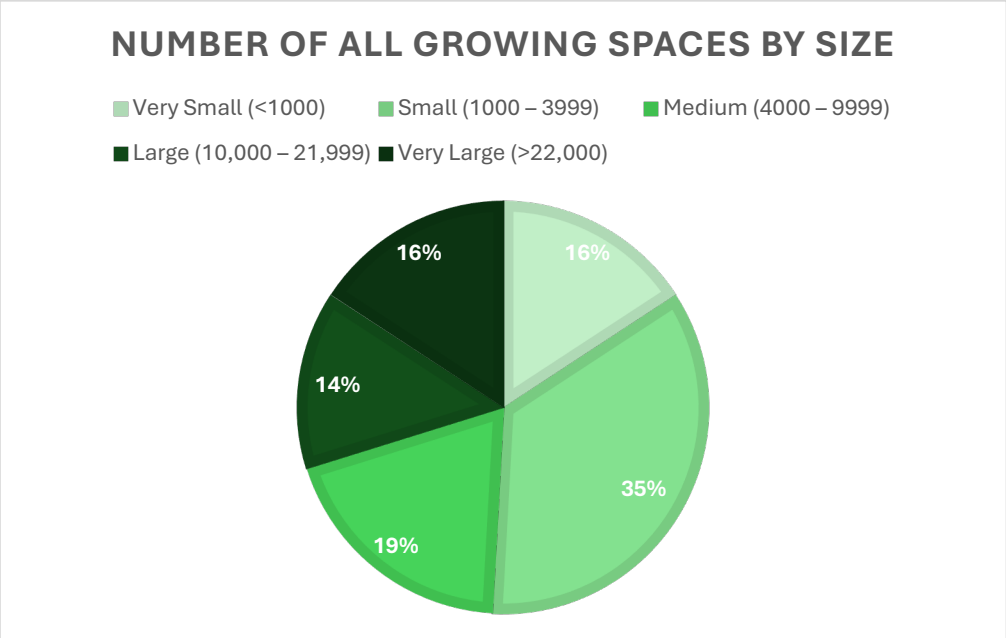

Figure 20: Percentages of the number of all spaces in each size category (Author, 2025)

Table 6: Number of community gardens in each size category (Author, 2025)

Size of Community Garden (m^2)	Number of Spaces
Very Small (<1000)	7
Small (1000 – 3999)	5
Medium (4000 – 9999)	2
Large (10,000 – 21,999)	0
Very Large (>22,000)	0
Total	13

Table 7: Number of allotments in each size category (Author, 2025)

Size of Allotments (m^2)	Number of Spaces
Very Small (<1000)	1
Small (1000 – 3999)	12
Medium (4000 – 9999)	8
Large (10,000 – 21,999)	8
Very Large (>22,000)	9
Total	37

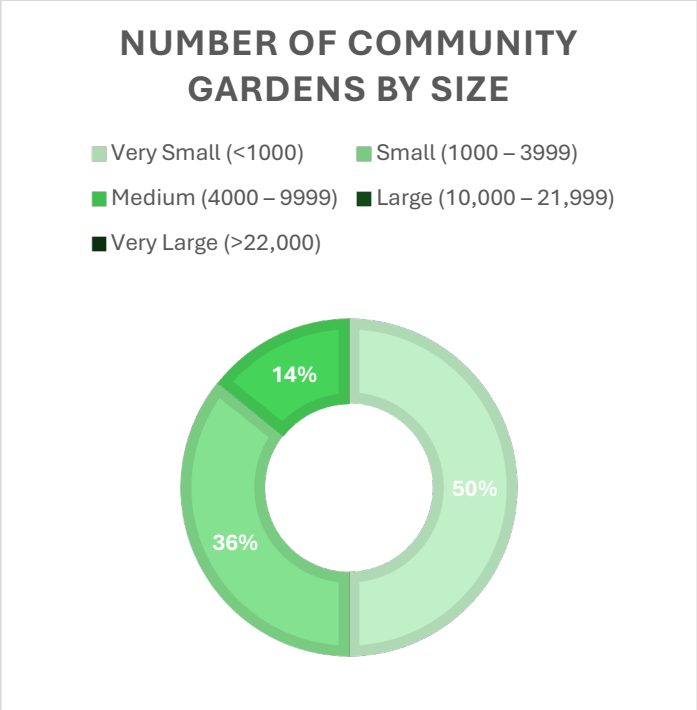

Figure 21: Percentages of the number of community gardens in each size category (Author, 2025)

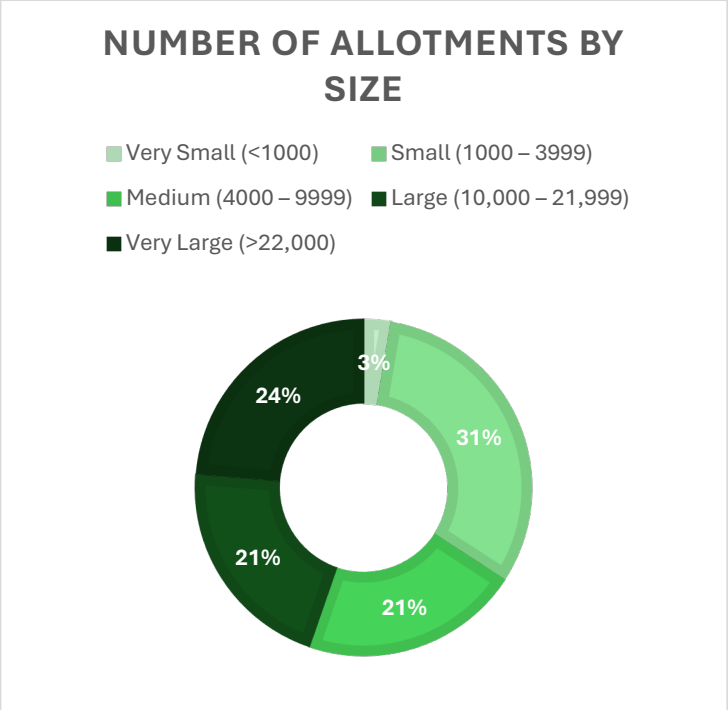

Figure 22: Percentages of the number of allotments in each size category (Author, 2025)

The final metric from the GIS analysis that was measured was the average IMD scores of each growing space category. This metric was recorded and then formatted into a bar chart in order to visually represent the data.

Table 8: Average IMD score of each category of growing space (Author, 2025)

Type of Space	Average IMD Score
Community Gardens	47.73
Urban Farm	56.45
Allotments	36.16
Urban Orchard	32.23

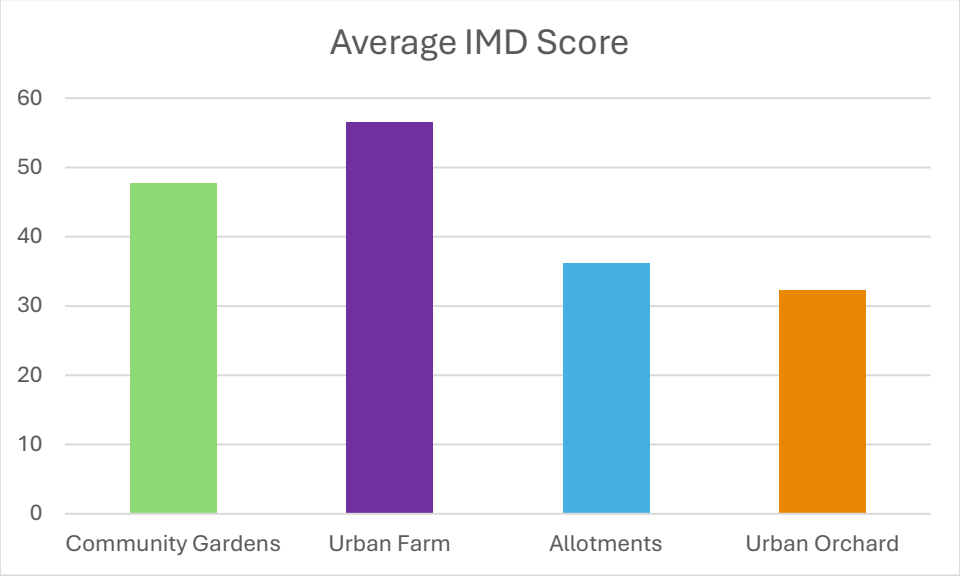

Figure 23: Average IMD score of each category of growing space (Author, 2025)

5.3: Future Land Use GIS Results

By mapping the land that has been designated for future housing supply (FHS) development, potential areas in which urban agricultural practices can be established were identified. By combining new housing development with UA, funding for UA is provided by developers (Brighton and Hove Council, 2020). FHS designations (visualised in yellow) were mapped alongside existing growing spaces for context. These were presented in their usual colour scheme. The area designated as a strategic housing location (SHL) is also presented in pink (Manchester City Council, 2012).

From this mapping (Figure 23), it clear that most of the designated FHS is in the North and East of Manchester, with some clustering of spaces in the city centre. Most of this space is in the SHL area.

An additional layer showing IMD scores was added. Areas with high IMD scores were deemed to be those that would benefit the most from SUA. This mapping (Figure 24) indicates that most of the large FHS areas fall into areas of relatively high deprivation.

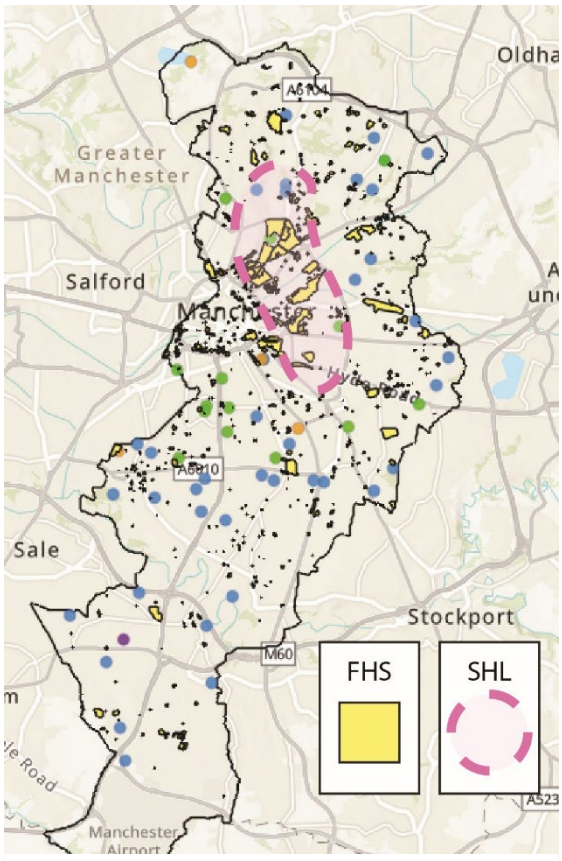

Figure 24: FHS and SHL demarcations alongside growing spaces (Author, 2025)

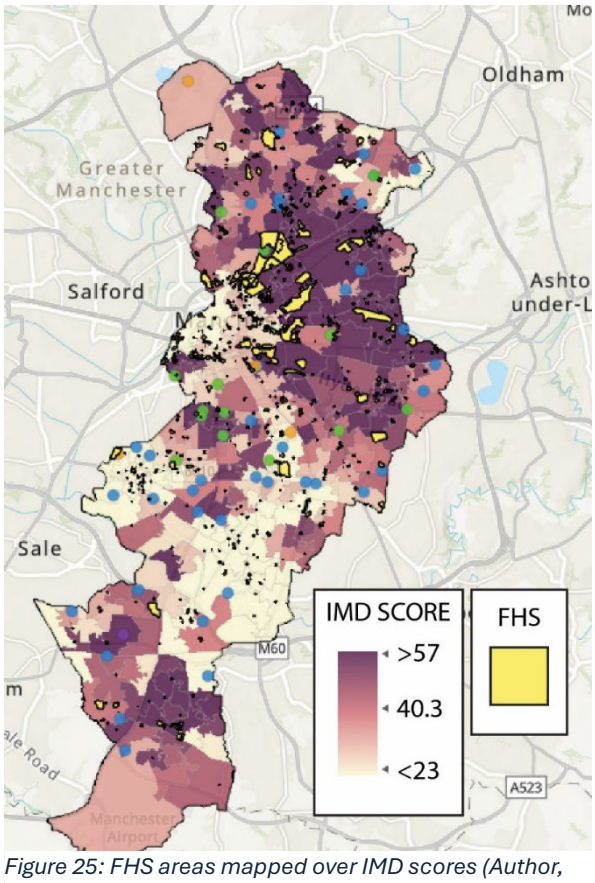

Figure 25: FHS areas mapped over IMD scores (Author, 2025)

To better understand how FHS areas relate to existing growing space locations, 1km buffers were added to the map. As Figure 25 shows, there are some large FHS areas that do not fall into the buffers of any growing spaces. These are zoomed in on and highlighted in red in figure 26. FHS spaces are again shown in yellow, with growing space types following their usual colour code.

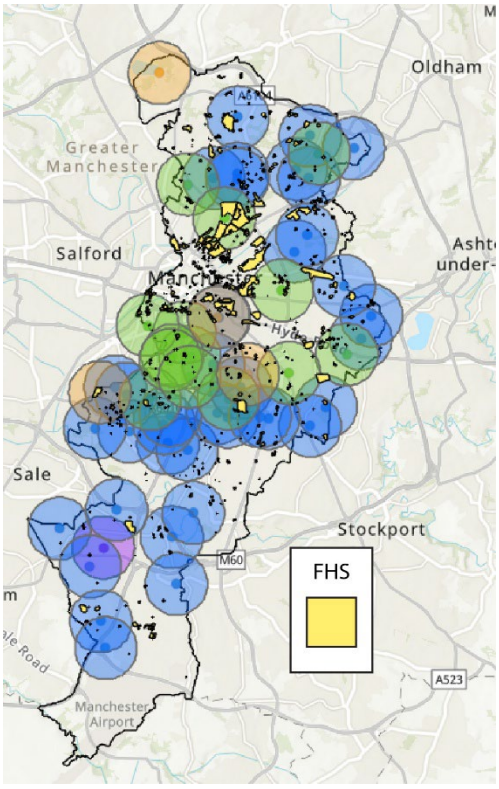

Figure 26: FHS areas and growing space buffers

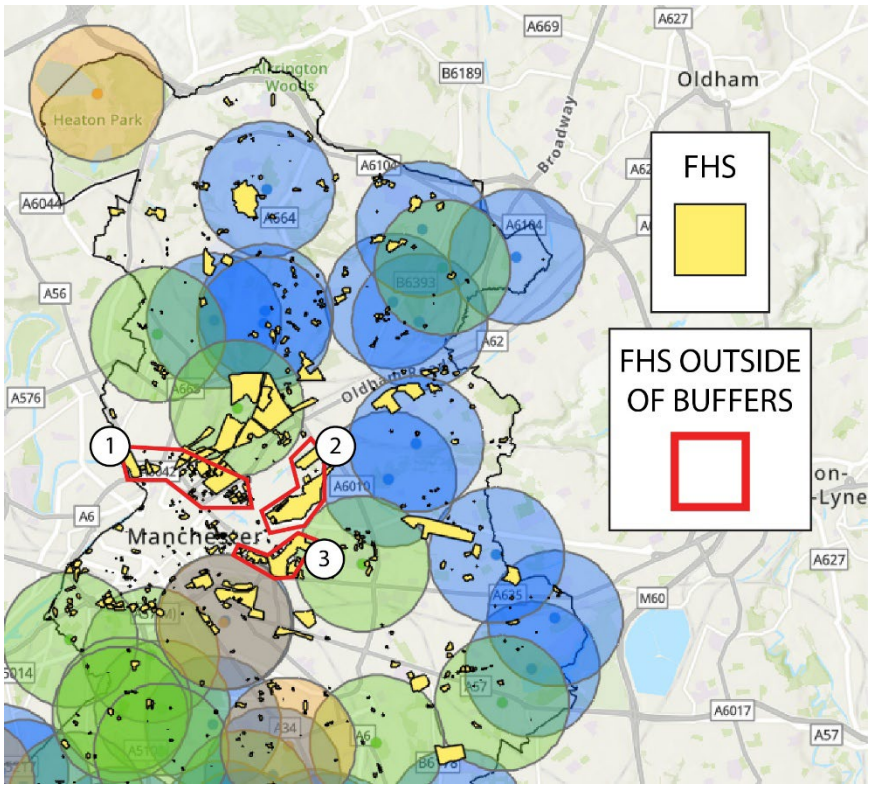

Figure 27: FHS areas outside of buffers

Due to the fact that these spaces fall outside of a 15-minute walking distance from existing growing spaces, SUA developments should be prioritised here in order to provide increased accessibility to SUA. Spaces 2 and 3 sit in high deprivation areas. The space 1 would serve to provide greater access to SUA for those living in the city centre.

CHAPTER 6: DISCUSSION

This chapter will discuss the results from the previous two chapters and aim to draw useful conclusions about what they mean for UA potential in Manchester.

6.1 Current UA in Manchester

The mapping of current urban agricultural growing spaces in Manchester has revealed a large percentage of growing spaces are located in Central Manchester, with fewer growing spaces further to the edges of the city limits.

Perhaps surprisingly, the location of growing spaces does not seem too dependent on how deprived an area is. While community gardens did have a slightly higher average deprivation score to allotments, the difference was not large enough to infer any obvious disparities in the wealth of their users. An assumption going into the study was that allotment use would be tied to wealth, however the results indicate this is not the case.

The issue with allotments then, is not a wealth barrier to entry, but rather that the number of allotments act as a barrier to entry. As the literature review indicated, allotments tend to have a large wait list to get access to them (Kwartnik-Pruc and Droj, 2023). There is clearly a demand for growing spaces, but not enough of them for everyone to access. This is important because allotments take up 94% of the urban agricultural space in the city of Manchester. If there are not enough allotments for the people who want them then there are certainly not enough of the other categories of growing spaces.

All of this points to a potential demand for more growing spaces in Manchester. Combine this with an informational campaign to bring the idea of urban growing spaces to the public consciousness, and there could be more people interested in making urban agriculture work in Manchester.

6.2 Food Security

Some sources argue a UK city may need to devote about 3% of its land to produce enough daily vegetables for the urban poor (Badami and Ramankutty, 2015). Manchester's poverty rate is 37%. This indicates that less than 10% of space could supply the whole city its vegetable needs. However, another study estimates this figure is closer to 33% (Martellozzo, 2014).

The current total of urban agricultural space in Manchester is 0.5km^2. The total area of Manchester is 116km^2, which means that 0.58% of the total space in Manchester is used for growing food. In order to reach 10% of space used on all forms of urban agriculture, just over 17 times the amount of current growing space would need to be added. In order to reach 33%, 66 times the amount of current growing space would be needed. This would mean somewhere between 11.1km^2 and 37.78km^2 of UA space would need to be created in order to provide Manchester with enough vegetables.

Going into the research, it was assumed that a primary benefit of UA would be its ability to improve food security. While the literature review showed this is true to an extent, this study has concluded that UA cannot produce enough food to break the urban-rural divide. In terms of food security, UA is perhaps best suited to individuals, families, and community groups that have the time, skills and motivation to participate in it (Holmer and Drescher, 2005). This speaks further to the relative popularity of allotments, when compared to other growing space types.

Other benefits, such as biodiversity, sustainability, community, health, and vacant lot use are perhaps more applicable to Manchester and should be prioritised in planning implementation.

6.3 Towards a UA Planning Framework

Looking to build on lessons learned from this study, a basic model for how the city could implement SUA practices has been formed. Keeping in mind principles such as the 15-minute city, and permaculture's concentric ring design, a "UA city ring" design has been created (Moreno, 2021) (Babac and Belic, 2018).

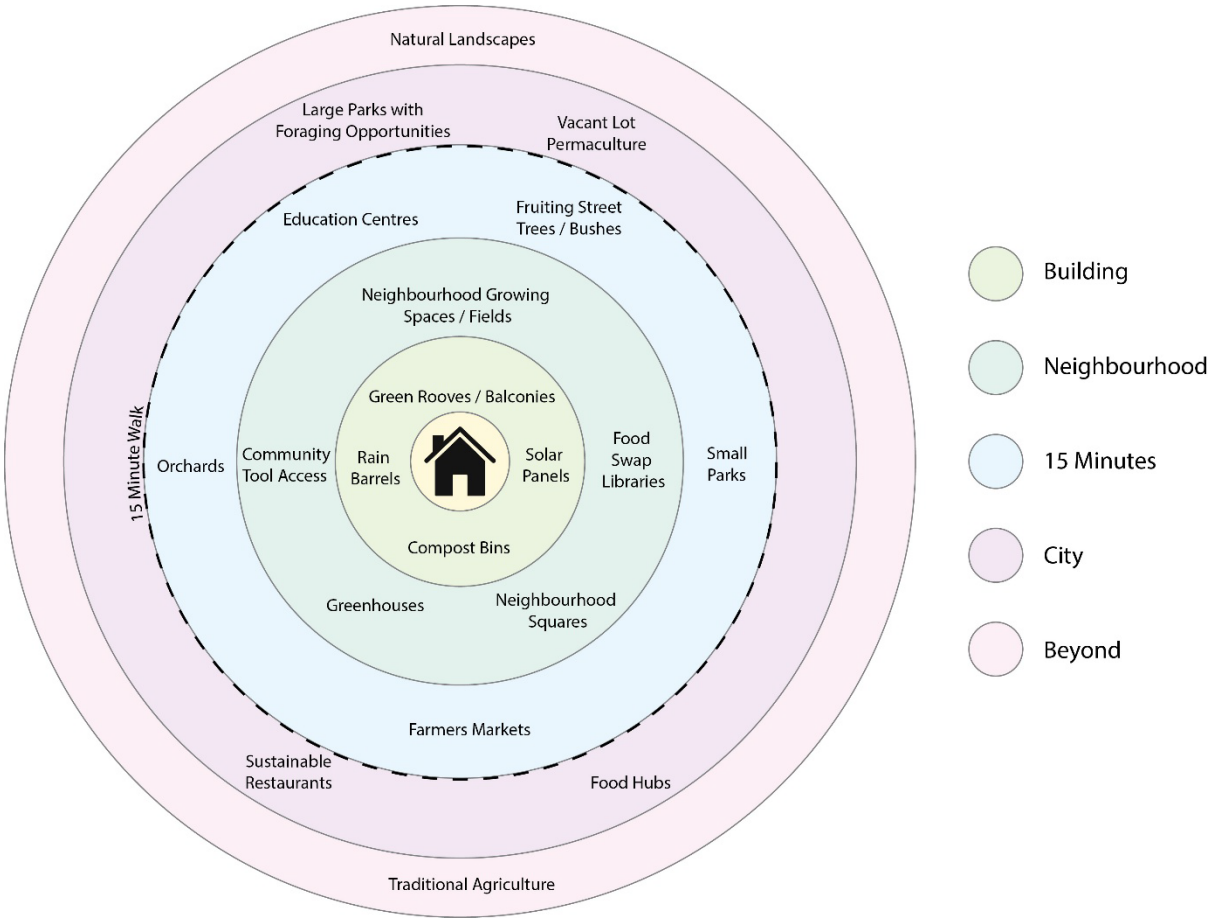

Figure 28: SUA Ring Design (Author, 2025)

This ring design is an amalgamation of best practice examples found in the literature and case studies. The design visually represents how resources could be spatially distributed across a city based around urban agriculture and permaculture principles. Its intention is to inform the policies that would be needed in order to transform Manchester into a SUA focused city.

Within buildings, it would be a good idea to provide green roofs or balcony space to allow for some kind of growing space (Bakkalogu, and Sahin, 2023). Solar panels could help to provide energy for buildings and keep energy costs low (Hemenway, 2015). Compost bins could encourage residents to properly dispose of organic waste, which would act as fertiliser for growing spaces (Knoot, 2009). Rain barrels would catch water which could be used for farming (Hemenway, 2015).

Outside of individual buildings and looking out to neighbourhoods, the provision of growing spaces, greenhouses and community tools would give residents the opportunity to grow their own food (Knoot, 2009). Food swap libraries would allow people to trade excess crops that they have grown and promote community interaction (Morales, et al. 2023). Neighbourhood squares in which people can gather to talk and children can play would further promote community engagement.

Moving further out, we get amenities that should be accessible to people daily, ideally within a 15-minute walking distance. Here we have parks, urban orchards and edible street trees and bushes (Kachanova, et al. 2025). Schools and educational facilities that can teach people about growing would also be ideal (Didarali, and Gambiza, 2019).

Outside of that 15-minute radius, and more sparsely found throughout the city would be larger parks with foraging opportunities and sustainable restaurants and food hubs, in which locally grown produce can be used (O'Hara, 2009). Outside of the city, more traditional, large-scale agriculture would still be required to meet food demand for the city (Morgan, 2010).

This ring design acts as a synthesis of this study's parts. It presents the principles of a SUA city and provides an example of how this research's findings could be used in future planning decisions

CHAPTER 7: CONCLUSION

This dissertation aimed to investigate the benefits of different types of UA, and how in particular sustainable forms may be implemented into Manchester's urban planning strategy. While there was already a body of research examining the benefits of UA and SUA, this study aimed to provide a new perspective by linking these benefits to the roles and aims of urban planning, in order to show how the two can empower each other. Specific focus on Manchester also added novelty to the research. Manchester is a city in which little literature has discussed the potential of widespread UA, despite its growth in recent years.

To answer the overall question of the dissertation, four research objectives were adopted. These were:

1. Identify the benefits of urban agricultural practices.
2. Measure the current extent of urban agricultural spaces in Manchester.
3. Identify areas across Manchester that have both the required space and the need for urban agriculture.
4. Explore ways in which urban agriculture can be effectively integrated into Manchester's urban planning framework.

Objective 1 was primarily completed through a literature review of previous research. The review was used to identify key themes across the literature. This thematic analysis was the basis for identifying the benefits of urban agricultural practices. These benefits could broadly be placed into four categories. These were social, economic, environmental, and land use benefits. Further analysis of Manchester Council's core strategy indicated that these benefits align with the city's existing goals of improving sustainability.

Objective 2 was achieved through the use of GIS mapping. Through mapping out all of the existing urban growing spaces in Manchester, and taking measurements of area, a clear picture of the extent of city's urban agriculture was created. This highlighted that

most growing spaces in Manchester are allotments, and there is predominant clustering of growing spaces just south of the City Centre.

Objective 3 was also achieved through the use of GIS mapping. Relative deprivation levels and areas of land identified by the council as suitable for housing development were mapped. As exemplified in Brighton, if space for urban agriculture is pushed for in planning policy, then new housing developments could include these spaces (Brighton and Hove Council, 2020).

East Manchester was identified in particular as suitable for SUA development. Here, there are large plots of available land for development, in conjunction with high levels of deprivation. This area is home to much of the strategic housing location identified by the 2012 core planning strategy (Manchester City Council, 2012).

Objective 4 was completed through a case study approach to reviewing other cities' planning policies which related to urban agriculture. Through the case studies, it became apparent that placing a focus on urban agriculture in planning advice to developers is key to increasing the frequency of UA related development proposals.

Economic policies are essential. They can provide monetary support to people who want to buy locally gown food and can promote UA investment. Subsidies can create public incentives to turn vacant land into productive growing spaces.

Specific farming techniques can mitigate the problems of poor soil health and ground contamination. This is particularly relevant for ensuring the success of SUA in East Manchester.

To ensure equitable access to UA, community groups must be active participants in UA dissemination, and growing spaces must be accessible via walking and public transport.

Finally, these lessons were used in the development of a theoretical planning framework. This further explored the potential for UA integration with planning strategies in Manchester and represents the cumulative findings of this study.

7.1 Limitations

Due to time constraints, only the Central Manchester region was considered in the research. A review of the whole of Greater Manchester would be beneficial to discover the full extent of urban agriculture across the region. During the research process, some community gardens and allotments were found just outside of the study area and so were not included in the data. This, however, does not necessarily reflect the reality of people living close to those provisions, as people within the Central Manchester region can still access growing spaces outside of its boundaries.

Additionally, only four types of UA spaces were considered in the research. These being community gardens, allotments, urban orchards, and urban farms. Due to time and word count constraints, these were chosen because one or more examples could already be found and verified in Manchester. Other forms of UA, such as green roofs, hydroponics (compact, water-based agriculture) and back garden farming could all be considered in the future.

Another limitation concerning people's lived experiences is that the only methods used in this study were GIS analysis and literature analysis. In order to better understand the extent of urban agriculture and how it plays a role in people's lives in Manchester, interviews with allotment users, members of community gardens, people who live near growing spaces, and professionals who work in food and agriculture related fields in Manchester would all have been useful.

These were not possible however due to ethical concerns regarding talking to members of the public. Professionals working in food related fields were contacted. These included Sow the City and Incredible Edible. However, either no response was received, or their response indicated they were not able to be interviewed. Perhaps if the study was over a longer period of time, it would have been possible to schedule interviews.

7.2 Future Recommendations

As mentioned in the limitations, this study only considered the Central Manchester Region. Future research should definitely aim to analyse the whole of the Greater Manchester area.

Perhaps another useful study would be to analyse the effects that a growing space has on the surrounding area over time. A study over 10 to 20 years could yield some illuminating information. This would provide insight into how these growing spaces truly function, and whether they provide the benefits to Manchester which the literature suggests they should.

Interviews with users of growing spaces and fieldwork at these growing spaces would also add to the academic literature surrounding urban agriculture in Manchester and give a more holistic view of its benefits. Back garden farmers could also be consulted during interviews.

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APPENDICES

APPENDIX 1: THEMATIC ANALYSIS TABLE

Themes	Literature
Social	
Community	Garcia-Sempere, A., et al. (2016). Janse van Rensburg, D. (2020). Yassien, G. and Ebrahiem, S. (2021). Hemenway, T. (2015). Glover, T. D., Parry, D. C., & Shinew, K. J. (2005). Miller, W. (2018). Holmer, R. and Drescher, A. (2005). Donovan, J. et al. (2011). Kwartnik-Pruc, A, and Droj, G. (2023).
Education	Janse van Rensburg, D. (2020). Haluza-DeLay, R. and Berezan, R. (2014). Eigenbrod, C. and Gruda, N. (2014).
Culture	Leahy, T. (2022). Holmer, R. and Drescher, A. (2005).
Health	Lingham, S., et al. (2025). Janse van Rensburg, D. (2020). Hemenway, T. (2015). Eigenbrod, C. and Gruda, N. (2014). Miller, W. (2018). Haysom, G. (2021). Sonnino, R. (2014).
Economic	
Food Security	Donovan, J., et al. (2011). O'Hara, S. (2009). Haysom, G. (2021). Eigenbrod, C. and Gruda, N. (2014). Bakkalogu, A. and Sahin, S. (2023). Murphy, (1999). Kwartnik-Pruc, A, and Droj, G. (2023).
Local Produce and Local Economy	Leahy, T. (2022). Badami, M. and Ramankutty, N. (2015). Miller, W. (2018). Donovan, J., et al. (2011). Sonnino, R. (2014). Murphy, (1999). Górna and Górny, (2020).
Poverty Aid	Lingham, S., et al. (2025). Miller, W. (2018).

	Haysom, G. (2021). Sonnino, R. (2014).
Environmental	
Biodiversity	Garcia-Sempere, A., et al. (2016). Haluza-DeLay, R. and Berezan, R. (2014). Krebs, J. and Bach, S. (2018). Hirschfield, S. (2021). Bakkalogu, A. and Sahin, S. (2023). Rada, P. et al. (2022).
Climate Resilience and Sustainability	Haluza-DeLay, R. and Berezan, R. (2014). Yassien, G. and Ebrahiem, S. (2021). Henao, R. (2022). Krebs, J. and Bach, S. (2018). Hirschfield, S. (2021). Donovan, J., et al. (2011). Kwartnik-Pruc, A, and Droj, G. (2023). Deelstra, T., and Girardet, H. (2000).
Water Management	Henao, R. (2022). Bakkalogu, A. and Sahin, S. (2023). Lin, B., Philpott, S., Jha, S. (2015).
Soil Health	Krebs, J. and Bach, S. (2018). Hemenway, T. (2015). Hirschfield, S. (2021). Schneider, P., Faulk, T., Mihai, F. (2023). Deelstra, T., and Girardet, H. (2000).
Waste Cycles	Henao, R. (2022). Hemenway, T. (2015). Deelstra, T., and Girardet, H. (2000). Murphy, (1999).
Land Use	
Local Centres	Garcia-Sempere, A., et al. (2016). Janse van Rensburg, D. (2020).
Vacant Lot Use	Lin, B., Philpott, S., Jha, S. (2015). Korsunsky, A. (2019). Górna and Górny, (2020). Knoot, (2009). Murphy, (1999).
Density	Haluza-DeLay, R. and Berezan, R. (2014). Henao, R. (2022). Kenworthy, J. (2006).
Green Space	Holmer, R. and Drescher, A. (2005). Donovan, J. et al. 2011). Kwartnik-Pruc, A, and Droj, G. (2023). Kenworthy, J. (2006). Murphy, (1999).

APPENDIX 2: CURRENT EXTENT OF UA IN MANCHESTER TABLE

Name	Category	Size	IMD Score
Abbotsford Road Allotments	Allotments	Small (3552m)	22.97
Ackroyd Avenue Allotments	Allotments	Very Large (23,692m)	42.43
Acorn Close Allotment Gardens	Allotments	Small (2746m)	29.21
Albermarle Allotments	Allotments	Very Large (32,484m)	40.47
Baguley Hall Allotments	Allotments	Large (16,369m)	43.26
Bluestone Road Allotments	Allotments	Medium (9008m)	52.35
Bradley Fold Allotment Gardens	Allotments	Very Large (23,455m)	11.65
Brailsford Road Allotments	Allotments	Small (1550m)	17.01
Brighton Grove Allotments	Allotments	Large (15,301m)	22.73
Broadhurst Park Allotments	Allotments	Medium (5836m)	31.74
Brooklands Allotments	Allotments	Medium (4134m)	35.76
Cleveleys Avenue Allotments	Allotments	Large (11,416m)	14.55
Crowden Allotments Pavilion	Allotments	Small (3646m)	53.28
Crumpsall and Cheetham Model Allotments	Allotments	Very Large (28,154m)	38.10
Cypress Street Allotments	Allotments	Small (1826m)	75.04
Edge Lane Allotments	Allotments	Very Large (22,299m)	54.02
Fallowfield Allotments	Allotments	Large (13,739m)	23.87
Foxfield Allotments	Allotments	Medium (7826m)	45.57
French Barn Lane Allotments	Allotments	Large (18,093m)	38.97
Gorton Reservoir Allotments	Allotments	Very Large (32,857m)	44.79
Hartfield Close Allotments	Allotments	Very Small (884m)	51.24

Hazeldene Road Allotments	Allotments	Small (3723m)	22.15
Hough End Allotments North	Allotments	Small (3631m)	28.99
Hough End Allotments South	Allotments	Small (3399m)	39.54
Ivy Green Allotments	Allotments	Large (12,358m)	9.58
Levenshulme Allotments	Allotments	Very Large (48,667m)	39.74
Northenden Allotments	Allotments	Medium (8174m)	40.30
Northern Moor Allotments	Allotments	Medium (8726m)	50.12
Ossory Street Allotments	Allotments	Small (1697m)	29.60
Phillips Park Allotments	Allotments	Small (3517m)	35.44
Pleasant Street Allotments	Allotments	Small (2779m)	75.04
Scotland Hall Road Allotments	Allotments	Small (1559m)	71.22
Scott Avenue Allotments	Allotments	Large (13,861m)	15.00
Sharston Allotments	Allotments	Medium (7738m)	23.01
Southern Allotments	Allotments	Very Large (27,279m)	54.23
Tonbridge Allotments	Allotments	Very Large (25,901m)	28.72
Wellington Road Allotments	Allotments	Medium (6347m)	26.88
Woodhouse Park Allotments	Allotments	Large (15,927m)	45.47
Aquarius Community Allotment Project	Community Gardens	Very Small (568m)	28.54
Beswick Urban Growers	Community Gardens	Small (2253m)	38.13
Broadhurst Park Community Garden	Community Gardens	Very Small (166m)	31.74
Brotherhood Peace Garden	Community Gardens	Very Small (323m)	56.31
Caritas Lalley Community Allotment	Community Gardens	Small (1632m)	70.65

City Road	Community Gardens	Very Small (91m)	56.78
Crowcroft Park Orchard Garden	Community Gardens	Small (1691m)	46.40
Forever Fields	Community Gardens	Medium (7026m)	32.62
Grierson Street Community Garden	Community Gardens	Very Small (211m)	52.57
Guidance Hub Cheetham Hill	Community Gardens	Very Small (92m)	67.29
Moss Side Community Allotments	Community Gardens	Small (1596m)	49.76
Platt Fields Market Garden	Community Gardens	Medium (4316m)	23.87
Ryder Brow Community Allotment Society	Community Gardens	Small (2356m)	61.17
Sow the City	Community Gardens	Very Small (218m)	52.57
Wythenshawe Community Farm	Urban Farm	Medium (5000m)	56.45
Birchfield Park Forest Garden	Urban Orchard	Small (2583m)	29.33
Gartside Orchard	Urban Orchard	Very Small (867m)	51.24
Heaton Park Community Orchard	Urban Orchard	Small (1594m)	33.38
Ryebank Fields Community Orchard	Urban Orchard	Small (1111m)	15.00