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Faculty of Landscape Architecture, Horticulture and Crop Production Science

Multifunctionality of Urban Community Agriculture in Belo Horizonte, Brazil: Practice and Politics

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Multifunctionality of Urban Community Agriculture in Belo Horizonte, Brazil: Practice and Politics

Multifunktionalitet inom stadsodling i Belo Horizonte, Brasilien: Praktik och politik.

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Foreword

During the Christmas break before the last semester of my bachelor studies in International Development and Political Science at Lund University, with the usual re-runs of old TV shows, one programme caught my attention. It was called the Edible Garden, and during six episodes, the viewer got to follow the horticulturist and journalist Alys Fowler as she lived off the vegetables grown in her typical British backyard during an entire growing season. It was then that the penny dropped – I had to find a way to work with food! Later during the semester, as I pondered what to do after finishing my bachelor, and with Alys' urban garden still in the back of my head, I stumbled upon the Agroecology master's programme at SLU Alnarp. I had never heard of the concept of agroecology, but just as I had done with my previous studies, I trusted my gut feeling and applied.

That fall, I began the journey of reconnecting with the experiences from my farm upbringing, mixed with the diverse cultural and academic perspectives of my classmates. It took a while to grasp the agroecology concept, but at the end of these two years the holistic and systemic approach makes so much sense not only to the world of food, but to life. We humans constantly search to label and categorise things, but in fact everything is connected rather than separate, and complex rather than linear. I believe that the ability to zoom out and put things into perspective is useful in all spheres of life.

Without having consciously planned it out, the selection of case and focus for this thesis has come to be influenced by the three fields I have most come in contact with during my academic years: agroecology, development, and political science. The process of working with the thesis has not been easy – I chose to study a case in a country where the university had no pre-established ties, a city that I was previously unfamiliar with, and a language that I more or less mastered. It was, to say the least, a challenging endeavour, and I have time and again questioned my choices. However, I think the constant reflection upon myself, my work, and the world around me has been of great benefit to my learning process. Agroecology emphasises *process,* and the work with my thesis has truly been a process of both professional and personal learning and growth. I have made realisations about things that I do not like, as well as found new interests, such as interviewing people about their experiences. I felt privileged and humbled to get to listen to the stories of the urban farmers, and wish that I could somehow return the favour.

The ambition to change the world for the better might sound like a cliché, but I believe that we all can do something. And I think to me, that 'something' has got to do with food, because food is something that matters to us all.

Sofie Olsson
September 2016

Abstract

As the food system is becoming increasingly global, and the world's population increasingly urban, food is disconnected from people and place. This causes a range of social, economic, and environmental problems such as public health issues, disruption of livelihoods, and biodiversity loss. Urban agriculture (UA) has been endorsed as a key element of local food systems, with the potential to reconnect people with their food and contribute to solving many of the problems that cities face.

This thesis analyses how urban farmers themselves view the benefits of urban community gardens on individual, neighbourhood, and city scales, how these perceptions are represented in the political framing of UA, and how they can highlight potential to advance the UA agenda. The empirical data derives from a qualitative case study of urban community gardens in the city of Belo Horizonte, Brazil, where observations and semi-structured interviews were carried out with urban farmers, municipal authorities, and researchers. The data has been triangulated with secondary data from peer reviewed academic literature, reports and official documents. By analysing the research question within a framework of agroecology, systems thinking, and multifunctionality, this thesis has aimed to bring a fresh perspective to the UA setting in Belo Horizonte, and highlight how the agenda can progress.

The findings show that while UA is framed as a strategy to increase the food and nutrition security of the population, urban farmers perceive the gardens as generating a wide range of social, economic, and environmental benefits on individual, community, and city scales. The findings also indicate that UA initiatives within other municipal government bodies, although targeting some of these other aspects, are not carried out in integration with the main UA programme, possibly due to the low level of intersectoral collaboration. I argue that by recognising the potential of UA within more policy areas, the UA agenda could gain new momentum. I also suggest that a framework of multifunctionality can be a useful tool to any city wishing to explore the multiple possibilities of UA, in order to better use its potential.

Keywords: agroecology, Belo Horizonte, Brazil, farmers' perceptions, multifunctionality, systems thinking, urban agriculture.

> Gardening is the most therapeutic and defying act you can do, especially in the city. Plus you get strawberries.
>
> *Ron Finley, the "Gangster Gardener"*

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Acronyms

BH	Belo Horizonte
CEVAE	Centre for Agroecological Living (Centro de Vivência Agroecológica)
CFF	Cities Farming for the Future (Cidades Cultivando para o Futuro, CCF)
CNAU	National Urban Agriculture Collective (Coletivo Nacional de Agricultura Urbana)
COMUSAN	Municipal Food and Nutrition Security Council (Conselho Municipal de Segurança Alimentar e Nutricional)
CONSEA	National Council of Food and Nutrition Security (Conselho Nacional de Segurança Alimentar e Nutricional)
ENAU	National Encounter on Urban Agriculture (Encontro Nacional de Agricultura Urbana)
FPM	Municipal Park Foundation (Fundação de Parques Municipais)
FStT	From Seed to Table (Da semente à mesa)
NGO	Non-governmental organisation
SLU	Administration of Urban Cleaning (Superintendência de Limpeza Urbana)
SMAPU	Municipal sub-department of Urban Planning (Secretaria Municipal Adjunta de Planejamento Urbano)
SMASAN	Municipal sub-department of Food and Nutrition Security (Secretaria Municipal Adjunta de Segurança Alimentar e Nutricional)
SMPS	Municipal Department of Social Policy (Secretaria Municipal de Políticas Sociais)
UA	Urban Agriculture
UFMG	Federal University of Minas Gerais (Universidade Federal de Minas Gerais)

1. Introduction

1.1 Problem background: Urbanisation and the globalisation of food

Although the Green Revolution through industrial agriculture managed to diminish global hunger levels, it simultaneously generated a range of environmental, economic and social problems, which paradoxically pose a threat to current and future generations' food security and livelihoods (De Schutter 2014, 2010; FAO 2014; Altieri & Nicholls 2005; Pretty 2002; La Trobe & Acott 2000; Berry et al 2015). Our modern agriculture is often controlled by large agribusinesses and promotes monocultural, capital- and chemical intensive, market-oriented production systems, causing or contributing to irreversible damage such as biodiversity loss, soil erosion, deforestation, climate change, destruction of local cultures, and public health problems (Berry et al 2015; Altieri & Nicholls 2005). As stated by Altieri and Nicholls (2005: 19), the "economic and political domination of the rural development agenda by agribusiness has thrived at the expense of the interests of consumers, farmworkers, small family farms, wildlife, the environment, and rural communities". While alternative production paradigms have emerged and continue to do so, the constantly increasing global population (predicted to reach nine billion by 2050) and dietary changes (increased meat consumption among other things) suggest no halt to agricultural intensification (Berry et al 2015; FAO 2011; GO-Science 2011; Godfray et al 2010). The high dependence on external inputs and market integration gives especially small-scale farmers little or no power over their production (Gonzales de Molina 2013). One of the effects is a growing struggle among small-scale rural farmers to sustain a livelihood (La Trobe & Acott 2000), which has contributed to an amounting urbanisation (Mougeot 2006; De Schutter 2014; McClintock 2010; Harvey 2012). Combined with a (colonial) history of concentrated land ownership, this has led Latin America to become the world's most urbanised region with 80% of the population living in urban areas (FAO 2014) – a percentage that is expected to become a global reality in 2050. In Brazil, as much as 86% of the population is now urban (World Bank 2016).

Urbanisation does not only mean that producers become fewer and more large-scale. In traditional food systems, food production and consumption are closely connected to the local nature, resources and culture (Dubbeling et al 2015b). As urban populations grow and the food is sourced from far away, consumers become increasingly disconnected from food production. This on the one hand diminishes the awareness of where the food comes from, and on the other hand decreases nutrient cycling and requires more processing, packaging, transportation, and storing, which in turn has negative implications on the environment (Pretty 2002; La Trobe & Acott 2000; McClintock 2010). Furthermore, the urban poor often suffer from higher levels of food insecurity and malnutrition than the rural poor as they more frequently depend on purchased food, which requires financial resources that large shares of urban populations do not have (Mougeot 2006; Sonnino 2009; Dubbeling 2011; Armar-Klemesu 2000).

De Schutter (2010) calls for a future agriculture that is based on the right to food[1]. In the context of an increasingly global food system, it is crucial to strengthen local food systems [2] that can reconnect consumers with producers and place, decrease dependency on global supplies, and increase urban resilience (De Schutter 2014; Serdar Mendle 2015; Dubbeling et al 2015b). Francis et al (2003: 102) state that "in current urban culture, food may be the only remaining connection to nature". Urban agriculture (UA) is increasingly endorsed as a key aspect of local food systems, a local countermovement to global capitalist problems (McClintock 2010: 199), and a solution to several social and environmental problems in the city.

1.2 Aims and research questions

[3] The overarching research question of this thesis is: *How are urban farmers' perceptions of the benefits of urban community gardens represented in the political framing of urban agriculture in Belo Horizonte, and how can these perceptions highlight potential to advance the urban agriculture agenda?*

My assumption is that urban farmers, as the everyday practitioners of UA, have valuable perspectives on how UA benefits them, the surrounding community[4], and the city at large. By learning about their views, as well as the views of municipal authorities and researchers, and discussing these in a multifunctionality framework through the lenses of agroecology and systems thinking, this thesis aims to bring a fresh perspective to the UA debate in BH and illuminate possibilities for advancing the UA agenda.

The following research questions have been developed to guide the data collection and analysis of the study:

1) How are the urban gardens set up and managed? What are the main challenges?
2) What are the benefits of the urban gardens, according to the urban farmers?
3) How is UA framed in local politics in Belo Horizonte?
    - Which is the political home of UA?
    - How do different municipal government bodies approach UA?
    - How is the UA work of different municipal government bodies integrated?

---

[1] According to De Schutter (2014: 3), "the right to food is the right of every individual, alone or in community with others, to have physical and economic access at all times to sufficient, adequate and culturally acceptable food that is produced and consumed sustainably, preserving access to food for

[2] Food systems can be defined as "networks of food production, distribution, and consumption" (Gliessman 2015: 31), and in a *local* food system the aim is to involve only local actors in this network.

[3] All quotes in the results chapter (chapter 5) as well as excerpts from policy documents and laws (pages 12, 14, and 15) are my own translations from Portuguese to English. The wording is as close as possible to the original, but sometimes modified to keep the correct meaning.

[4] 'Community' is a contested word (see e.g. Ernwein 2014: 79) and its meaning is often unstated. I am using it because it is a word that the urban farmers themselves use (*'comunidade'*) as a synonym for 'inhabitants in the surrounding area/neighbourhood'.

1.3 Scope and significance

Like any other type of agriculture, UA can generate functions that are either positive (e.g. increased biodiversity) or negative (e.g. polluted soil due to agrochemicals) – it all depends on the specific context and how the farming system is managed. While recognising that UA itself may create problems, the focus in this thesis is on the positive functions that UA can generate, i.e. how it can benefit farmers, the community, and the city. Specifically, it explores urban farmers' *perceptions* of what functions generated through their practices. As shown in the study by Lenihan et al (2009), it is relevant to not only measure the *actual* functions produced by agriculture, but also study the *perceptions* of multifunctionality. Perceptions can indicate what different actors see as important aspects or outcomes of an activity (e.g. UA), and they may moreover both reflect and influence practice and policy. Understanding farmers' motivations to participate and their perceptions on the gardens' contributions is important for the planning and design of gardens and UA policy. This is true not least in an urban setting, where agriculture resides so closely with the population. Van Huylenbroeck et al (2007) highlight the need for case studies about the value of non-commodity outputs. Pourias et al (2016: 258) likewise claim that there is a lack of research about the individual motivations of urban farmers, and state that "the functions assigned to the gardens are generally described without explaining which point of view is adopted. Yet, it has been shown that depending on the speaker, the functions assigned to the garden and the weight of each function vary considerably". Furthermore, showing the importance of UA to urban farmers, and its perceived multiple functions and benefits, could justify more political attention to UA, as suggested by Lovell (2010).

The empirical data in this thesis has been gathered at urban gardens, universities, and municipal departments/institutions in Belo Horizonte, and the analysis is subsequently situated on the levels of the individual farmer, the garden, the community, and the municipality /city. It does not analyse UA or its multifunctionality in a national perspective, but keeps in mind the environmental, social, and economic contexts beyond the set boundaries of my selected study area.

1.4 Thesis outline

Following this introductory chapter, the case context is described. Thereafter, I present the theories and concepts that have been used to guide data collection and analysis. The fourth chapter outlines and discusses methodology and research methods. Thereafter, the empirical results from the fieldwork in Belo Horizonte are presented. The sixth chapter analyses the results, and discusses the meanings and implications. It also makes suggestions for future research and reflections on the methodology. The final chapter concludes the thesis.

2. Context

2.1 Agriculture in Brazil

Agricultural transformation, urbanisation, and political context

Brazil is the world's fifth largest country both in terms of surface and population. It is a federal republic with governance on federal, state, and municipal levels (Sveriges Ambassad i Brasilien 2015)[5]. Brazil is a country of many inequalities: between ethnic groups (afro-Brazilian, white, mixed, and indigenous peoples), geographical regions, and rural and urban areas. The country has had concentrated land ownership since colonial times, but this intensified with the 1960s' technological revolution that made Brazilian agriculture part of the global economy. The Brazilian State promoted market-based agriculture with the help of policies and financial incentives, and the industry sector became an important partner to agribusiness by supplying machines, agrochemicals, and biotechnological innovations to expand agricultural production. It became increasingly difficult for family farms to survive in the countryside as their farms were being either purchased by large agribusinesses or forced to compete with them, and many had to become wageworkers in the city. The agricultural developments during the 1960s, 1970s, and 1980s profoundly transformed Brazilian society and millions of farmers migrated to urban areas. This resulted in the growth of both large metropolises and small- and medium-sized cities, leading to a new, more complex rural-urban setting (Elias 2013). The urban population has almost doubled during the past decades, from 46% in 1960, to 86% in 2015 (World Bank 2016).

Today, Brazil has a "dual agriculture" (Petersen et al 2013), with on the one hand large-scale, export-oriented cash crop production (e.g. soy, maize, sugarcane and beef) fundamental to the Brazilian economy (Altieri & Toledo 2011), and on the other a great number of small-scale family farms. Cohn (2006: 143) writes that "at times, governments [in the Americas] have trumpeted the importance of small farmers, and at times they have argued that farming is a backwards lifestyle that stands in the way of development and modernization". In Brazil, these two stances are represented by two different ministries: the Ministry for Agriculture and Supply (MAPA), which supports the agroindustry, and the Ministry of Agrarian Development (MDA), which supports family farming and agroecology (albeit with a significantly lower budget). Brazilian civil society has put pressure on political leaders by leading a tenacious struggle for more sustainable production systems and universal access to food. This resulted in, among other things, the approval of the National Policy for Agroecology and Organic Production in 2012 (Bianchini & Passos Medaets 2013; Wezel et al 2009).

[5] Important to mention is Brazil's current and continuously worsening economic crisis and political turmoil, which was instigated by the corruption scandal in the state-owned oil company Petrobras that erupted in 2015 and involved a large number of high-level politicians.

Urban agriculture in Brazil

UA has been present in Brazil since the first cities were constructed, but gained momentum as part of policies and programmes aimed at increasing the food and nutrition security of the Brazilian population, such as the famous Zero Hunger programme (Santandreu & Lovo 2007). In 2010, the Right to Food was amended into Brazil's constitution (Rocha 2016). A study that mapped UA in Brazil found that UA is practiced in all regions of the country, and initiated by various actors including individuals, civil society, academic institutions, public authorities (federal, state, municipal), and more recently, private enterprises (Santandreu & Lovo 2007). Most projects are aimed for home consumption and some for commercialisation, and about half are organic or agroecological. According to the authors, the main weakness of UA in Brazil is the lack of legal- and institutional frameworks and policies conducive to UA, and the low level of collaboration and exchange between different initiatives. Therefore, key priorities must be to institutionalise UA and improve participatory management and intersectoral collaboration, and to inform the population about the benefits of UA. Based on the study, a process of constructing a national UA policy was initiated, however it was abandoned in 2012 (ENAU 2015). In 2014, the Inter-ministerial Chamber for Food and Nutrition Security (CAISAN) assumed the responsibility for policy creation. A bill to instigate a national UA policy is currently being assessed (PL 906/2015). In terms of the connection to agroecology, the presence of UA in the first National Plan for Agroecology and Organic Production 2013-2015 was weak, without any budget or minister responsible for UA initiatives. Civil society has put pressure on the Brazilian government to include UA more clearly in the second plan that is currently being elaborated (ENAU 2015). The first National Encounter on Urban Agriculture (ENAU) reinforced the conclusions drawn by the National Council of Food and Nutrition Security (CONSEA) and the National Urban Agriculture Collective (CNAU), regarding what a national UA policy should entail:

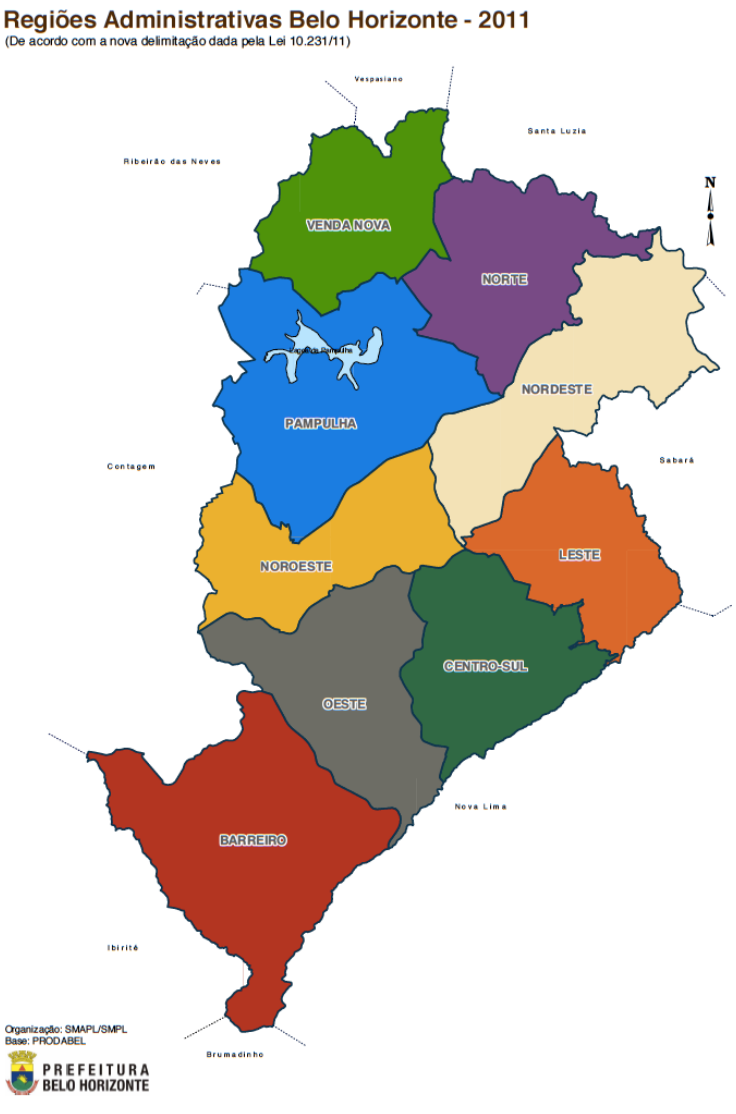
"Actions that support UPA should be developed and implemented with integration among them, and with actions on SAN, housing, urbanism, agroecology, social assistance, health, education, solid waste management, work- and income generation, professional training, and environmental protection, organised in networks, in a way that promotes dialogue between different governmental sectors and with civil society." (ENAU 2015: 3-4)

In summary, UA in Brazil does not yet have its own laws, policies, and budget, but has largely been advanced as part of policies and actions that target food and nutrition security. It has been only briefly included in the agroecology debate. ENAU, based on the document by CONSEA and CNAU, specifically highlight the importance of recognising the social, cultural, economic, and political multifunctionality of UA, and of developing UA initiatives in an intersectoral, decentralised, participatory manner (ENAU 2015).

2.2 Belo Horizonte

Belo Horizonte (BH) is Brazil's sixth largest city, with a population of 2.4 million (Mendoça & Rocha 2015; FAO 2014). The municipality is divided into 9 administrative regions. One of these regions is Barreiro, where the two urban gardens studied in this thesis are situated. Barreiro itself is older than Belo Horizonte and was originally an agricultural area that came to supply the emerging city of BH, and that with industrialisation and growth came to be included in the municipality. Today, Barreiro has almost 300,000 inhabitants and is one of the most economically important regions in the city. About half the population in Barreiro have a monthly salary between 0.5 and 3 minimum wages (Bairros de Belo Horizonte *s.a.*).

Map 1: Location of Belo Horizonte, Brazil (starred). *Source: Google Maps 2016 (used based on Google's "fair use" principles)*



Map 2: The nine administrative regions in Belo Horizonte and the location of Barreiro (bottom red area). *Source: Prodabel s.a.*

An introduction to urban agriculture in Belo Horizonte

Belo Horizonte municipality is considered 100% urbanised, which on the one hand means that food has to be acquired from the surrounding municipalities in the metropolitan region or from other parts of Brazil (Souza & Vasconcelos 2014), and on the other that preservation of the few remaining green areas is critical. The climate[6] in BH allows for year-round vegetable production.

In Belo Horizonte, urban agriculture is officially interpreted as *"the set of activities of cultivation of greens, medicinal plants, fruits, flowers, of forest management, as well as of animal breeding, fish farming, and artisanal production of foods and drinks for human consumption, exchange, donation, commercialisation, and service delivery"* (Lei Nº 10.255 2011, § 1º). Typically, it is focused on horticulture, medicinal plants, fruit trees, and small animals and a part-time activity directed to own consumption, with only a small share being donated or sold (Lara & Almeida 2008). While the ratio of men to women engaged in UA is rather equal, the majority of urban farmers are older than 60 and have low education and income levels (Souza & Vasconcelos 2014). Various actors (civil society, NGOs, private enterprises, academic institutions, and municipal government bodies) establish and support urban agriculture in Belo Horizonte. Politically, UA is endorsed through the *School and Community Garden Programme*, which was established by municipal decree in 1998 and is one of six branches (see Appendix 4) of the Municipal Sub-Department of Food and Nutrition Security (SMASAN) (Souza & Vasconcelos 2014; Rocha & Lessa 2009; Rocha 2016; FAO 2014). This department was created in 1993 (then named SMAB) with the aim of improving the food and nutrition security of Belo Horizonte's population, in particular vulnerable people. SMASAN's approach was a forerunner to national policies, has inspired cities worldwide, and has been applauded by international scholars and organisations (Rocha & Lessa 2009; Sonnino 2009; FAO 2014). However, "in terms of promoting urban and peri-urban food production, efforts in Belo Horizonte have been modest" (Rocha 2016: 38-39).

While the intersectoral- and multi-stakeholder work on food and nutrition security has several platforms[7], no such fora currently exist for UA. A multi-stakeholder forum on urban agriculture was established during the international project Cities Farming for the Future (CFF) that was implemented in BH between 2006 and 2008, however it is no longer active. BH's participation in CFF was induced by the local NGO Rêde (Lovo 2011: 88) and implemented by the international organisations RUAF Foundation and IPES in partnership with the municipality of BH (represented by

[6] Temperatures are on average 17.5C° in June and 22.9C° in January (Climate-data.org, s.a.). The summers are wet and winters dry – extended droughts are an increasing problem in the region.

[7] CAISAN-BH is a council that coordinates the intersectoral work on food and nutrition security. COMUSAN is a type of food policy council (FAO & RUAF 2015; Rocha 2016), composed of 16 civil society representatives and 8 civil servants from the municipal departments, aimed at social control of food and nutrition security management. The recently established FOMASA is yet another multi-stakeholder food council, aimed at discussions around supply, with participation of actors within production and commercialisation (Decreto N. 16.157, 2015).

FPM, the Municipal Secretary of Urban Policy, and the regional Barreiro administration). In addition to the forum, the three main outcomes from CFF were 1) the document 'Agricultura Urbana: Belo Horizonte cultivando o futuro' that analysed UA in BH, 2) the Action Plan, 'BH Cultivando Agricultura Urbana 2008-2018', with strategic objectives for UA, and 3) the establishment of the pilot garden 'Jardim Produtivo' (Lovo 2011; Lara & Almeida 2008). Another main objective was the "formulation of a municipal UPA policy constructed in a participatory way" (Santandreu & Lovo 2007: 52), which resulted in three law proposals. In 2010, a municipal law that authorised UA as a non-residential land occupation was approved (Lovo 2011: 154). The following year, an overarching UA policy was passed, stating that: *"Hereby the Municipal Policy for Support to Urban Agriculture is established, as a constituent part of the municipal policy of supply, in harmony with the urban policy, and directed towards the population's food and nutrition security, on sustainable foundations"* (Lei Nº 10.255 2011, Art. 1º). The mayor vetoed parts of the policy with reference to infringements on urban and environmental laws (despite the policy's aim to incorporate these areas, as evident in the above cited statement). In 2010, another international project called From Seed to Table (FStT), also run by RUAF and IPES, was implemented in partnership with the Federal University of Minas Gerais (UFMG) at the three urban gardens Capitão Eduardo, Vila Pinho, and Jardim Produtivo[8]. The aim and outcome of FStT was to make production more viable and increase the level of commercialisation as an addition to home consumption (Borges 2013; Lara & Almeida 2008; Lopes Filho 2011; RUAF Foundation 2010).

2.3 Summary

Globalisation and the transformations of the agricultural sector from the 1960s and onwards dramatically changed the structure of Brazilian society both geographically and socially, and was a major cause of the large outmigration from rural areas. Brazil today has a dual agriculture system with both an industrialised, export-oriented agribusiness sector driving the Brazilian economy, and a small-scale family farming sector vital to domestic supply and rural livelihoods. Urban agriculture has existed as a source of alimentation for many decades, but emerged on the municipal and national governance agendas largely as part of the policies and programmes on food and nutrition security that gained momentum in the 1990s and early 2000s. While many actors support UA initiatives in BH, it is politically part of SMASAN's pioneering and successful food system that was created in 1993. A municipal UA policy was approved only a few years ago. It reaffirms UA as part of the food and nutrition security agenda, but also makes reference to urban policy and sustainability. A multi-stakeholder UA forum was implemented at the end of CFF, but it is currently inactive.

[8] Capitão Eduardo is a CEVAE supported by FPM, while the urban gardens Vila Pinho and Jardim Produtivo are supported by SMASAN.

3. Theories and concepts

The first two subchapters on agroecology and systems thinking have been the theoretical lenses throughout the entire research process. They have guided what things I look at, how I look at those things, and how I interpret them. The third subchapter presents concepts from the field of urban agriculture, multifunctionality, and the political framing of UA. These concepts are used to analyse my empirical data and to relate my study to previous research in the field.

3.1 Agroecology

Agroecology has been endorsed as more sustainable and just alternative to our current agricultural paradigm, based on the premise that it presents a possible approach to increase agricultural production so that it can meet the growing global demand for food, while simultaneously protecting smallholder livelihoods and ecosystems and slowing urbanisation rates (De Schutter 2014, 2010). Scholars have defined agroecology in different ways, the broadest perhaps being Wezel et al's (2009: 503) definition of agroecology as "a scientific discipline, agricultural practice, or political or social movement". In Europe, the concept emerged during the first half of the 20th century as a scientific discipline that applied ecology to agriculture. In Brazil, it grew as a movement that raised concerns about the industrial farming approach and recognised the advantages with more traditional ways of farming (Wezel et al 2009).

As a research approach, agroecology combines methods and concepts from both natural and social sciences and is "the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions" (Francis et al 2003: 100), or the "holistic study of agroecosystems" (Altieri & Nicholls 2005: 31). These definitions imply that research can be situated on various scales ranging from individual plots to entire food systems, but also that any issue or subject is studied in a way that sees all scales and dimensions as interrelated and humans as "embedded within, rather than separate from, nature" (Hassanein 1999: 18). It recognises how "humans simultaneously shape and are shaped by the ecosystems to which we belong" (McClintock 2010: 201) and moreover underlines the uniqueness of place and the people and other species that inhabit that place (Francis et al 2003: 100).

According to Gonzales de Molina (2013), the political dimension of agroecology is often overlooked both in scientific research and in practice. He argues that "agroecosystems, as socioecological constructions, are produced through power relations" (Gonzales de Molina 2013: 45) and that social inequality often leads to degradation of the environment. Therefore, access to resources and market opportunities need to be supported politically through public policy and institutional change, in order to obtain sustainability and stability on the farm scale, and an actual change within the food system.

Agroecology has been a guiding concept in all phases of the research process of this thesis, by emphasising the importance of holistic thinking and attention to the interrelations among the various scales and dimensions of my case. I have studied the gardens and governance from natural, social, and economic perspectives. Furthermore, the political dimension, highlighted by Gonzales de Molina (2013), has been a useful element because of the centrality of politics in my studied case.

3.2 Systems thinking

The concept of systems thinking is integral to agroecology (Wezel et al 2009; Francis et al 2003). Agroecology, as described, emphasises complexity and interconnectivity between dimensions and scales. It moves away from reductionist thinking, which sees components of the world as separable (Bawden & Packham 1993). Nonetheless, while the aim is to obtain an understanding that is as holistic as possible of an issue or situation, "no view of the world can ever be comprehensive" (Midgley 2000: 36). According to Ison (2008: 13), "systemic inquiry is an approach to managing complexity which is adaptive to changing circumstances". There is a difference between hard systems thinking, which views the *world* as systemic, and soft systems thinking, which views the *process of inquiry* as systemic (Checkland 2000). For practical reasons, the researcher in either case has to create boundaries, which are abstract constructs that define what composes a system and what is internal and external to that system (Gliessman 2015). Gamble et al (1996) suggest for example, that the level of control that the main actors have can determine where to draw the limits. Systems can be natural, social, political, and so on, and each system consists of smaller subsystems and is in turn part of larger systems – all interconnected (Checkland 2000) and co-adaptive (Ison 2008). While the researcher may focus on a certain system, it is crucial not to forget about the context that surrounds it – "the system and its environment (context) are logically inseparable if one is attempting to be holistic" (Ison 2008: 15). Gamble et al (1996: 45) accordingly claim that "it is only when the whole is understood, that it is possible to identify emergent issues/themes that are critical to the future of the farming system".

Soft systems thinking has driven my whole research process and not least the fieldwork. In fact, this thesis is focused on the interconnections between the central 'system' of inquiry, i.e. the urban gardens, and the surrounding context, not least the municipality as the representative of the local political system affecting (and possibly being affected by) the gardens. I entered the field with a rather open-ended approach, with the aim of departing from the real world situation and getting a holistic understanding of actors and places, and I have throughout the process tried to remain reflective of the context as well as my own position and choices.

3.3 Multifunctionality in urban agriculture

3.3.1 Defining and describing urban agriculture

Urban agriculture (UA) can be defined in many different ways, but this thesis adopts the simple definition that UA is "the growing of plants and the raising of animals within and around cities" (RUAF s.a.). The practice of UA has existed as long as cities have existed (Mougeot 2006; Lovell 2010) – indeed, the urban civilisation exists thanks to the development of agriculture some twelve thousand years ago (Steel 2008). Mougeot (2006: 5) writes that "urban agriculture is anywhere and everywhere that people can find even the smallest space to plant a few seeds". It is estimated that currently 800 million people worldwide practice UA, and while it is unlikely for cities to be self-sufficient, 15% of the global food supply is produced in urban areas (FAO 2015; Mougeot 2006). Academic research on UA is fairly recent, but has boomed during the past two decades, maybe as a consequence of the growing critique against an increasingly globalised food system (FAO 2014; Steel 2008). Because the literature on UA is so vast and written in many languages, there are continuous debates on how different terms should be defined and used. In this thesis, I have adopted the terminology used by the urban farmers in my case study[9]. This is why I write '**urban agriculture'** (*agricultura urbana*) or 'urban farming' (which I consider a synonym since only the other term exists in Portuguese) rather than 'urban gardening'; '**urban farmer**' (*agricultor urbano*) rather than 'urban gardener'; and '**urban garden**' (*horta urbana*) rather than 'urban farm'.

UA practices are complex and place-specific, but some concepts are helpful for the purpose of description and analysis. In Figure 1 I have summarised examples of aspects that can be used to describe an urban garden (internal) and its context (external), by drawing on the work of agroecologists such as Bawden & Packham (1993), Ison (2008), and Gliessman (2015), and urban agriculture scholars and sources such as Garnett (1996), Mougeot (2005), Dubbeling (2011), the FAO (2007) and the RUAF Foundation (s.a). The farming system is characterised by what is produced, how it is produced, and what the destination of the produce is (e.g. home consumption or sales). As for any farm, how the garden is set up and managed is to a large extent affected by the natural, political, and socio-economic context. In this study I have also included farmer relations as a possible (internal) factor, since many urban gardens are collective. Aspects such as the garden's location (intra-urban or peri-urban, public or private land, homestead or away), affect the availability and cost of land, access to resources and services, market proximity, environmental circumstances (e.g. pollution levels), and farmer identity and drivers. Management is also related to what inputs the garden uses and what outputs it produces, not least depending on whether or not it is managed according to organic principles.

[9] As Ernwein (2014) notes, terms can mean different things in different languages, but I still believe that translating the terms used by the farmers is the closest I can get to an honest illustration of the context. The Portuguese terms are written in cursive in brackets.

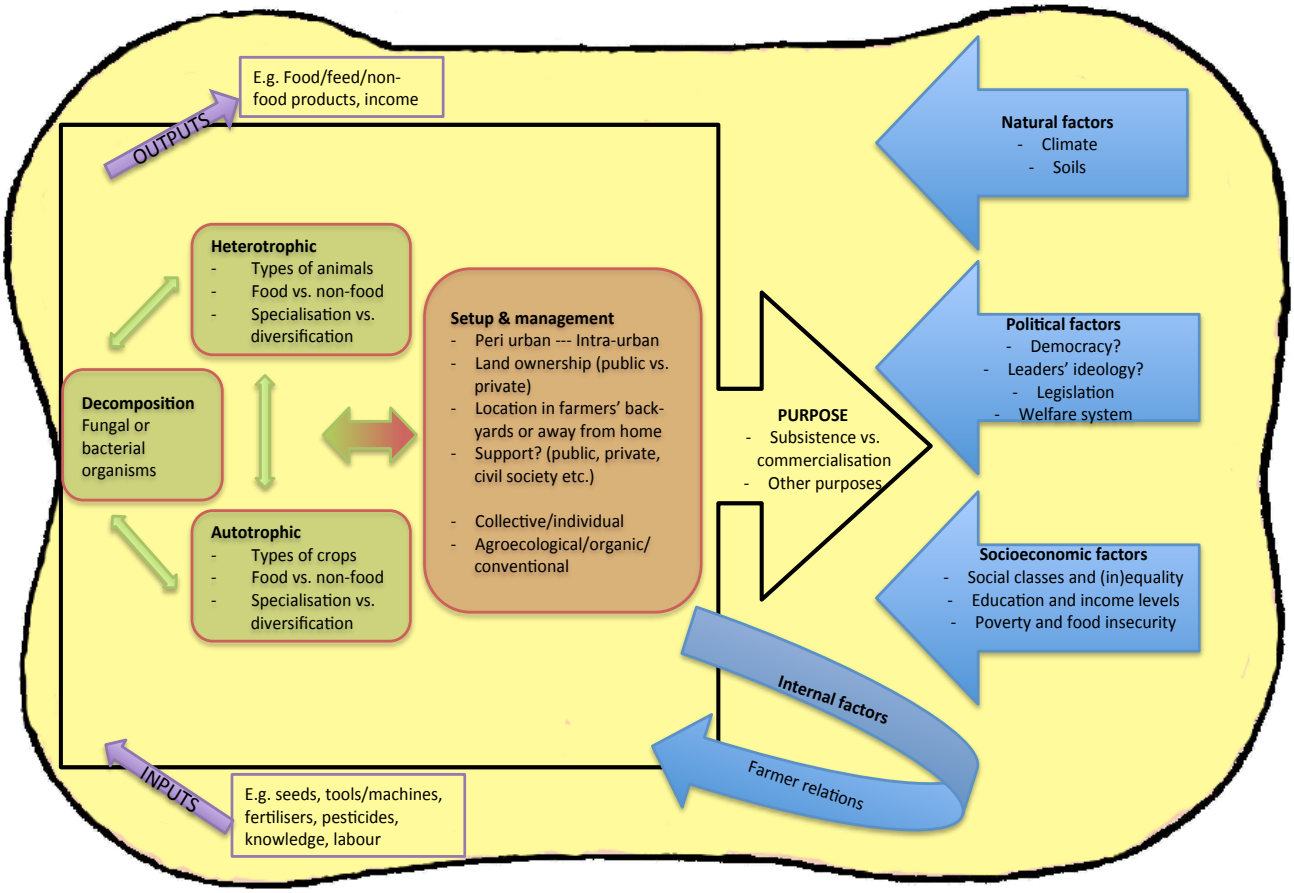


Figure 1: A revised version of the Hawkesbury's Peanut Model (see Bawden & Packham 1993), adapted by the author of this thesis to summarise examples of internal and external factors to describe UA.

In general, rural and urban agriculture have very different preconditions. Challenges that are more common in urban areas include limited availability of land and the competition of access to land and other resources (Vandermeulen et al 2006; Halloran & Magid 2013). UA often competes with other green spaces such as parks (Lovell 2010). Some scholars have raised concerns that UA might exacerbate the rural-urban migration and that policies and funds might neglect rural areas in favour of urban. However rather than competing with rural agriculture, UA should complement it, and make use of the unique benefits that the urban setting offers, such as the proximity to consumers (Vandermeulen et al 2006; Halloran & Magid 2013; Lovell 2010). Moreover, most people that move to cities do so in search of other types of jobs, even though they might end up growing food as a survival strategy (Mougeot 2006; Mougeot 2000). When UA emerges from the bottom-up, it is indeed often rooted in a need to put food on the table. However, motivations and drivers to farm the city are diverse, as will be described in chapter 3.3.3. UA projects can also be initiated by NGOs, international organisations, private actors, and public authorities. Chapter 3.3.4 will present different motives and approaches that drive local governments to advocate for UA.

Although this thesis focuses on possibilities and potentials of UA, it is important to acknowledge that UA practices can also generate problems. Many scholars highlight for instance the possible health hazards from consuming food grown on polluted

grounds (Lovell 2010; Armar-Klemesu 2000). Mougeot (2000) concludes that concerns of this type are real and must be taken seriously, with appropriate planning, policy, and technical measures as well as education to urban farmers.

3.3.2 The concept of multifunctionality

The concept of *multifunctionality* has diverse interpretations, but it is mainly understood either as a *characteristic* or as an *objective* of an economic activity. When viewed as a characteristic, *multifunctional agriculture* is agriculture that generates multiple functions beyond its primary aim of producing food and/or non-food products (Van Huylenbroeck et al 2007; Maier and Shobayashi 2001; Marques-Perez et al 2014). These multiple functions can be intended or unintended, complementary or conflicting, direct or indirect, and positive or negative, and they are often interrelated, implying that a change in one affects the other (Maier and Shobayashi 2001). When multifunctionality is viewed as an objective, it is given a normative connotation, suggesting that agriculture should strive to be as multifunctional (in the positive sense) as possible, which means that "maintaining a multifunctional activity or making an activity "more" multifunctional, can become a policy objective" (Maier and Shobayashi 2001: 14). In this interpretation, it corresponds with agroecological thinking as it emphasises the many positive social, environmental, and economic outcomes that UA can and should aim to generate.

In line with systems thinking, multifunctionality in agriculture can be analysed on different scales and levels, which are connected and undoubtedly affect one another. On a national level, the debate often concerns whether and how countries should remunerate farmers for added positive functions, so that agriculture is steered towards production systems that consider aspects beyond the productive function, such as biodiversity conservation. Because many of the functions are intangible and immeasurable, the producer neither gets any recognition or remuneration for the positive outputs, nor has to pay for the negative ones (Van Huylenbroeck et al 2007). So-called "green payments" (Buttel 2003: 9), which compensate farmers whose agriculture provides benefits for the environment, already exist in the EU with the Greening measures implemented in the 2013 CAP reforms (European Commission 2016). The main critique against green payments is that it represents a new form of protectionist policies (Maier and Shobayashi 2001).

Analysis can also focus on how lower political levels (state, municipality, city) can incentivise and support multifunctional agriculture, on the supply (producer) as well as demand (consumer) side (Vandermeulen et al 2006). Local political bodies have the advantage of being able to depart from the specific characteristics and needs of the local context when forming policies and other kinds of support (e.g. services). On farm level, one can analyse the functions generated from food production (Pourias et al 2016).

3.3.3 Multifunctionality in urban agriculture

Urban agriculture is according to Mougeot (2006: 62) "a tool to address multiple challenges faced by the city, its environment, its economy, and its people". He and other scholars highlight the potential of UA to help solving many of the problems that urbanisation itself generates and problems deriving from our current production-, distribution-, and consumption patterns (McClintock 2010; Garnett 1996; Halloran and Magid 2013; Lovell 2010; Mougeot 2006; Vandermeulen et al 2006). UA is an activity that can contribute to urban areas both by making better use of its resources, and by delivering other resources that are beneficial to the city: UA is "tapping on resources (unused or under-used space, organic waste), services (technical extension, financing, transportation), and products (agrochemicals, tools, vehicles) found in this urban area and, in turn, generates resources (green areas, microclimates, compost), services (catering, recreation, therapy), and products (flowers, poultry, dairy) largely for this urban area" (Mougeot 2006: 4-5). The concept of multifunctionality can be a way to justify agriculture as a land use in areas with land competition, as its production value might not be enough to compete with other land uses (Lovell 2010).

Previous research on UA and multifunctionality suggests various ways to categorise the functions. For example, Van Huylenbroeck et al (2007) uses a framework of green, blue, yellow, and white functions, while Marques-Perez et al (2014) divide the functions as social, environmental, or economic. Guided by both literature and the empirical data in this study, I have divided the functions into socio-economic functions, which are those that relate to social, economic, and cultural benefits, and urban-environmental functions, which relate to environmental and spatial (urban planning) benefits. The sections that follow will describe and give examples of the different functions[10].

Socio-economic functions

Food and nutrition security and income generation

One of the most acknowledged motivations and functions of UA in previous research is household food and nutrition security (see e.g. Allen 1999; Altieri et al 1999; Deelstra & Girardet 2000; Mougeot 2000; FAO/WB 2008; Hamilton et al 2013; Mougeot 2005; Poulsen et al 2015; Zezza & Tasciotti 2009). The "productive aspect" (Spiaggi 2005) i.e. the food function, is in the majority of my researched case study literature shown to be the main motivation for being an urban farmer (e.g. Pourias et al 2016; Gasperi et al 2015; Halloran & Magid 2013). Food production decreases farmers' dependence on purchased food and thereby lowers their total household expenses (Gasperi et al 2015). Moreover, UA generates jobs, and if the urban farmers choose to sell part of the produce, they can also make an income from UA (Mougeot 2000; Lovell 2010). Studies have suggested that while the income in absolute terms is

[10] It is important to note that the occurrence of the presented functions depends on the type of farming system, its management, and the specific context in which it is situated.

smaller in UA than in rural farming, the margin of profit is larger (Poulsen et al 2015). Garnett (1996: 37) also suggests that "many food growers, rich and poor, see the activity not as a substitute for, but an alternative to traditional employment and welfare", a job where they can be freer and do something that they like and that can provide them with enough income to sustain. The food, income, and independence that food production generates can decrease people's vulnerability to world market prices (FAO/WB 2008; Nugent 2000), and be "part of a process where local people can regain some control over the local food economy" (Garnett 1996: 31).

Health & wellbeing

Especially in the Global North, social aspects such as health benefits and social interaction can be more central than the food itself (Pourias et al 2016; Halloran & Magid 2013), but these aspects are often important also in settings where the food and income are necessary. UA can give farmers and customers access to fresher, more nutritious, and more varied food with known origin. Improved alimentary habits can also be a tool in the fight against lifestyle diseases such as coronary heart disease and diabetes, which like in many other countries globally are increasing in Brazil (Lovell 2010; Garnett 1996; Araújo 2016). In addition to the improved alimentation, UA can generate other physical and mental health benefits, above all for the farmers but also for visitors and customers. The garden is a refuge from the stressful city environment, work, and life situations, and offers exercise, relaxation, recreation, enjoyment and wellbeing (Lovell 2010; Pourias et al 2016; Perez-Vazquez et al 2005). It is a place where the air feels fresher and where people can reconnect with nature (Deelstra and Girardet 2000). As a physical activity, farming is a form of exercise that can be accessed by low-income populations, and by not being a "sport" it can attract other groups of people (Garnett 1996). Being an urban farmer can also benefit mental health by creating a sense of deeper meaning. The responsibility and competences that are developed when taking care of plants brings satisfaction, independence, empowerment and self-worth (Lovell 2010; Garnett 1996). Spiaggi (2005: 199) found that "the most important result is the increase in the self-esteem of the participants (mostly women). They can now argue for their rights and for a better quality of life". Another case study furthermore suggested that gardens can increase respect for oneself and others (Garnett 1996). Finally, gardens can provide psychophysical rehabilitation, especially for vulnerable groups in society such as elderly people, prisoners, and people suffering from substance abuse (Gasperi et al 2015).

Social interactions and community cohesion

A function that seems especially important in urban community gardens (as opposed to rural or homestead farming) is social interaction, networking, friendships and community strengthening (Lovell 2010; Gasperi et al 2015; Pourias et al 2016). Garnett (1996: 25) writes that UA can bring together the community and "generate a

sense of 'can-do', and also help create a sense of local distinctiveness" to counter the "sense of placelessness and social isolation" that the urban environment can cause. Farming with other people can decrease marginalisation and loneliness, foster social skills and the ability to coexist with other people, and increase the sense of belonging to a group and to society. The interaction happens both among farmers and with consumers, visitors, and passers-by, and can be strengthened through exchange and donation of products and other assets, which can act as an informal safety net (Halloran & Magid 2013). In Kingsley and Townsend's (2007) case study in Melbourne, the gardens mainly generated bonding social capital, i.e. strengthening bonds within more uniform groups, whereas bridging social capital, the connecting of different social groups, was experienced in Bergquist's (2010) case study in Rio de Janeiro: "the collaboration between inhabitants in the favela and from richer neighbourhoods means that relations were established between persons that would otherwise never meet" (Bergquist 2010: 7). Garnett (1996) likewise means that food production can be an activity that unites people across aspects such as gender, generations, ethnicity, and social status.

Knowledge and culture

Within the setting of a globalised food system where producers and consumers have become increasingly distant, UA can have an indispensable role in making food production visible and thereby increasing the awareness of food and nature, not least among new generations born in cities (Lovell 2010; Gasperi et al 2015). UA can contribute to the preservation of traditional plants as well as the knowledge of how to use these for cooking and medicinal purposes. The traditional knowledge that older generations hold can regain its value and be passed on to younger generations (Halloran & Magid 2013; Garnett 1996). Feeling that one's knowledge is valuable can be empowering, as can learning new skills (Lovell 2010; Pourias et al 2016). Garnett (1996) also suggests that the knowledge transfer can come full circle if urban farmers decide to move (back) to a rural area to farm.

Urban-environmental functions

Neighbourhood greening and improved safety

Urban gardens can have an important visual value to an area's inhabitants, especially when created in former vacant lots, wastelands, and terrain unsuitable for construction (Lovell 2010). Conversely however, some think that gardens are not visually attractive. Garnett (1996) emphasises the need to involve the local population in planning and design so that gardens become an appreciated and valuable element in the community. The preservation of open, public, green areas can have an important role to communities by creating a sense of locality, encouraging social interaction, and generating awareness of food. It offers a green refuge for relaxation, as well as a possible arena for cultural events and tourism (Garnett 1996). It can also prevent the

emergence of informal settlements that are difficult to reverse (Halloran & Magid 2013; van den Berg & van Veenhuizen 2005). According to Fleury & Ba (2005: 6), gardens form "green areas in the city without (high) public expenses". They share many of the benefits that parks provide and can therefore be an alternative to parks or a way to diversify existing parks and make them more multifunctional, as the study by Lovell and Taylor (2013) suggest. Garnett (1996: 61) writes that urban gardens "provide green 'lungs' in an often polluted environment, encourage people to walk instead of drive, stimulate a sense of community pride in the locality and increase the attraction of the area for would-be investors". Gardens can moreover provide aspects that parks cannot, since many of the functions generated in urban gardens are connected to the food function (Pourias et al 2016).

Studies have shown that UA has the potential to both prevent and decrease high crime rates (Lovell 2010; Garnett 2010). Mougeot (2005: 12) states that "not only does the use of vacant land for crops and grazing livestock reduce municipal maintenance of green spaces, it also discourages garbage dumping and squatting" and that "in residential areas, replacing wild-grass fields with low-height crops eliminates hideouts for thieves and other delinquents". Likewise, results from a case study in the city of Rosario, Argentine, concluded that "waste areas, where drug-trafficking and crimes were often sighted, were turned into clean well-managed and aesthetically pleasing landscapes" (Renting et al 2013: 26).

Climate, biodiversity, and waste management

Urban agriculture can produce a range of ecosystem services that can be a tool for sustainable urbanisation and contribute to solving many of the environmental problems that cities face and thereby decrease the ecological footprint (Garnett 1996; Mougeot 2005; Deelstra and Girardet 2000; Lin et al 2015). Food production in the city decreases the distance between producer and consumer and the need to procure food from outside the city (or from other countries) and thereby reduces food miles. The use of fuel decreases as a result of fewer transports (to distribute and to purchase), less packaging, and less technology-intensive production systems (at least in most UA cases in the Global South) (FAO/WB 2008). Moreover, studies have shown that small-scale farmers are more productive than large-scale farmers (Garnett 1996), suggesting that UA is an efficient land use. Scholars suggest that UA can, like other green areas, positively impact the climate and increase resilience through for example cooling, improved air quality, and reduced airborne dust, and control the micro-climate through offering shade, diminishing wind, and regulating humidity levels (Mougeot 2005; Lovell 2010; Gasperi et al 2015; Lin et al 2015).

Van den Berg and van Veenhuizen (2005: 1) write that UA can be a tool for "managing parks and periurban landscapes that hold important natural resources". By creating or restoring green areas in the city, habitats for wildlife are created and biodiversity enhanced (Lovell 2010; Gasperi et al 2015). This is especially the case if the garden is managed according to organic or agroecological principles, and if

gardens have a diverse mix of crops (Lin et al 2015). Moreover, growing and saving seeds that are native to the local area and/or not available commercially, can preserve important natural and cultural resources (Garnett 1996). Lin et al (2015: 189) conclude that "varied vegetative structure, increased native plant diversity, and reduction of urban impervious surface are key features of UA systems that contribute significantly to urban biodiversity and provide important ecosystem services".

Urban agriculture can make an important contribution to the three R's of waste management: reducing, reusing, and recycling. Direct links between producer and consumer reduces the need for packaging and thereby reduces waste. Moreover, it is less likely that food will be wasted when it is produced by oneself or by a friend. The waste that is anyways generated can, depending on its character, be reused e.g. as containers for food growing, or recycled e.g. for compost (Mougeot 2005; Bourque 2000; Lovell 2010; Gasperi et al 2015). The gardens and the city can thus enter a win-win situation where urban food waste and yard trimmings are given to farmers and used as compost. McClintock (2010: 194, 195) states that "rescaling these nutrient cycles and reducing dependence on petroleum-based food production lie at the heart of UA's potential to mitigate metabolic rift [and are] relevant not only to the development of sustainable agriculture but also to urban waste management and the impending environmental crises of mega-urbanization."

3.3.4 Framing of UA in local politics

While UA is often a spontaneous practice that people adopt out of necessity, it has at times also been consciously advocated by local and national governments, usually with specific objectives. What those objectives are, i.e. how UA is framed, depends on the context: "different cities emphasize different urban agriculture policies, and not all cities are at the same stage of developing these policies" (Halloran & Magid 2013: 122). Scholars suggest that a difference in how UA is framed politically can be discerned between cities of the Global South[11] and the Global North, as a result of the prioritisation of problems related to urbanity (de Zeeuw et al 2009).

Government advocacy of UA has historically been present mostly in the Global North, not least during times of crisis (McClintock 2010). Already in the late 1800s, governments started promoting allotment gardens as a means for workers to have cheap food, improve their health, and reconnect with rural life (Ernwein 2014; Battersby & Marshak 2013). During the two World Wars, these gardens became an actively backed strategy to ensure the food and nutrition security of the population (Steel 2008; McClintock 2010). From the 1960s and onwards, the allotment gardens diminished in importance and instead, community gardens grew from the bottom-up as a political movement for land rights (Ernwein 2014). Today, in the wake of the

[11] In line with Garnett (1996) I have in the absence of more accurate and convenient terminology chosen to use the terms Global South for low- to middle-income countries (such as Brazil) and Global North for high-income countries.

2008 economic crisis, the practice of UA is once again emerging as a food and nutrition security strategy as middle-class people have been pushed into poverty (McClintock 2010). UA is also growing as part of a critique of today's corporate global food system (Sage 2014), as well as current trends to consume local, organic food[12]. Moreover, UA in the Global North is often incorporated in urban planning or environmental policies, targeting for instance improved landscape and biodiversity (Renting et al 2013). Lastly, Battersby and Marshak (2013) argue that UA in the North is principally framed in relation to its social benefits, such as fostering a sense of community, connecting people to place, and improving peoples' health.

During recent decades, also governments in the Global South have embraced UA, mainly as part of development policies aiming to reduce poverty rates, secure livelihoods, and improve food and nutrition security, in a context of rapid urbanisation and increasing urban poverty (Poulsen et al 2015; Lovell 2010). UA has also been forwarded as a way to deal with environmental issues, especially as a tool for waste management and sustainable management of risk areas (Battersby & Marshak 2013; de Zeeuw et al 2009). This environmental perspective has also started to gain ground in the North (McClintock 2010). Thus the originally quite different framings of the North and the South have gradually become more alike as the global context has changed.

A critical perspective must be added when discussing the political framing of UA. According to Ernwein (2014: 79), "urban gardens have repeatedly been politically manipulated as various governments have instrumentalized gardens for political means". She argues that it is important to be aware of the framing of UA since power relations are involved when defining how something is framed, i.e. perceived. Moreover, she claims that urban gardens are not inherently inclusive, since the degree of inclusiveness "depends on both the spatial and social framing of the project" (Ernwein 2014: 79). Coutinho and Costa (2011) and Borges (2013) likewise suggest that the sometimes overly optimistic views of UA might conceal neoliberal political ideas and continue to neglect underlying structural problems, rather than offering a counter alternative to the dominating paradigm. Thus the risk is that the State uses an inclusive public policy as a cover-up for other interests, and refrains from fulfilling its role to secure livelihoods and food security of its population and instead makes people responsible for their own survival.

3.3.5 Integrated local support to UA

Scholars emphasise the key role that local governments have in ensuring the sustainability of UA, by creating "an enabling institutional environment for UA" (Dubbeling 2011: 126). Local governments can support UA in many different ways, through laws and policies, economic incentives, and practical inputs. They can among

[12] Organic produce is often sold at a higher price and thus becomes class-dependent (La Trobe & Acott 2000; Allen 1999). UA can be a way for more people to access these foods.

other things ensure access to vacant land and other basic resources (water, electricity, etc.), promote training to urban farmers, and facilitate marketing possibilities (de Zeeuw et al 2009; Dubbeling 2011; RUAF Foundation s.a.). Fleury and Ba (2005) even suggest that the benefits UA create should receive direct financial compensations. Local governments must also work to minimize any health or environmental risks related to UA (de Zeeuw et al 2009). What support they chose to give can play a key role. For example, if farmers are given training in organic management, this will diminish human and environmental health hazards. They can also decrease farmers' dependence on governmental resources for instance by strengthening networks of local food actors and farmers' access to other financial sources (Grando & Ortolani 2015).

Although each city endorses UA as part of the policy that is most relevant in their respective context, different urban challenges are linked (Battersby and Marshak 2013), and therefore "UA should be framed and supported in a way that addresses the multiple dimensions of metabolic rift[13]" (McClintock 2010: 203). Scholars mean that an integrated approach, with involvement by departments from both socio-economic and urban-environmental policy areas, is key to optimise the potential of UA and create synergies between different initiatives (see e.g. Dubbeling 2011; Serdar Mendle 2015; Mougeot 2000). The RUAF Foundation (s.a.) writes that "governmental policy should create the proper framework conditions for optimal development of the social, economic and ecological benefits of urban agriculture". According to Renting et al (2013: 61) "positive and stimulating policy frameworks have in common that they explicitly recognise and address the multifunctional role of urban and peri-urban agriculture and take specific measures for regulating and stimulating these". Mubvami and Mushamba (2006: 22) likewise state that "institutionally, the [policy] framework should acknowledge that urban agriculture falls under the jurisdiction of several different levels and types of authorities". So how can an integrated UA policy be achieved in practice? Scholars (de Zeeuw et al 2009: 20; Dubbeling 2011: 125; RUAF Foundation s.a.) recommend three key actions:

- Localise a political home for UA. This implies incorporating UA into an existing department, or creating a new department specifically for UA.
- Establish an interdepartmental committee on urban food production and consumption, where various municipal departments can dialogue and coordinate their work on UA.
- Establish a multi-stakeholder forum or an urban food council, where municipal departments, market actors, civil society, and other UA stakeholders can meet. By involving stakeholders in decision-making on UA, the initiatives are grounded in their needs, something that is key to the commitment to, and sustainability of, UA initiatives.

[13] The theory of metabolic rift is by McClintock (2010) used as a lens to "understand the dynamics giving rise to UA in various settings in both the North and South, as well as the ways in which UA has developed as a multifunctional response to these dynamics" (McClintock 2010: 192)

4. Methodology and methods

4.1 Research approach

Theoretical underpinnings: social constructivism

This thesis is founded on **social constructivism**, which views the world and knowledge as socially constructed, i.e. co-created by interactive and interrelated people and systems (Bryman 2012: 380). This does not mean that there are no physical things, but that they acquire meaning through social processes.

Since also the researcher partakes in the co-creation of the social environment, he or she inevitably influences the research, especially when it involves other people (Jörgensen & Phillips 2008). Nonetheless, I have constantly questioned and reflected upon my choices during the research process, as well as checked my assumptions with third parties whenever I deemed it necessary, in the strive to be as objective as possible. Because the world and knowledge are social constructs, it is important to pay attention to **ethical concerns** and **power relations** caused by "histories of colonialism, development, globalization and local realities" (Sultana 2007: 375). These issues will be discussed in chapter 4.4*, Reflections on my role as a researcher*.

Design and strategy: qualitative case study

This study is a **qualitative case study** of two urban community gardens in Belo Horizonte, supported through SMASAN's UA programme. Because the thesis focuses on the urban farmers' perceptions, a qualitative research approach was chosen as it aims to see things "through the eyes of the people" (Bryman 2012: 399). A case study was appropriate because it offers the possibility to study a complex phenomenon in-depth while also considering how it is influenced by the surrounding context (Baxter and Jack 2008). So-called "**thick descriptions**" (Bryman 2012: 401) of the context and people is vital to qualitative research, in order to describe peoples' worldview and everyday concerns (Bryman 2012). This also harmonises with the agroecological approach, which emphasises a holistic, systemic understanding of the case.

While I had a general aim prior to starting my fieldwork (based on readings about the case), my empirical work was rather **open-ended** (Francis et al 2009) because I wanted to focus on aspects that my interviewees emphasised. Otherwise, "certain decisions must have been made about what [the researcher] expects to find" (Bryman 2012: 403), and I wanted to avoid drawing such predetermined conclusions. The specific topic was instead unravelled through repeated data collection, literature review and reflection (see Bryman 2012: 384). According to Francis et al (2009), open-ended cases often create an uncomfortable research process as the outcome is largely unknown, but "flexible and continuous learning and adaptation" (Chambers 1994: 1449) is necessary to understand complex real world situations. This approach to research thus not only generates learning about what is being studied, but also about the process and my own role. Checkland (2000: 44) means that soft systems

inquiry and learning (see chapter 3.2 *Systems thinking*) emphasises process, and "is not straightforward, [but] a way of thinking which the user can consciously reflect upon". Equally, Ison (2008: 14) underlines the importance to "reflect upon what it is that you do when you do what you do". In line with Kolb's learning cycle (Figure 2), the research process is a continuous cycle of concrete experience, reflective observation, abstract conceptualisation, and active experimentation (Bawden 2010: 46).

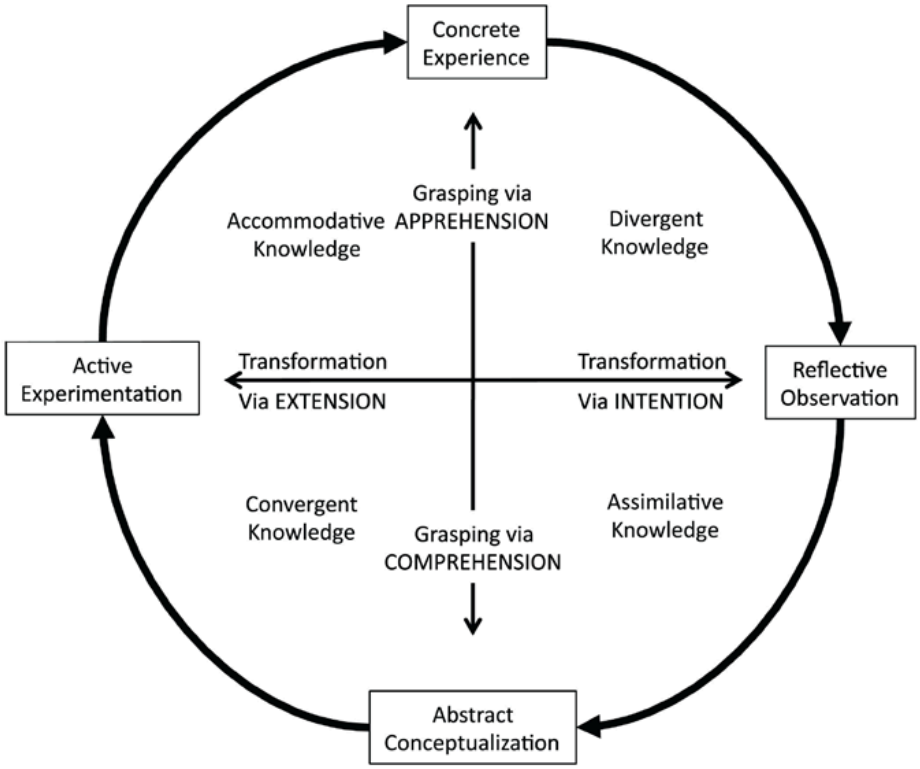


Figure 2: Kolb's learning cycle.
Source: Baker et al 2012: 3 (permission is granted to use materials for academic uses).

Another model that emphasises reflection, learning, and personal growth as an integral part of agroecological research, is the Dual Learning Ladder (Lieblein et al 2007, 2012). The model consists of an external ladder that focuses on facts, skills, practice and theory, and an internal ladder that focuses on personal reflection, creativity and responsibility. They mean that not only knowledge of facts and theories matter, but that also "deep reflection, rich observation, creativity and moral imagination, responsible participation and action, and dialogue-based communication" (Lieblein et al 2012: 727) are vital skills for an agroecologist.

4.2 Materials and methods

My study is based on **empirical data** gathered through **fieldwork** in the city of Belo Horizonte, Brazil during November and December 2015, as well as **secondary data** from peer reviewed academic literature, reports and official documents. I chose Belo Horizonte as my case because I wanted to study urban community gardens in a setting where the municipality has been a driving actor and runs an UA programme that my readings saw as successful. My fieldwork had two overlapping phases, where the first phase focused on interviewing the urban farmers about their farming system, perceptions and views, and the second on interviews with municipal authorities about the political framing of UA in Belo Horizonte.

Sampling

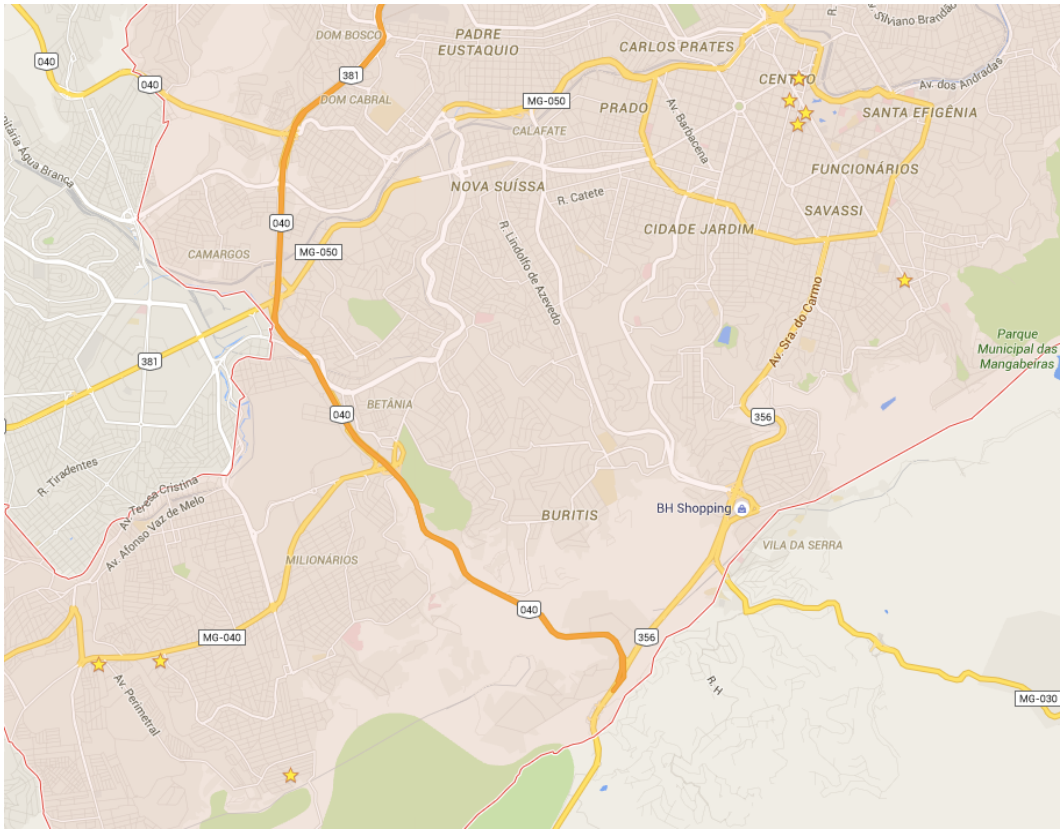
The research questions in this study require analysis on two different levels: the **farm level** (the urban gardens and their participants) and the **city level** (with a focus on politics). In order to make the analysis richer, this case study is embedded within multiple units of analysis (Yin 2009: 46): two urban gardens as the main unit of analysis, municipal departments/institutions as the secondary units of analysis, and two researchers as complementary data sources.

The selection of the two gardens was influenced both by purpose and convenience. I wanted to study gardens that are run by communities, managed agroecologically, and that sell part of their produce, because I wanted to see how social, environmental, and economic aspects interact. Through my key informant, I had the opportunity to meet with the UA manager at SMASAN, who based on my criteria assigned me to the two gardens that are analysed in this thesis. To select the participants, I used a mix of **purposeful sampling, convenience sampling, and snowball sampling** (Bernard 2006: 192; Bryman 2012: 201-202, 418-421). I wanted to obtain a sample that is diverse and "fairly represent different viewpoints among members of the social setting" (Bryman 2012: 393), but I also saw the need to be pragmatic in my selection. I did not know beforehand how easy or difficult it would be to gain access to people, and since I also believe that relevant data can be obtained from unexpected sources, I decided to be open to any opportunities given to me. I had the opportunity to meet with the urban farmers and establish an initial contact (see Leech 2002: 665), as well as introducing myself and the purpose of my study, during field visits that I did together with a SMASAN agronomist during my first week in BH. As I started interviewing the farmers during the following visits, I selected interviewees among the farmers that were present (i.e. convenience) in a snowballing manner. Yet, I aimed at a purposeful selection of urban farmers, both in terms of number of interviewees per garden (11 out of 19 in Vila Pinho and 6 out of 10 in Jardim Produtivo), and gender (I interviewed nine female and eight male farmers). The three sampling techniques mentioned were also used to select municipal authorities.

Data collection

For data collection I used the following techniques:

- Semi-structured interviews with 17 urban farmers at two urban community gardens (agroecological and focused on both subsistence and sales) that received support from SMASAN: Vila Pinho, situated in the neighbourhood Diamante, and Jardim Produtivo, situated in the neighbourhood Cardoso, both in the Barreiro region in the south-west part of the municipality. At Vila Pinho, I interviewed eleven farmers (of the total 19) in the age range 47-76, and at Jardim Produtivo, six farmers (of the total 10) in the age range 41-63.
- Semi-structured interviews and informal conversations with 15 employees (politically appointed secretaries and civil servants) at four municipal departments and one public institution[14].
- Informal interviews (Bernard 2006: 213) (conversations) with two researchers at the Federal University of Minas Gerais (UFMG). One of the researchers functioned as my key informant and gave invaluable guidance to the context and introduced me to initial contacts. We also discussed academic and practical ideas regarding my topic.
- Observations in the urban gardens, and during interviews and meetings.



Map 3: Map with the main data collection sites in Barreiro (urban gardens, stars in the bottom left corner) and central Belo Horizonte (municipal authorities, stars in the upper right corner). *Source: Google Maps 2016 (used based on Google's "fair use" principles)*

[14] The Municipal Park Foundation (FPM), linked with the Department of Environment (SMMA), is not a department but a municipal public institution.

The advantage of individual interviews is that they can provide "an in-depth understanding of farming activities, contribution to livelihoods, their constraints and aspirations" (Martin et al 2002: 7). **Semi-structured interviewing** was my main method because it offers flexibility both in the sense that I could ask follow-up questions, and that the interviewees could focus on the issues that are of importance to them (Bryman 2012: 487). Based on my readings and the information that I had gathered from the initial farm visits and conversations with other actors, I prepared an **interview guide** (Bryman 2012; Leech 2002) with a number of topics and open-ended questions (see Appendix 1). In most of my interviews, I aimed at creating an informal atmosphere and the feeling of having a conversation, and let the interviewees talk on the specific aspects they chose to address (as suggested by Bernard 2006). The interview guide served as a support to get back to my topics of interest if the conversation deviated too much, and to make sure that I covered everything. I asked for the interviewees' permission to take notes and voice record the interview (a few persons declined recording), and let them select the venue. Most of the interviews with the farmers were carried out in their plot or in the collective areas or the gardens, and were not always done in privacy. Almost all of the interviews with municipal authorities (see interview guides in Appendix 2) and researchers were done in their respective offices, most of the time in privacy.

As my interviews with the urban farmers were carried out at the gardens, it became natural to make **informal observations** of the gardens and the farmers' work, as well as the interaction among the farmers. I also paid attention to the interviewees' behaviour and reactions during the interviews. My observations were kept in my **field diary**, in which I also jotted down thoughts and feelings during the entire fieldwork (Bernard 2006). I found the diary to be a very helpful tool. During the field period, it was an outlet for all the new impressions and helped me to stay focused when things got stressful or tough, and during the writing of the thesis it was an invaluable resource to remember my research process.

I also did some **additional field visits** to both broaden and deepen my knowledge of the case. I visited several other SMASAN initiatives in order to get a first-hand, holistic understanding of the system and its interactions. I participated in a COMUSAN meeting to learn about the social control system. I also visited two other urban gardens: the FPM-supported CEVAE 'Morro das Pedras', and another SMASAN-supported community garden called 'Diamante Azul'. The purpose of these visits was to check biases and expand my empirical knowledge of urban gardens in BH, especially since I came to understand that Vila Pinho and Jardim Produtivo were two quite unique success cases and the most frequently visited. Diamante Azul is smaller and less developed, organised, and established, and I could based on the my visit and conversation with a SMASAN agronomist confirm the claims that Vila Pinho and Jardim Produtivo are indeed exceptional UA examples in Belo Horizonte.

Data analysis

During and after the fieldwork, notes and voice recordings were transcribed (Bernard 2006). My research process was iterative, with repeated data collection, analysis, coding, and specifying of research questions (Bryman 2012: 387). I have used a grounded theory coding approach, which implies "giving labels (names) to component parts that seem to be of potential theoretical significance and/or that appear to be particularly salient within the social worlds of those being studied" (Bryman 2012: 568). My labelling of data has been induced by my research questions (the topics of interest), theory (previous research), and data from my fieldwork. Codes in grounded theory are "in a constant state of potential revision and fluidity" (Bryman 2012: 568). I line with social constructivism, I have inevitably affected the coding process by determining what to include and what to omit, and how labels have been grouped, but as systems thinking (see chapter 3.2) suggests, the researcher has to set boundaries for the purpose of analysis even though everything is interrelated. The final stage of analysis entailed to interpret the codes/themes, find interrelations between them, and reflect upon their meanings and implications.

4.3 Reliability, validity, and generalizability

Since qualitative research involves people and social situations, alternative concepts have been developed to evaluate the research. I have chosen to use the four criteria suggested by Yardley (2000). First of all, Yardley emphasises *sensitivity to context*, both in terms of the social setting and the underlying theoretical and ethical considerations. This has been a main concern in my thesis, as I describe in the sections on social constructivism (4.1) and power relations (4.4). Second, the researcher needs to be dedicated, skilful and conduct thorough research to obtain *commitment and rigour*. While I had robust background knowledge of methods and the topic before entering the field, my skills as a researcher have evolved and improved during the process. By being transparent and keep records of all phases of the research process, I have tried to acquire *transparency and coherence*. Yardley also suggests that the study should be of *impact and importance* in practice and in theory. I have chosen a topic and an approach aiming to study and suggest improvements for a real situation, and I also believe that the multifunctionality approach can be of use in a broader setting than this specific case, as I will discuss in chapter 6.2. Yin (2009) stresses that the aim of a qualitative case study is not to generalize the findings to a population, but to theory. I thus do not say that my findings are applicable to any other setting, but that they offer an empirical example adding to the body of literature on the topic.

4.4 Reflections on my role as a researcher

Culture and language

The fieldwork period in Belo Horizonte was my first time in the city. However, I had recently lived in Brazil's capital during five months, as well as in other parts of South America prior to that, and therefore had a sound cultural understanding of the region. Culturally, Belo Horizonte has both commonalities and differences with other parts of Brazil, but what mattered more to my study were the differences between areas *within* the city. In the following section (*power relations, access, and trust*), I will discuss how I approached different people and social settings.

Since few people speak English (even among those with high educational level) it was a necessity to speak Portuguese – all my interviews were carried out in Portuguese. My language skills were fairly good, and Brazilian people are in general encouraging. Even so, language was a challenge, because of local accents and slang that I was not used to. I considered contracting a translator, but decided not to, as I felt it would be a greater bias to my study. Instead, I asked my interviewees to clarify whenever needed, and voice recorded everything so that I could double check afterwards whether I had understood things correctly. It was a challenge to ask questions in the right way (without adding value etc.) due to my somewhat limited vocabulary. Moreover, it did sometimes obstruct the flow and asking follow-up questions, and I might at times have received incorrect or insufficient information due to my non-native culture- and language proficiency (Bernard 2006: 360-364). Yet, Bernard (2006) also stresses that some degree of naivety can be positive. I felt that being genuinely curious and interested in the interviewees encouraged them to explain things more thoroughly. Maybe, I was also more open-minded and made fewer presumptions about things compared to someone native to the context. After all, any background biases a study, but in different ways.

Power relations, access, and trust

Throughout the study, I tried to be myself, but also adapt to the different contexts (Bernard 2006: 358). Sultana (2007) emphasises that "it is important to pay greater attention to issues of reflexivity, positionality and power relations in the field in order to undertake ethical and participatory research" (Sultana 2007: 374). My own cultural background and ethnicity, as European, white, young, female, and academic, are likely to have affected the study (Sultana 2007). She also notes that going abroad sometimes means ascending to another social class; while I would consider myself middleclass in Sweden, I would probably be positioned as upper-middleclass in Brazil, which is important to be aware of. Sultana also underlines the fact that power relations "influences methods, interpretations, and knowledge production", and it has been important to me to reflect upon the information I gathered: what information and opinions did the interviewees share with me, and why?

It was easier than I had expected to gain access to the municipal authorities, and I was amazed by people's willingness to take time to talk to me and show me around. Depending on the person's hierarchy within the department/institution, I could see differences in access and the degree of planning and formality an interview required, but I was always met with a welcoming attitude. I am not sure what enabled my access, but I do have some reflections. First of all, I believe that my key informant (an UFMG researcher) really was *key* in gaining access to the municipal authorities. Thanks to his network, I immediately gained trust from them, and they in turn "validated me" to others. Secondly, my background and ethnicity might have helped, although my key informant claimed that the departments are rather open and that a Brazilian student would gain access with the same ease. While that might be true, it might not be the case for a Brazilian person belonging to a different societal class.

In terms of gaining trust among the farmers, my background could rather be a disadvantage precisely because of underlying inequalities and power relations. First of all, I made sure to explain who I am, why I was there and what I wanted to study. While the civil servant from SMASAN who introduced me to the urban farmers was a necessary gate-opener and gave me legitimacy, I had to clarify that I was an independent student and not affiliated with the municipality (Bryman 2012: 439). I explained that I also conducted interviews with municipal authorities, that I was there not to assess them but to learn, and that all interviews were equally important. I also underlined the voluntary nature of participation and that they would remain anonymous in my study. I occasionally felt uneasy with not being able to give a lot back. Some of the farmers meant that researchers just extract information and leave, and that they need more resources, and one farmer declined participation because she was tired of telling the story of the garden once again, which probably is due to the fact that these two gardens are the most visited ones, as I came to understand during my fieldwork. However despite the short time in the field, I felt that I managed to gain people's acceptance and trust. While I knew that my background posed challenges, I believe that finding a common language, focusing on similarities (in my case for instance, being from the countryside), and sharing personal stories and thoughts, was key to building trust. I also think that more "obvious" things such as being respectful, open-minded, flexible, and humble go a long way. I got several indications of acceptance; one woman that I interviewed told me that she normally does not talk to people, some of the other farmers invited me to share their lunch and visit their homes, and another told me that he appreciated my respect towards them and the mere fact that I was talking directly to those who do the farming and not only to those higher up in the hierarchy. Finally, I made sure to inform the farmers of the length of my fieldwork, and made a final visit to say goodbye before leaving the field (Bernard 2006: 383).

5. Results

This chapter presents data gathered from my fieldwork in Belo Horizonte. The following research questions have been studied:

1) How are the urban gardens set up and managed? What are the main challenges?
2) What are the benefits of the urban gardens, according to the urban farmers?
3) How is UA framed in local politics in Belo Horizonte?
    - Which is the political home of UA?
    - How do different municipal government bodies approach UA?
    - How is the UA work of different municipal government bodies integrated?

5.1 Farming system of the studied gardens

This subchapter presents the findings for research question 1: *How are the urban gardens set up and managed? What are the main challenges?*

Vila Pinho (picture 2) was the first garden that SMASAN initiated. It is also the largest, with 19 farmers sharing 10 000 m2. It was created in 1998 to improve people's food and nutrition security and the safety in the area. **Jardim Produtivo** (picture 1) was created in 2008 as a pilot garden within the CFF project. Today there are ten farmers at Jardim Produtivo. Figure 3 uses the adapted version of the Hawkesbury's Peanut Model (introduced in chapter one), to present a combined image of the farming systems at Vila Pinho and Jardim Produtivo[15].

Picture 1: Entrance Jardim Produtivo. *Photo: Thesis author*

Picture 2: Entrance Vila Pinho. *Photo: Thesis author*

[15] I chose to present a combined image for reasons of clarity and because the two gardens' farming systems and the challenges they face are very similar.

5.1.1 The farming system

Biophysical system

Both gardens have tremendously diverse cropping systems, with over 90 different types of plants and trees (see Appendix 4). The most common plants are different types of lettuce, kale, spring onion and parsley. The gardens do not have any animals, which means that no manure is available within the farming system. Internal recycling thus only involves plant material (e.g. leaves for compost).

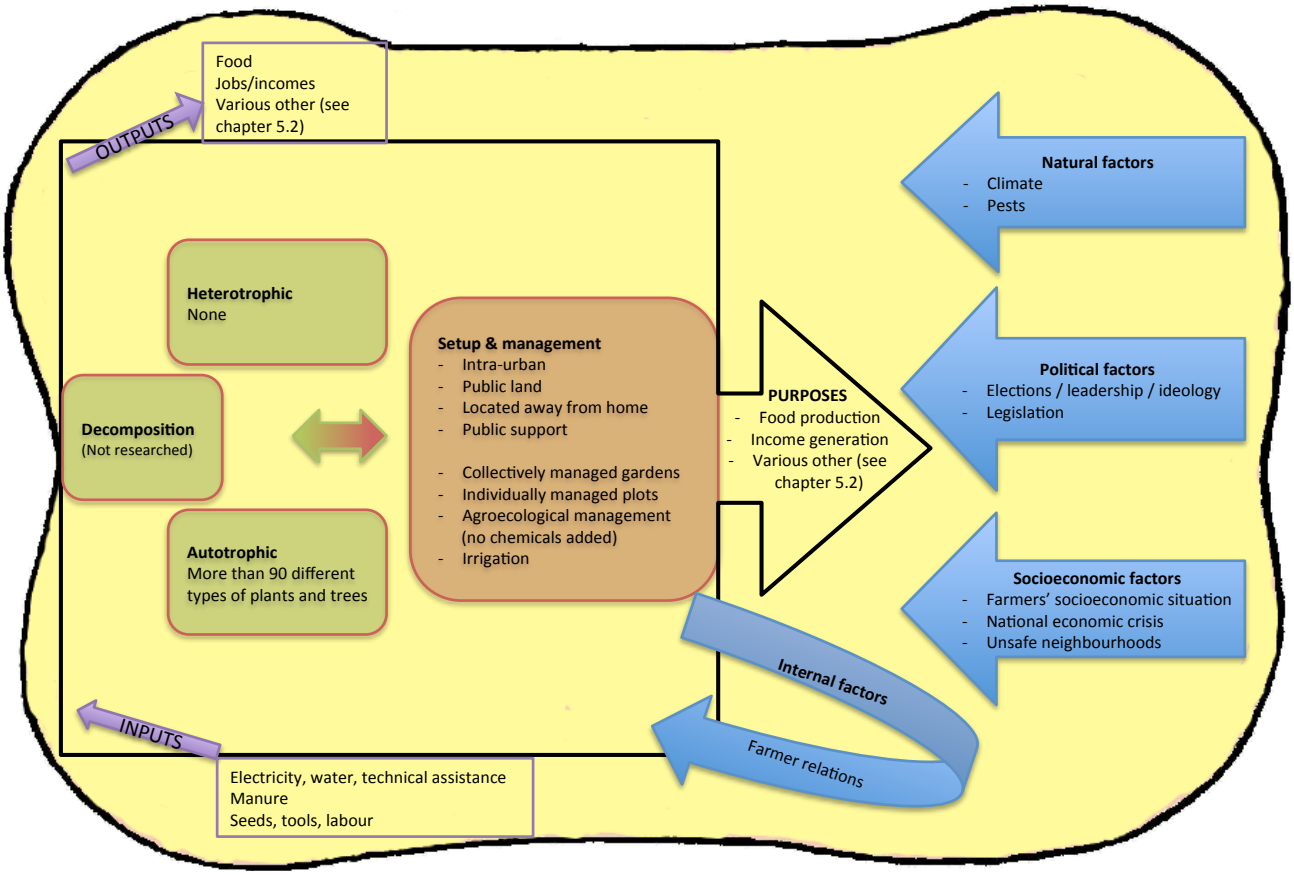


Figure 3: A revised version of the Hawkesbury's Peanut Model (see Bawden & Packham 1993), adapted by the author of this thesis to present a compound image of the farming systems at the studied urban community gardens Vila Pinho and Jardim Produtivo, and the main factors affecting the gardens and their management.

Setup & management

The gardens are situated in an *intra-urban* area on *public* land, and receive continuous support from a *public* entity (SMASAN), as well as occasional support from other sources (e.g. as part of projects). They were both run collectively at first, but due to conflicts over workload and revenues, they were later divided. Now, each gardener manages his or her own plot (making it resemble an allotment garden typically found in the Global North, but with less clear borders between plots). There are no collective decisions concerning what to grow, instead it is up to the farmers to run their plots as

they prefer. The farmers collaborate as much as they want, but mostly when it comes to collective tasks such as larger garden maintenance projects. Both gardens have common areas where they can prepare their sales, eat together, etc.

It is possible to grow crops year-round, but planting slows down during the rainy season between November and February. As part of SMASAN's support system, the gardens have to be managed *agroecologically*, which in this setting means that the farmers are not allowed to use any agrochemicals[16]. Many farmers say that they would like to obtain organic certification in the future, both for the inherent benefits with organic produce and because it would increase the value of their products and provide access to more sales channels. The farmers use manure and homemade compost for fertilisation, and prevent and treat pests with various homemade pest remedies. Both gardens have irrigation systems installed, but only that in Vila Pinho is working. The water for irrigation is pumped from the groundwater through an artesian well.

Inputs, outputs, and purpose

The main inputs to the gardens are:

- Electricity, which SMASAN supplies
- Water, which SMASAN supplies
- Technical assistance, supplied by SMASAN agronomists
- Manure, partly supplied by SMASAN from a yearly animal exposition in Belo Horizonte, and partly bought by the farmers themselves from farms in neighbouring municipalities
- Seeds, which each farmer buys (except for those who save seeds)
- Tools (manual – no machinery is used at the gardens) and irrigation devices (e.g. sprinklers, hoses) which each farmer buys
- Labour, provided by the farmers themselves
- A monthly contribution of 10 BRL from each farmer to the garden association (only at Vila Pinho)

The main garden outputs are:

- Food produce (vegetables, herbs, and fruits)
- Jobs and incomes for the farmers
- Other benefits for the farmers, community, and city (see chapter 5.2)

[16] Based on my interviews, there seems to be varying understandings of agroecology among different actors in BH. For SMASAN, agroecological farming implies not using any agrochemicals in the production (SMASAN2). This understanding is endorsed also by one of the researchers I talked to, who means that some mineral fertilisers may still be used, and that agroecology is a step in between conventional and organic farming (UFMG1). Another researcher however rejects this understanding, meaning that agroecology is a step further than organic, and that in Brazil, agroecology is a political movement that opposes the agroindustry and struggles for agrarian reform, genetic protection, and an inclusive economy (UFMG2) In this understanding, agroecology is a practice, science, and movement, which is in line with the view taught at SLU.

The core purpose of the garden is to produce food and contribute to the farmers' food and nutrition security, however the farmers themselves have various reasons and motivations to participate. These will be presented more in depth in chapter 5.2. The farmers sell their produce surplus (only fresh produce, as they are not allowed to sell processed products due to legal restrictions). The garden entrance is the most important sales outlet. Many also sell on the street and deliver to regular customers. On rare occasions, they sell to specific events. Furthermore, three growers at Vila Pinho and one grower at Jardim Produtivo sell produce to local schools. Finally, one farmer sells at a stand in the only currently existing UA market in Belo Horizonte, situated outside of the city in Cidade Administrativa.

5.1.2 Challenges

Internal factors

While most growers appreciate the collaboration and conversation with the others, **interpersonal relations** can be challenging, as the farmers want different degrees of interaction and sharing of assets. There are also minor conflicts over each farmer's plot size: some farmers feel their plot is too small to support their livelihood. Finally, the lack of a system for pricing (at Vila Pinho) and customer access can be an issue, both for the farmers close to the entrance that have to be constantly at customers' disposal, and for the farmers furthest away from the entrance, some of whom feel they have a disadvantaged location and cannot sell enough.

Natural factors

The **climate** in Belo Horizonte allows for year-round crop production. However, the area (like large parts of Brazil) has been experiencing increasingly severe droughts during the past years (possibly as an effect of climate change), which pose a threat to the harvest. **Pests**, mainly aphids, woodlice, worms, ladybugs, slugs, and snails, are another major problem to the majority of the farmers. Since they are not allowed to use any agrochemicals, they instead use natural, homemade remedies. Some feel that the pest problems are too large and request more support from SMASAN agronomists to analyse the soil and to share more advice for pest management.

Political factors

Elections are a factor that affects the gardens, especially since they are supported by a municipal department. **Leadership** has changed since SMASAN was created in the 1990s, and so has the **ideology** and thereby political priorities, which has had implications for the resources allocated to the food system. Moreover, a change of leadership can also entail a change of (non-elected) civil servants, which means that it is difficult for the urban farmers to establish long-term relations with municipal

authorities. **Legislation** is another element that greatly affects the conditions for the urban farmers and the gardens, mainly in the following ways:

- The municipal sub-district of Barreiro owns the land where Vila Pinho and Jardim Produtivo are situated. The farmers have permission to use the land, but lack official documentation to ensure the circumstances and extent of that right. Such documentation can only be signed between two legal entities, i.e. entities that possess a so-called CNPJ[17]. The lack of documents creates a sense of insecurity and instability, and might hamper development and investments (by farmers themselves and external actors). Some farmers express concern over how long they will be able to stay and what will happen if they have to leave.
- Urban farmers cannot sell their products at the already existing markets in the SMASAN food system. To sell at the 'Straight from the field' markets requires a DAP (family farmer ID), and this can so far only be obtained by rural farmers[18]. They also cannot sell at the organic markets, because they are not certified.
- There is an established price limit for the schools' food purchases (see Lei n° 11.947/2009), and it is difficult for small-scale urban farmers to sell their produce to the same price as rural farmers. The school staff would have to pay the price difference themselves if buying for the higher price that the urban farmers request. Therefore, collaboration between urban farmers and schools has low economic viability and most farmers choose to sell to private customers. Some urban farmers believe that the municipality should do more to support them.
- 'Urban farmer' is not an officially recognised profession, which for instance means that it does not contribute to the pension payment[19]. This makes the profession insecure and might affect its attractiveness. It is possible, however, for urban farmers to register as micro-entrepreneurs and make monthly payments to the pension system. The main obstacle is that the income generated from farming is rather small and that payments to the pension system would comprise a significant share of the farmers' much needed income.

Socio-economic factors

Most of the interviewed urban farmers live in modest **socio-economic circumstances**, and would therefore struggle if they were to sustain the gardens without any economic support. Many of the growers make only enough to survive, which makes it difficult to maintain what they have, let alone implement changes or improvements. Some

[17] To obtain such registration was the main purpose of the creation of a farmers' association at Vila Pinho in 2012. Last year (2015), the association applied to obtain the CNPJ, but a farmer claims that they have not yet received any response. PBH states that the application process has been delayed because Vila Pinho still lacks some organisational components (SMASAN2). Although they lack a formal land agreement, a SMASAN manager believes it is unlikely that the gardens will disappear, since the gardens are already an integrated part of the neighbourhoods.

[18] These are federal restrictions that are currently being reviewed at MDS (SMASAN2).

[19] Changing this requires changes on federal level and it is thus something that the municipality cannot do.

request more support from SMASAN, while others express that they are lucky to receive support and cannot demand too much. They believe the sometimes slow response to their needs is not due to a lack of willingness, but of human resources and time. Without the support that they receive from SMASAN, all income would go to maintenance of the gardens and not to the farmers and their families, which would be discouraging and for some even devastating since their livelihoods depend on it.

Another pressing issue is **safety**. Although the neighbourhoods have become safer since the gardens were established, there are still issues affecting the farmers in their daily work. Both Jardim Produtivo and Vila Pinho have problems with trespassing, theft of vegetables and objects, destruction of plants, and personal threats and muggings. It is particularly precarious for the women, who do not feel safe even inside the garden if no male gardeners are around, which means that women are forced to leave earlier than they had planned if the men leave, or that men have to stay although they are ready to leave for the day. The farmers request better police presence in the area in order to feel safer.

5.1.3 Summary

The farming systems of Vila Pinho and Jardim Produtivo and the factors affecting the systems are summarised in Figure 3. In line with systems thinking, it has been important to analyse the farming systems in relation to the natural, political, and sociocultural context in which they are situated, because these greatly affect how the gardens are managed and pose challenges to the gardens that the farmers have to cope with, which in turn affects the value given to the gardens. The following chapter will study the reverse relation; how the gardens affect the context. It will delve further into what motivates the farmers, and how the gardens benefit the individual farmers, the neighbourhood, and the city.

5.2 Multifunctionality of the gardens

This subchapter presents the findings for research question 2: *What are the benefits of the urban gardens, according to the urban farmers?*

It describes the urban farmers' perceptions of what functions the gardens produce and how these benefit them, the surrounding neighbourhood, and the wider population and city of Belo Horizonte. Although all functions are interlinked, they have for the purpose of clarity been separated as described in chapter 3.3.3.

5.2.1 Socio-economic functions

Food and nutrition security and income generation

The socio-economic importance of the urban gardens is multidimensional. **Food and nutrition security** as well as **job and income generation** are key drivers to becoming and remaining an urban farmer at Vila Pinho and Jardim Produtivo. Providing their family with fresh and healthy produce is the most important objective for nearly all the farmers.

> *"I pick to eat. […] Always when I plant something here […] the first thing that I harvest is always for my home, I thank God for the blessing."* (João, Vila Pinho)

Thanks to the garden, they save money as they no longer have to (nor want to) buy vegetables in the supermarket; only items that they cannot grow such as bread, milk, meat, and to some extent, fruit. Many emphasise the health aspect of their agroecologically-produced vegetables compared to what the supermarket and other stores have to offer, and how being an urban farmer has improved their alimentation.

> *"I like this type of job, and it's also very important for me to have healthy vegetables, and also to sell. Before, I didn't like to eat any leaves, only fat, meat, but not anymore."* (Raimundo, Jardim Produtivo)

The garden has not only improved the food and nutrition security of the farmers and their families, but also of the customers, who appreciate the quality of the products that, in comparison with the vegetables from the supermarket, taste better, have longer durability, and are more affordable.

> *"With the sales here I buy bread for my family, meat, milk, even medicines. But my objective is not to make money from the sales […] it's to serve the community, to plant and to harvest."* (João, Vila Pinho)

> *"A lot of people come here and they tell us that their alimentation improved a lot, that they learnt. They buy here at the garden once, and they don't want to buy vegetables from Ceasa[20], so people come from all the way over there at the end,*

[20] Ceasa = Centrais de abastecimento, are public or public-private supply centres in Brazil that organise the supply of fruits and vegetables. There are also specific Ceasa sales locations.

to buy vegetables here, and they buy vegetables for the entire week." (Eliane, Vila Pinho)

The community is key to the sustainability of the garden, and the farmers make sure to grow many different crops and varieties and to give a generous amount of vegetables to keep customers happy with the produce and service. Regular customers create security for the farmers.

*"There's a girl that buys two times a week from me. […] I reserve the vegetables for her, and when she arrives everything is prepared. […] It's good, security, you know? Every Thursday I know I will get some money." (*Márcia, Vila Pinho)

"I think that the garden is really important, it has been here for almost 20 years. […] It's the community that sustains the garden, […] If they wouldn't come to buy from us, one wouldn't plant the products if there wasn't anyone to sell it to, it would be discouraging." (Sandra, Vila Pinho)

The sales make an important contribution to the farmers' income from other jobs or pension. For some of the farmers, the garden is their only income source and it is thus essential to their livelihoods and to be able to buy complementary basic foods.

"Here it's each cent that comes in, you know. To consume… I don't care for eating so much. I work to be able to sell, to pay the rent and support my family." [So what you earn here is very important to you?] *"Ave Maria, this fell from heaven for me. Even though it's little. […] If there was more, I would have more, but the land has no more space. It works out."* (Renato, Vila Pinho)

The farmers' make differing statements regarding their revenues from the garden, but one farmer claims it is possible to make up to 1500 BRL[21] per month with dedicated work and the right conditions. This suggests an income above the minimum wage in Brazil[22], but a low pay per hour, and it can be concluded that being an urban gardener in BH is not a very profitable occupation. For some it is enough to sustain a family, while others say it is impossible to have this as their only income. Some say that it works out since they are used to living a fulfilling life with little money. Moreover, while there is no security of a fixed monthly income, the advantage is the freedom and the possibility to earn some money on any given day. Most of the growers donate vegetables to relatives, friends, and neighbours, to people in places they frequent such as the hairdresser or clinic, and to people in need. It is a way to strengthen relations to people, to express gratitude, and to make people happy.

"[Donating] is also a way to incentivise people to eat. […] It doesn't make me neither richer nor poorer, but it makes me happier, healthier, calmer." (João, Vila Pinho)

[21] BRL = Brazilian Real, the currency in Brazil

[22] The minimum wage in Brazil was 788 BRL in 2015 and has for 2016 been set to 880 BRL (Valor Econômico 1/1 2016).

Moreover, it is a marketing tool, i.e. a way to promote their products so that more people will get to know the gardens and the farmers.

Health & wellbeing

For some of the farmers, the main motivation is not consumption or sales, but their love of gardening. The majority of the urban farmers grew up in the countryside, and the gardens are a place to reconnect with their roots. They emphasise that gardening is hard work, but at the same time a form of physiotherapy that positively affects their physical and mental health and general wellbeing.

> *"It is a struggle that pays off, good for the health, good for the mind" (João, Vila Pinho)*

> *"I grew up in the countryside, working with farming. […] Although I came to the city, one wants to change, but that root remains, you know. […] Money is the main thing, but there has to be love, you know. And to like money doesn't exclude also loving the soil. It's one thing together with the other."* (Silvio, Vila Pinho)

Many growers say that the gardening has offered a meaningful way to spend their time, especially after retirement. They mention the freedom the job offers, and the satisfaction and empowerment that self-employment brings. Moreover, the gardens have a therapeutic quality and have helped some of the farmers to heal physical and mental problems, including substance abuse.

> *"I'm a pensioner. […] I stayed at home, cleaning, cooking, cleaning, cooking… eating poison. […] For me it was great, things changed so, so, so much, my life pace, you know. Not having to worry about high blood pressure, there's nothing [no illness], I don't even go to the health clinic, I don't feel anything thank God."* (Ana Maria, Jardim Produtivo)

> *"When I retired I got into a depression. Then my colleague told me 'go to the garden', for me to work there, and I came. […] So I started here to recover from the depression."* (Eliane, Vila Pinho)

> *"Here, my dear, after my wife died, I'm here more than at home, you know? To be distracted."* (Guilherme, Vila Pinho)

> *"It's like it is sacred money, you know […] from your own sweat. Lots of work, lots of courage, and willingness too." (*Márcia, Vila Pinho)

> *"I was having problems with… I was drinking too much, with big alcohol problems, but thank God I'm recovering, you know? I haven't been drinking for six months already."* (Luis, Jardim Produtivo)

> *"It helps me a lot in my treatment. […] One keeps working, it's physiotherapy, […] I get calmer."* (Emerson, Jardim Produtivo)

Social interactions and community cohesion

The interaction and bonding with the other farmers is a source of great wellbeing and joy to most of the farmers, and a major motivation to continue. Some see the group as a big family; with difficulties and conflicts, but ultimately, great care for each other. Some of the farmers become good friends and meet outside of the garden as well.

> "*If for two days I don't come here, I feel bad. I like to come here, here I get distracted, talk to one person, talk to another, and work, and in a moment an hour goes by. If I feel a little sad, a little bored, I get happy. […] Sometimes we're like a family, you know. Sometimes there are some quarrels, but afterwards we solve it, like siblings, just like a family"* (Edna, Vila Pinho)
>
> *"I want to know what's up with the others, and I want them to listen to me, and I also want to listen, to learn. […] This union, this good thing, this good conviviality […] I want to continue living my life like this."* (João, Vila Pinho)
>
> *"You get to know new people, make a good circle of friends."* (Raimundo, Jardim Produtivo)
>
> *"On Saturdays, we always sit down together. When we finish, we get together and cook something to eat. Then we always schedule to go to someone's house to drink beer. […] It's not only here inside the garden, but also outside. Here, we have become a family."* (Eliane, Vila Pinho)

The farmers make a point of helping each other, especially with heavier tasks. If anyone needs a specific tool, someone will lend it, and they sometimes exchange seeds, seedlings, and plants with each other. If the farmers at Vila Pinho need to make collective purchases and someone has difficulties paying at that moment, they will use money from a little cash box that they all contribute to monthly. There are thus several ways in which being a community garden provides a sort of multifunctional safety net for the individual farmers; both socially and economically.

One farmer at Jardim Produtivo describes that the garden's location in the middle of a neighbourhood with many families creates a sense of locality in the area. The gardens have an important role to forge and maintain relations within the neighbourhood. The farmers become known to people and get a central role in the area, and make connections and friendships with customers, people in the community, and other visitors.

> *"One starts to make a lot of friends. […] I like everyone here inside, and I like all the customers that come."* (Ana Maria, Jardim Produtivo)
>
> *"I like the therapy, medicine for my mind, to talk to you, have a dialogue. […] Sometimes I like to come here to have this type of contact with persons that I never saw or met before."* (Gilberto, Jardim Produtivo)

Knowledge and culture

Another function of the gardens is the preservation and dissemination of culture and knowledge. As mentioned, almost all the farmers grew up in the countryside and had previous farming experience; only one person had never worked with plants.

> *"Everything I learnt, I learnt here, I knew nothing. When I came here, I didn't even know how to use a hoe! […] I learnt it here, and I go to the Internet and research."* (Eliane, Vila Pinho)

Even those that had previous experience have learnt from participating at the garden. The growers exchange knowledge, information, and advice, mainly on an informal, ad hoc basis, but Vila Pinho additionally has a more systematic knowledge exchange through monthly meetings, where collective matters are discussed and decisions made. The farmers have also learnt new skills from the agronomists at SMASAN, as well as during their participation in the international projects CFF and FStT. The farmers emphasise that their practical knowledge in combination with the technical knowledge of the agronomists can improve many things. During FStT, the farmers learnt to sell their surplus produce, in order to make money, not waste any of their produce, and to give also the community access to local, healthy vegetables.

The gardeners not only learn from and teach each other, but also try to inform their customers in order to create awareness of how food is grown. They claim that people in the city, especially younger people, often have very limited knowledge of where their food comes from. Merely by being customers, people learn, because they get to see how the garden works and how things are grown. Moreover, some growers more actively teach people about the plants and about why one should eat vegetables that do not contain agrochemicals.

> *"It's also a demonstration, for the people, visual, it's really good. People visit, come inside, get to know it."* (Raimundo, Jardim Produtivo)

> *"When they [the customers] come, they want to get to know the garden, and I explain how vegetables work. […] They look around, sometimes they don't know anything and then I explain 'this is this, this is that'. […] There are always people who don't know anything. They don't know which one is kale, which one is onion, banana tree. […] It's incredible, right? Funny people! […] Young people, they don't know […] where the vegetables come from, how they are planted, nothing. So it's good that we have an idea about things and pass it on."* (Gabriela, Jardim Produtivo)

> *"Sometimes I bring lettuce to someone and they say 'this lettuce has snails', then I say that it's proof that it doesn't contain any poison."* (Sandra, Vila Pinho)

Vila Pinho and Jardim Produtivo are very well disseminated in both local media and on the Internet. They have inspired other gardens, and the farmers have shared their knowledge and experiences to help others. They also receive visits from local schools and universities, as well as from international researchers, organisations, and cities who want to learn from them. Some growers express that they would like to get some

economic support in return for teaching visitors. Although they are the "model gardens" of BH, they aspire to show the gardens as they are.

> *"The schools visit often, the faculties here visit often. Our garden is well disseminated. Students come from abroad to do their research. […] That's good for the municipal administration too, you know."* (Ana Maria, Jardim Produtivo)

> *"People have to come and see us the way we are! […] We are not machines, we do as much as we manage to. […] So the people coming here will see the truth, nothing false."* (Eliane, Vila Pinho)

Religion and traditional belief are highly present at the gardens and important to many as motivation and support in the daily work. The gardens are thus a platform for maintaining beliefs and stories connected to Brazilian nature and culture. One farmer explains that according to traditional belief, one can only plant a seed from a fruit that has not been eaten in order for the tree to bear fruit. He also strives to live in interaction with his plants.

> *"I communicate with the vegetables here. Every day when I get here I say good morning to my seedbeds, to my piece of land. I say a prayer, I thank each of them – I'm being serious. I say 'good morning kale, good morning lettuce, good morning scallion.'[…] I'm like this, I interact like this."* (João, Vila Pinho)

> *"Rue […] Brazilians with African descent, they say that it's for treatment of the 'evil eye', […] people who seem to be afraid of things. […] Ora-pro-nóbis, they say that it's because people had just left church and went to pick it and that's how it got the name of ora-pro-nóbis [pray for us]. […] Pokeweed is used for candomblé, spiritism […] Job's tears is used to pray the rosary."* (Gilberto, Jardim Produtivo)

By saving seeds and growing plants native to Brazil or the local area, and plants that are considered weeds, the farmers contribute to theses species' conservation. Many farmers also have extensive knowledge of how different plants have been used traditionally to provide alimentation or medical benefits, such as treatment of worms, colds, and stomach problems.

5.2.2 Urban-environmental functions

Neighbourhood greening and improved safety

The establishment of the gardens has transformed vacant lots full of weeds and waste into green, flourishing areas that are a visually appealing element in the neighbourhood. As described in the sections ***health*** and ***social interaction***, the gardens offer a space where farmers can relax, reconnect with nature, find a purpose, and forge friendships. Although the gardens do not have a specific infrastructure for offering recreation to visitors, it is a public space that customers and others are welcome to enjoy.

"[People] can feel free to relax here, [they can] join us to harvest, people bring their kids." (Ana Maria, Jardim Produtivo)

"After constructing the garden, everyone who lives around here, ah they loved it! Cause, the landscape improved, and the safety too." (Eliane, Vila Pinho)

A farmer at Vila Pinho also claims that the garden has prevented informal settlements in the area, and calls for more recognition from the authorities for their contribution to keep the area free from construction.

"They should appreciate it, because this here, if we weren't here, doing gardening and planting here, it would have already been invaded here, people would already have done like over there, that over there is all invaded […] People arrive and the area is empty so they build houses." (Edna, Vila Pinho)

She also says that the municipality sometimes constructs housing as a measure to prevent informal constructions, and that the gardens thus have an important role to preserve urban public space from both illegal and legal constructions.

The terrains where the gardens are situated used to be places where criminals dealt drugs and threw away dead bodies. The farmers assert that the areas have become safer after the implementation of the gardens.

"This used to be a place for killing people, bury bodies here, drug area, you see? So, we are taking care of it." (Cristina, Vila Pinho)

"Before, this was a vacant lot, where people threw away everything, construction material, everything! Dead animals… and lots of weed. […] It's good here, it's been worse, every day they killed two, three, but not anymore. [...] It's among them, you know, […] nobody is bothering us." (Ana Maria, Jardim Produtivo)

"Here, they say that it was a place where people were doing drugs, killing each other. Cause you know that in a place where these things happen, there's a lot of wrong things, there's death, there's robbery." [Is this still happening?] *"Now there's no more of that because we are here. They left, they removed them from here. […]The garden cleaned up. Thank God they left and we entered."* (Edna, Vila Pinho)

Climate, biodiversity, and waste management

The direct relation between producer and consumer has many positive effects on the climate. Since most sales are carried out at the garden entrance, the need for packaging, storing and transportation is greatly reduced or even eliminated. The farmers reuse materials both for decorative purposes and to cope with different challenges. One of the farmers saved his harvest during the dry season thanks to a roof that he made from material that he found, and another has found a way to prevent erosion in his sloping plot with the help of old wardrobe doors that people throw

away. Furthermore, all farmers make homemade fertilisers and pest remedies out of farm resources.

> *"We don't use any agrochemicals, nothing. So I've learnt to make a remedy called 'biogel', one does what the others do. […] It's a kind of compost, a liquid, that we always make. It contains a lot of things, it has cow manure, plants, kale leaves, milk, molasses from sugar cane, cow liver… […] This biogel […] makes the plants green and healthy."* (Raimundo, Jardim Produtivo)

While the gardens do not produce their own manure, there is potential to create recycling processes on a wider scale and build synergies between diverse urban activities.

> *"The manure, we buy it at neighbouring farms […] currently, we are also buying an organic product, a compost, from a person in Betím, a neighbouring city."* (Silvio, Vila Pinho)

> *"This manure that is there at the Gamileira exposition… […] They [the municipality] don't have anywhere to throw it and we also need manure, you know, so it's good."* (Edna, Vila Pinho)

> *"I get manure from the chicken farms, where they sell chicken, the guy gets it for me and I give him bedding for the chicken, sawdust from wooden sticks."* (Gilberto, Jardim Produtivo)

Vila Pinho and Jardim Produtivo are managed agroecologically and use no agrochemicals in their production. Nor do they use machinery. The only farmer statements regarding biodiversity concern different types of pests, which would probably not be (as) present in a production system that uses chemicals. Moreover, the crop diversity is likely to be beneficial to wildlife, and based on my observations during the garden visits it indeed seems to be a refuge for wildlife.

5.2.3 Summary

The urban farmers gave both broad and deep accounts of the gardens' multiple functions and contributions on various scales. One farmer summarises some of the main benefits of the garden:

> *"Now what was wrong is right, because here the garden helps people and even eradicates people's hunger. One sells the vegetables, makes money and buys food. One eats good vegetables that are not treated, and one distracts the head, all of that is good."* (Edna, Vila Pinho)

The farmers also mentioned various other socio-economic functions such as social interaction and preservation and dissemination of knowledge and culture, as well as urban-environmental aspects such as the recycling of some urban resources and the contribution to safer and greener neighbourhoods. The following subchapter will look more into how the municipal departments/institutions work with UA and whether the work reflects the farmers' stories.

5.3 Governance and political framing of urban agriculture

This subchapter presents the findings for research question 3: *How is UA framed in local politics in Belo Horizonte?*

To explore this question, the following sub-questions have been posed:

- Which is the political home of UA?
- How do different municipal government bodies approach UA?
- How is the UA work of different municipal government bodies integrated?

The results are based on my interviews with both politically elected officials and civil servants, at four municipal departments and one municipal institution. The first two parts present how socio-economically and urban-environmentally oriented municipal authorities respectively view and work with UA. The third part delves deeper into their perceptions on integration among different policy areas.

5.3.1 Municipal government bodies focused on socio-economic aspects

Municipal sub-department of Food and Nutrition Security

The institutional home of UA in Belo Horizonte is the *School and Community Gardens Programme*, which is one of six main branches of the Municipal sub-department of Food and Nutrition Security's (SMASAN) work to improve the food and nutrition security of its population. The programme currently involves 140 school gardens (120 active) and 56 community gardens (45 active), as well as the *Pro-Pomar* programme (fruit tree planting in public areas) and courses for planting in alternative spaces (e.g. in PET-bottles).

A community garden can be initiated either by a group of individuals who contacts SMASAN and receives support to set up a garden, or by SMASAN who finds a suitable area for a garden and then searches for interested participants. SMASAN then assesses the land together with agronomists from EMATER (the Enterprise for Technical Assistance and Rural Extension Services). SMASAN provides access to land (if public), water, electricity and technical assistance, and during the first two years also other resources to assist the establishment of new gardens. Funding is a major obstacle, especially as Brazil is now going through an economic crisis, however by creating an association it is possible for the gardens to become eligible for private funding, which is something that also benefits the companies (in the form of tax reductions or social marketing). During 2016, SMASAN will establish ten new gardens in partnership with the federal Ministry of Employment, which supplies the major part of the funding. This type of funding is only available for short-term projects and not as a long-term strategy to finance support for the gardens.

SMASAN partners with the community, but each urban farmer usually has his/her own plot, and all gardens are managed agroecologically (according to SMASAN's definition, i.e. without agrochemicals). At the moment, five of the community gardens

are commercialising their products. The urban producers are only allowed to sell non-processed vegetables and fruits. To expand the possibilities to commercialise, SMASAN is planning to establish a number of sales points for urban produce in 2016.

> *"We are creating the urban agriculture [sales points] to promote the urban farmers, to give them the right to sell without depending on the DAP.* […] *We will locate 30 new [sales] points for urban agriculture within Belo Horizonte, […] in various places in the city. […] We will train people and give them better conditions."* (SMASAN 2)

The idea is to formalise the commercialisation of products, to offer another outlet in addition to the ones that currently exist. So far, one market location has been authorised, but as it is situated in the centre of BH, SMASAN must provide transportation for the farmers to sell there because the farmers themselves do not have the conditions. One SMASAN manager however also sees logistic benefits of UA produce, which in contrast to food that is supplied from the countryside does not require long transportation and storage facilities. While the amount of UA produce is far from enough to supply BH's population, it can be a good complement.

SMASAN is one of three sub-departments within the Municipal Department of Social Policy. The social focus is seen in SMASAN's view on intersectoral collaboration.

> *"We work in partnership with three departments: Education, Health, and Social Policy."* (SMASAN 2)

> *"With [SMAPU]… it is a bit more distant. […] I don't think that Urban Planning has gone much into depth on this topic [UA]. […] It was included in Urban Planning as a demand from us, from SMASAN, and from the Park Foundation, that urban agriculture should be known within Urban Planning. It was not an internal request, but rather an achievement by other organs."* (SMASAN 6)

> *"The [department of] Environment works a little differently from us. We work with health, food security, whereas the Environment works with environmental preservation. […] When you place the Environment here, and the Urban Planning, they don't assimilate… they don't fit very well with our politics."* (SMASAN 2)

The view within SMASAN thus seems to be that urban planning and environmental policies are not in concordance with social policies, and that their methods and aims contrast. SMASAN works with sustainability of the *gardens*, as a transversal approach, but does not integrate their UA work with the environmental work of the *city*. Nevertheless, there are projects that, in practice if not in policy, are linked with urban-environmental entities. SMASAN for instance collaborates with the Administration of Urban Cleaning (SLU), which fetches leftovers from the food system (e.g. the Popular Restaurants) and transforms it into organic compost that is used at the city's squares and parks. It is however not returned to the food system, because the gardens' need is too small in comparison with that of the squares and parks. Furthermore, SMASAN has recently recommenced its collaboration with FPM.

"With the Park Foundation I'm currently signing […] to make urban gardens […] inside the parks […] in all parks where it is possible. […] It's quite advanced and ready to be signed." (SMASAN 1)

"There is intersectoriality. Even though, for example the CEVAEs, until now they have been growing in their own direction. Now, together with Karine [the FPM President], we are trying to bring things together." (SMASAN 1)

"We are promoting a partnership with EPAMIG and with the Zoo-botanical Foundation. […] This project is still in the planning phase. But the three of us will sign a contract now to make a partnership, to develop new technologies focused on urban agriculture. […] EPAMIG does the research […] and the Zoo-botanical foundation has the space […] and our specific aspect is that of alimentation." (SMASAN 1)

Municipal Department of Social Policy

The Municipal Department of Social Policy (SMPS) works with the population of Belo Horizonte, in particular with vulnerable and marginalised groups. It overarches three sub-departments: the sub-department of Social Assistance, the sub-department of Citizens' Rights, and the sub-department of Food and Nutrition Security (SMASAN). The role of SMPS is to lead and integrate the work of these sub-departments; to promote intersectoralism. For over a decade, SMPS has run a project called 'Vila Viva' that aims to support local communities to restore the area where they live, which can include urban agriculture. Furthermore, SMPS is currently initiating a project called 'Empreendendo Vidas' that strives for socioeconomic inclusion of homeless people, in collaboration with the NGO INSEIA. One of the (private) initiatives of the project is by the group Plantação, which teaches homeless people how to breed seedlings for consumption and sales. While this is not a public project, SMPS supports the approach to benefit people in vulnerable situations while simultaneously greening the city's public spaces.

One of my interviewees at SMPS explained that the agricultural production in the city is very small, because there is no space available and the price on land is high, so even though a lot of people have migrated from rural areas and have agricultural experience, most prefer to construct buildings since it is better economically.

"Belo Horizonte is a very small municipality, the physical area is tiny in relation to the population, so our population density is very high. This means we have few free areas, available lands; they are all occupied with buildings and constructions. […] There is no more rural agricultural land in the municipality. There are some school gardens, some community areas that sometimes even generate an income because they can sell their production if they have a big plot." (SMPS 1)

She explained that she had made a suggestion in the past to install community gardens on private, unused land. The community would be responsible for the management of

the plot and benefit from the food, the landowner would have the plot taken care of as well as receiving a tax reduction (because the tax is higher for unused land), and the municipal administration would act as an intermediary to guarantee that both parties followed established rules. However, the project was never realised. She believes that there is enough technical knowledge to do a more coherent UA project, and that the private, unused land is the optimal location for temporary UA initiatives.

Alike SMASAN, SMPS view their work as rather divided from the urban-environmental policy area.

> *"I never dialogue with [the Department of] Environment."* (SMPS 1)

> *"The important partners for us are the regional administrations. […] They manage the public services locally. Because they know the reality, they interact regularly with the population. […] We have to strive for collaboration with the regional administrations above all."* (SMPS 1)

However, the Vila Viva project is an example of true intersectoral (local level) work.

> *"The Vila Vivas are a really awesome urban development initiative, with agglomerated towns, settlements and favelas. It's a process that involves the two policies; the urban policy and the social policy. Because it has an entire process of planning, of reform of these areas, involving the actual community that lives there. So it is the community that is contracted to do the whole adjustment process. So you contract the workforce within the principles of urbanization, but mainly with respect to the environment, so you marry the issue of access to schools, healthcare centre, culture. It is the coolest initiative that we have in terms of intersectoriality between the social area and the urban area."* (SMPS 2)

Municipal Government Department

The Municipal Government Department is the department closest to the central administration, and has an overarching role. My interview was carried out with one of the department's special advisors on drug policy, and one aspect of this job is finding opportunities for reintegrating persons with substance abuse into society, including reinsertion into the workplace. Gardening is already a tool used for therapy – many of the public health clinics have their own small gardens – and the advisor sees opportunities to expand this idea and offer work at urban gardens to persons that are recovering from substance abuse, as it provides therapy and employment simultaneously. So far, two persons have been trying out this new project (at Jardim Produtivo) and although it has been met with some resistance from the already established families, it has shown good results and he believes it has potential to grow.

> *"A garden is a cheap investment, and something that any person can do."* (SdG)

The advisor has presented a project proposal that is currently being reviewed, which aims to insert 2040 socially marginalised families belonging to the project 'Familia

Cidadã, BH sem Miseria', into new and already existing urban gardens. The main objective is to create an income source for these families, and indirect objectives include increasing their self-esteem and social interactions as well as preserving public space and preventing it from being used for criminal activity.

> *"These [gardens] that I want to create within this programme, they have a commercial aspect, to generate an income for these women, because I believe that the income is fundamental for a person that doesn't have anything. […] To improve the self-esteem, and to be able to have some money. I believe that the income is important."* (SdG)

> *"In addition to have the aspects of environment, I like the idea of urban agriculture, I think it's a good alternative to arrange work for homeless people, it's something that doesn't have employment ties, that doesn't have employer, the person can work whenever he wants. So I think it's a good alternative, and that it's good for society. I think it will have good outcomes."* (SdG)

He wants UA to become an institutionalised part of the decrees on drug policy, and tries to use already existing physical and political structures and connect different departments to advance UA as something that can benefit many areas.

> *"The arrangement with the gardens emerged because it is something easy, we have a lot of space. And in this I saw an opportunity, by doing this work, to try to anchor the subject of urban agriculture so that it can become established."* (SdG)

He is currently collaborating with FPM on the possibilities of using parkland for these gardens.

> *"The parks in Belo Horizonte are only for environmental preservation of native vegetation, they don't have any food production, very few fruit trees, only native plants. […] I won't destroy native trees, but there are lots of parks that were created in already degraded areas, that the municipality is recovering, so there are areas with invasive trees and plants that don't belong to the habitat. […] In these spaces, we are suggesting to locate gardens, to create space for these families."* (SdG)

5.3.2 Municipal government bodies focused on urban-environmental aspects

Municipal sub-department of Urban Planning

The Municipal sub-department of Urban Planning (SMAPU) is responsible for the coordination of urban policy in BH, including areas such as land use, housing, environmentally protected areas, urban growth, and urban mobility. The rules and directions are determined in the overarching Municipal Steering Plan that is revised every four years, and smaller, more specific endeavors are planned in the Minor Plans. Rather than working hands-on with specific projects, SMAPU's task is to coordinate the work and create dialogue among the different municipal departments that are involved so that issues are approached in a coherent and integrated way. One

example of a SMAPU initiative is the so called "parklets"; small, green areas that are created, for example, by removing two parking spots by the sidewalk, with the aim of greening the city and creating meeting places and "areas of reflection". Another example of a Minor Plan is the Parque do Onça project. The location is a riverbank area that people have occupied illegally and that is not suited for construction because of the landslide risk. The plan is to reconstruct the area and build a park along the river, and it will among other things include areas for food production. According to the interviewees at SMAPU, they are not very active within the area of urban agriculture, but they are slowly beginning to include it in their projects.

> *"In 2010, the Municipal Steering Plan was revised and came to include urban agriculture among the activities that can be realized in Belo Horizonte. But since then it has not resulted in a public policy with incentives, how to work with urban agriculture. […] We can licentiate an urban agriculture project without any problems; it will be authorized and functioning. But it did not yet become a public policy, however now we are starting to construct some initiatives connected to urban agriculture."* (SMAPU 2)

They believe that UA has potential beyond food production, especially when it comes to engaging the community to be an active part of shaping the city.

> *"In order to guarantee that the city's public spaces are well taken care of, it's necessary to involve the communities. Gardens could be an instrument, an interesting way to promote that people within their communities, their quarter, have a closer relation to the public spaces in their daily life."* (SMAPU 1)

SMAPU is currently collaborating with CEMIG, which is the company in charge of the electrical grids in Belo Horizonte, to create a project aimed at enabling the use of areas below the electrical grids.

> *"In the city, there are some areas that are a bit degraded, because they are situated below the electricity grids. These areas cannot have any permanent settlements due to the infrastructural risks, but more sporadic access, such as planting, temporary things, are possible. So these are potential spaces for the creation of community gardens. It qualifies as an enhancement of public spaces, greener spaces, more friendly spaces that are more inviting."* (SMAPU 1)

SMAPU has drawn up a decree (which is presently being assessed by the mayor) that would permit these areas to be used for temporary activities such as cultivations. Moreover, there would be economic incentives for the landowner to grant access for others to use his land:

> *"There is an urban policy instrument in the Steering Plan, which authorizes the landowners, when they don't exercise their right to construct in a certain area, to have this right transferred to another area in the city. […] To obtain authorization for transferring his right to construct to another piece of land, he has to commit to finance and facilitate the implementation, the use of these areas, I think ideally with community gardens. […] It's a creative way to attract persons*

that can enable this financially." (SMAPU 1)

In conclusion, SMAPU always places great attention on the environmental aspects of the city and encourages green places where people can meet. They therefore believe that UA should be used as a tool to create more green areas in the city.

> *"[The parks] are already green areas, the ideal would be to find areas that are needing improvement."* (SMAPU 1)

> *"In a way, that is what we are trying to achieve with the projects below the electricity grids, which are areas with this type of problems: they are abandoned, full of waste…"* (SMAPU 2)

SMAPU shares the view of SMASAN and SMPS, that there is little collaboration between the departments across policy areas.

> *"We currently don't yet have any type of specific contact with them [SMASAN], it's kind of isolated."* (SMAPU 1)

Municipal Park Foundation

The Municipal Park Foundation (FPM), which is a public institution tied to the Municipal Department of Environment (SMMA), is responsible for Belo Horizonte's 74 parks, the cemeteries, and the five Centres for Agroecological Living (CEVAEs). The CEVAEs are urban gardens that integrate economic, social, and environmental aspects through four sub-programmes: environmental education, food security and health, agroecology, and income education and –generation. According to my interviewees, the CEVAEs were established by the Department of Environment, who arranged the space, equipment, and financing. Technical assistance was given first by SMASAN and later by the local NGO Rêde de Intercambio de Tecnologias Alternativas, but both collaborations ended after only a few years. In 2005, the responsibility for the CEVAEs was transferred to the newly created FPM. The programme steering is done at the main office, while the local units are in charge of day-to-day management and maintenance. There is currently no specific person in charge of the CEVAEs at the main office. The support to the CEVAEs has become continuously weaker. According to FPM, this is not necessarily an issue, but the researcher at UFMG does not agree as she means the CEVAEs have lost touch with the original idea and engagement.

> *"In fact, […] the farmers are in general people who have a heritage, who are from the countryside, they have knowledge that has been passed on from one to another. So, even if we don't give a recurrent technical assistance, they exchange ideas, they know how to work with pests."* (FPM 1)

> *"[The CEVAEs] are far from reaching their potential. The CEVAE, as a centre for agroecological experience, was a local source of inspiration, for local networks, they connected schools with health clinics, culture centres, social*

protection networks, with community leadership, they were very active community fora." (UFMG 2)

FPM recognises the need to regain momentum with the work with the CEVAEs and to advance the programme, as well as rebuild relations not only with SMASAN, but also with other municipal and local entities. The FPM President has therefore proposed a process to resume the project.

> *"We will make an evaluation of what currently exists, what needs to be done to improve, and how to progress. […] The idea is to recommence and to investigate why it stopped, so that the past problems don't happen again. […] There will be a person specifically dedicated to the CEVAEs next year; we are still studying this proposal, to really devote more to the CEVAEs."* (FPM 2)

The idea is to reinstall the CEVAE Steering Committee, with participation of SMASAN and the departments of Education and Health. The committee will only have mandate over the CEVAEs, but other entities that participate will want to benefit as well, so the aim is to instigate an intersectoral collaboration that can generate mutual benefits for the participants, with FPM as the central, driving force.

5.3.3 Policy integration and collaboration among municipal government bodies

As seen in the accounts given by the departments/institutions, there are several examples of intersectoral collaboration on UA *in practice*, but the interviewees share the view that they mostly collaborate within their own policy area, and do not mention any *institutionalised* integration between policy areas or departments/institutions.

> *"Intersectoriality is a difficult word to say, and even more difficult to do, because people are used to working each one in their little box, each one with their topic. And intersectoriality presupposes putting your own work at the disposition of others, and by doing this you could maybe receive critique, you could receive suggestions, you could receive proposals of readjustments of that model, you may realise that what you are suggesting in terms of public policy is not in tune with the city, so in conclusion, the person needs to be open for a debate that often doesn't fit within the sphere of the public authority precisely because of this hierarchical culture, with everyone in their box. A person who works within a specific area […] often has difficulties to view the policy holistically."* (SMPS 2)

> *"There are a lot of things going on, in various sectors of the administration, in Health, in Populations in Risk Areas… but there are no efforts to coordinate them and give them another status."* (UFMG 2)

During the 1990s, there was collaboration between the policy areas, not least in the CEVAE project that SMASAN and the Department of Environment created together. In fact, the vision of the CEVAEs was precisely this: to create a space where social, economic, urban/spatial, and environmental questions could interact and stimulate a political discussion regarding the food system and the urban setting.

"[The aim was] to connect the environmental concern with the alimentation concern. […] They were reference centres in the community, but with the objective to function in the community, not only at the centre. They were green areas where courses in agroecological production of vegetables were held, courses about medicinal plants, healthy eating, reutilisation of food, communitarian organisation... […] It was more a space for experimentation and training. […] So the idea wasn't only to produce food, but to, through food production, through the work in the backyards, at the health centres, to generate discussion concerning our food production system, and also of our urban system." (UFMG 2)

Both SMASAN itself and the CEVAEs were established during a favourable period of convergence between the global context influenced by the Rio Conference and Agenda 21, and the local context in which BH had gotten a new administration committed to get to grips with the widespread poverty and food insecurity. The funding that the CEVAEs received from the UNDP moreover assumed collaboration between the local government and civil society, thus both the political and the financial context was conducive to the type of integrated, multi-stakeholder projects that was the vision with the CEVAEs. The dialogue between the different actors however deteriorated after a few years, and when applying to join the CFF project, the NGO Rêde (who instigated BH's participation) decided not to partner with SMASAN, both because of the lack of dialogue between the two of them, and because SMASAN's political influence had weakened as administrations had been exchanged (and with that, ideologies and political priorities).

"SMASAN was the "beloved child" in the 1990s, but it is less prioritised nowadays, especially the production axis, where UA is included. It has not reversed, but some areas have stagnated and the political drive has weakened." (SMASAN 4)

Rêde instead managed to establish collaboration with the Department of Urban Policy (Urban Planning), however the department was unwilling to assume a key UA role:

"The coordinator of [the department of Urban] Planning at the time said that 'we will support the initiative, but we won't implement it, because we don't think that urban agriculture has to do with urban planning. We will do the analysis, we will carry out the whole process, but at the end of that process, you will have to steer and define an institutional anchor, a gateway, un umbrella for urban agriculture at the municipal administration." (UFMG 2)

During the CFF project, there was a major effort to map all the UA initiatives within the municipal administration, and a multi-stakeholder forum was created to integrate all these actions as well as civil society. However, when the international actors left (and with them the financing), the process came to a halt, and the forum has been inactive for a few years despite all the efforts to set up the forum and to integrate and advance the UA work of the city. Now (as described in the municipal authorities' accounts) the different policy areas again seem to be divided.

"From what I perceive, urban agriculture has not yet been inserted within the environmental debate. People must understand that urban agriculture ***is*** *environment."* (SdG)

"The municipality needs to move forward a lot within the sphere of intersectoriality that involves not only the issue of the environment, but urban policy. The urban policy needs to be married with the social policy. I often say that in public administration here in Belo Horizonte, you have two political branches: the social policy, and the urban policy. One doesn't work without the other. There is a need for these policies to marry." (SMPS 2)

"In my opinion, if I could choose where to locate urban agriculture, I would go for the Department of Government, because it's outside of the social and the urban, and it's a department with power, to create interaction […], institutional connections." (UFMG 2)

Both SMPS and FPM also emphasise the collaboration with the regional administrations because they know the reality, and because policies need to emerge from the communities and be anchored at the local level in order to be sustainable.

While UA is currently mainly a way to obtain food and nutrition security and income generation, one interviewee at SMASAN believes this could possibly change in a long-term perspective and that UA could become more of a political action showing new ways to use urban space, and that rural activities might gain more recognition. Another interviewee claims that while SMASAN's UA approach was innovative in the 1990s, the global UA agenda has since advanced:

"The debate on urban agriculture has now advanced in the world, not only as part of food systems, but as part of resilient cities, sustainable urban development… SMASAN doesn't think in that way, SMASAN has the same programme as in 1993, which is, a community garden programme and a school garden programme. […] It doesn't coordinate a ***policy*** *on urban agriculture. […] It doesn't have this political vision."* (UFMG 2)

Several actors say that civil society must also assume greater responsibility to advance the UA agenda. Some suggest that COMUSAN, the food council, has not had enough of a political debate that questioned the root causes, and that they need to put more pressure on the authorities to forward UA. However, civil society participation is obstructed by the hierarchical culture in Brazil where civil society makes demands and authorities make decisions. Many interviewees express that there is a lack of political interest that results in a lack of money, which is a resource that civil society often lacks (which means that civil society has to find new ways to affect the agenda).

"*Some things have more money, others have less. Not only money, but also political interest. It depends who the director is, if he is interested in something and there are resources, he will make it happen. But if there is money but no interest, he won't try to advance it."* (SMASAN 6)

"Everybody wants it, but no one has the money, the budgetary allocation to do it, it's not included as a possible expense." (SdG)

Financing for UA is a key issue that has to be solved if the UA agenda is to advance. Another important aspect is the institutionalisation of intersectoral collaboration:

"The municipal administration doesn't have these activities as a settled central policy. It's getting there slowly. At some point, they will have to define a regulatory framework and locate resources too." (SdG)

"It has to be a governmental programme, not only a favour because it has a thousand risks and little validity. […] [We need] a dialogue to create, through official vehicles, create obligations and responsibilities for each, who should monitor, and so on" (SMASAN 1)

*"[The collaboration] has to be institutionalised, all departments have to get together and form an intersectoral group." (*SMPS 2)

5.3.4 Summary

The political "home" of urban agriculture within the municipal administration in Belo Horizonte is SMASAN, where UA is one of the main programmes. UA is thus mainly framed within a socio-economic policy area, with the aim of promoting food and nutrition security, as well as income generation, among vulnerable populations. While the other departments/institutions in this study do not have any official UA policy or agenda, all of them have projects that involve UA, as well as plans to engage more with this topic. For instance, several departments/institutions mention the possibility of creating urban gardens in vacant or degraded areas of parks and privately owned land. FPM is a somewhat special case, as it has been the political home of the CEVAEs since 2005, despite not having any comprehensive UA policy or programme. Nevertheless, the UA initiatives within these other departments/ institutions are not much connected to SMASAN's UA work.

Municipal government bodies that focus on socio-economic topics seem to be rather well connected because of their work with vulnerable populations, but they do not have any established collaboration on UA specifically. The links to municipal government bodies working with urban-environmental questions are rather weak. Some suggest that their aims and methods are too different and even contradictory, while others believe that increased integration would be beneficial.

6. Discussion

6.1 Discussion of results

The previous chapter presented the perspectives and priorities of key UA stakeholders in BH within a framework of systems thinking, agroecology, and multifunctionality. These empirical results will now be linked and analysed in a holistic manner, by integrating the farmers' accounts of multifunctionality with those of municipal authorities. I will also analyse how different functions are linked, how the set-up, management, and challenges at the gardens affect what functions are generated, and conversely how the functions might affect the farming systems. Finally, I will discuss the integration on UA among the municipal departments/institutions and possibilities for better recognition of the farmers' contributions.

The centrality of food

To the majority of the urban farmers at Vila Pinho and Jardim Produtivo, the food itself is one of the main reasons to farm. This could seem obvious, but in fact, some studies in the Global North have shown that other aspects can be more important drivers, such as social integration and environmental education as found in Halloran and Magid's (2013) study in Copenhagen. However while some benefits could be the same ones produced in for example a park, the food function has an instrumental importance by being central to many of the other functions (Pourias et al 2016; Lovell and Taylor 2013), which I will show throughout the discussion.

Both farmers and customers[23] at Vila Pinho and Jardim Produtivo see the relation between quantity, quality, and price that the farmers offer as superior to that of the supermarkets, and customers appreciate the transparency that the on-farm sales provide, i.e. the possibility to see what is picked and how it is grown. By producing their own food, farmers save money on food purchases and become less dependent on world food prices, which tend to increase and fluctuate during economic crisis (such as the one that is currently occurring in Brazil) and affect especially lower income populations (Dubbeling 2011; Garnett 1996; Nugent 2000). While the food itself in one way or another is a key motivation to every farmer in this study, not all are food insecure in the sense that the garden is their only source of food and income. Some of the farmers are indeed dependent on the garden, while others receive their main income through their pension or other jobs. This is not to say that these farmers do not need the income – for most it is a crucial supplement to their main income. However, some mention other functions such as health and social interaction as more central to their participation.

[23] Informal conversations with customers at the gardens, though not a formal method of the thesis, gave me some indications on how the customers view the gardens and why they go there.

The benefits of sales

The sale of surplus is key to several of the functions generated through the gardens. First and foremost, the sales of vegetables matter because they generate an income for the farmers, something that is one of the most important motivations to participate. Second, the sales create a natural link to the surrounding community, giving more people access to the garden produce, and generating friendships between farmers and customers. I will discuss this aspect more in the next subchapter. The central role that the sales have is interesting, since this aspect was introduced only a few years ago during the FStT project. This shows how an external input (knowledge) has quickly and profoundly affected the farming system. It also points to the importance that international initiatives (and funding) have had to create momentum for UA in BH, which also Borges (2013) found when studying the impacts of the FStT project. The farmers affirm that the years that they were part of CFF and FStT were the most innovative and vigorous years in garden. Now, a few years later, the dynamism from that period seems to have diminished.

As already mentioned, some of the farmers at Vila Pinho and Jardim Produtivo depend on the garden income for their livelihood. Even though the income is in some cases higher than the minimum wage in Brazil, it is still low. Similar results were found by Poulsen et al (2015) and Zezza and Tasciotti (2009) in their studies of urban agriculture and food security impacts in low-income countries. Some case studies (in the Global North) have even shown that UA can have a negative impact on individual farmers' economy, but that this can be compensated by other benefits (Pourias et al 2016). Poulsen et al (2015) however mean that farmers in low-income countries often do not have many other alternatives. The economic alternatives available to the farmers in BH are in most cases other low-income jobs such as housekeeping, and they prefer the work at the garden because it is a source of enjoyment, as well as personal empowerment (Garnett 1996) in the sense of an increased self-esteem, independence, and feeling of earning 'sacred money'. While the farmers mean that they do not need a lot of money to be happy, the pay is too low to manage the garden independently from SMASAN. Borges (2013) suggests that the top-down establishment (by the municipality) of Vila Pinho and Jardim Produtivo and the subsequent lack of strategy to empower farmers could be factors restraining the farmers' independence. Still, low economic viability seems to be a general problem among urban gardens in BH (whether bottom-up or top-down); a comprehensive analysis carried out during the CFF project in 2007, found that few urban farmers are able to rely on farming as their only income (Coutinho & Costa 2011). The viability has likely increased thanks to the FStT, but as described, it is still low. Moreover, only five gardens (of the ones that receive SMASAN-support) currently sell their surplus, thus the benefits described in this subchapter are perhaps not available to farmers at other gardens. There are also legal obstacles for the commercialisation of UA produce, as described in chapter 5.1. For instance, unlike family farming, UA is not specifically mentioned as an important source for public procurement to the School Meal Programme (Lei n° 11.947/2009). SMASAN's plan to install 30 UA sales

points will be a progressive measure to expand and formalise sales possibilities, especially since the effort also involves strengthening more gardens to commercialise. Souza and Vasconcelos (2014: 24) think that an increased sales focus could make more young people interested in participating. Moreover, it might contribute to disseminating awareness of UA to larger parts of the BH population, which could in turn generate a form of protection for the gardens' continued existence[24]. As Fleury and Ba (2005: 6) write, "a real urban project needs to be accepted by the population: this is the case in Ottawa and Mexico City, where the disappearance of the inter-urban agricultural space would be seen as an unacceptable alteration of the landscape".

Health and social interaction

Pourias et al (2016: 269) suggest that in addition to the food itself, "the gardens have many other functions, without which the gardeners would perhaps not participate". This also holds true for customers, who beyond the access to local food can benefit from social interaction, knowledge transfers, and a green space. In my study, the farmers mentioned the health benefits of working at the garden as one of their main motivations. As shown in the results, several growers in fact joined the gardens to recover from different physical and mental health issues or to find a new purpose after retirement (also found by Souza & Vasconcelos 2014: 23), and two growers at Jardim Produtivo participate as part of a substance abuse rehabilitation process. Many of the benefits that the farmers mention are also found in previous research (e.g. Garnett 1996; Gasperi et al 2015), including enhanced wellbeing, relaxation, and recreation, and improved physical condition. In terms of alimentation, the gardens play a role in the prevention of lifestyle diseases. While a study found that the consumption of fruits and vegetables has increased in BH during the past decade (Araújo 2016), Brazil is not an exception to the increasing global consumption of cheap, processed foods, resulting in malnutrition particularly among lower income groups.

Also related to health is the social cohesion that the gardens create. The farmers confirmed previous research suggesting that participation in an urban garden can generate a "feeling of belonging to a community" (Pourias et al 2016: 266) and function as a support system (Halloran & Magid 2013). The fact that the gardens are at the same time communitarian and individual seems to both strengthen the positive functions of social interaction and diminish negative functions such as conflicts, because it gives the farmers the possibility to choose. While the common areas provide a meeting place where farmers can interact, share experiences, and meet customers, the individual plots offer individual freedom and the option to withdraw into a private sphere. The likelihood of being able to work undisturbed, however, seems to depend on the location of the plot in relation to the entrance.

[24] Here I am referring to the case of the Popular Restaurants, another branch of SMASAN's food and nutrition security work: when the municipal administration wanted to increase the prices at the Popular Restaurants, the popular protests were so significant that the changes were abolished.

The interaction with the surrounding community seems to be largely linked to the sales, as also suggested by Souza and Vasconcelos (2014: 23). During my fieldwork at the gardens, there was always someone arriving to buy vegetables, enjoy the gardens, and talk to the farmers. However, despite the gardens' central location in the neighbourhoods, the interaction with passers-by seems limited, in contrast to Pourias et al's (2016) study. This could be due to the high fences (see Ernwein 2014: 79) (which are nevertheless important to create safety for the farmers), or because the gardens do not really have any space for activities that are not tied to food production, which I will discuss in the next subchapter. Social interaction is also strengthened through vegetable donations to family, friends, neighbours, people in the area, and people in need, as for instance Pourias et al (2016) have previously suggested.

The social capital generated through the gardens is mainly of bonding nature (see Kingsley and Townsend 2007). The farmers have become friends with each other and with many customers. In contrast to Kingsley and Townsend's (2007) study, these relationships extend beyond the physical limits of the gardens, as farmers meet in other locations after the work is done for the day. Vila Pinho and Jardim Produtivo have also generated some bridging capital by partaking in larger projects, seminars, and other activities, however these relations seem less regular and stable. Possibly, the new sales points can generate more bridging capital by being located in various types of neighbourhoods. As Bergquist (2010: 7) notes, this is important in order to "increase the comprehension and integration between all socioeconomic classes of the urban society".

Maintaining green open spaces and improving safety

The farmers at Vila Pinho and Jardim Produtivo describe how the gardens have transformed the respective neighbourhoods, mainly in terms of improved safety, maintenance of land free from construction, and improved visual value.

The majority of the interviewed farmers highlight the improved sense of safety that the establishment of the gardens has generated, due to the reduced hiding opportunities (formerly made possible due to the weeds and waste) and increased human presence. Renting et al (2013) presented similar results in the case of Rosario, Argentine. Lovell (2010: 2508) likewise found that farmers expressed "perceptions of lower crime in the area". It is not clear whether crime rates have actually decreased, or if the delinquents have moved elsewhere. Moreover, there are still safety issues that need to be addressed so that the farmers (especially female farmers) can feel safe when working at the garden.

The gardens have added an element of nature into the neighbourhoods and beautified areas previously used as dumping grounds. This has offered an opportunity for people to reconnect with their rural roots and farming, and both farmers and customers describe the gardens as an enjoyable green refuge. According to the farmers in my study, most people in the vicinity appreciate the gardens. Vila Pinho and Jardim

Produtivo were from the beginning well anchored in the communities (through open community meetings), which previous studies have suggested as key to their sustainability (see e.g. Fleury & Ba 2005; Pourias et al 2016; FAO/WB 2008). However, some scholars (e.g. Garnett 1996; Lovell 2010) found that urban gardens are not a spatial element supported by everyone, but have opponents. In the cases of Vila Pinho and Jardim Produtivo, there have been incidents with opponents, but being supported by the municipality seems to have been an advantage. Also the recognition of UA as legal land use is an important step to legitimise the continued existence of urban gardens in the face of other (more lucrative) land uses.

According to some farmers, the gardens play an important role in the preservation of green areas in the city, since their presence averts (illegal and legal) constructions. This was a value highlighted also in Halloran and Magid's (2013) study in Dar es Salaam, in which one participant stated that "green zones are always under threat from land invaders, unless if you make them active" (Halloran and Magid 2013: 128). Fleury and Ba (2005: 6) likewise write that UA "preserves urban open spaces through agricultural activities or projects". BH is already 100% urbanised (Souza & Vasconcelos 2014: 13), and SMPS among others highlighted that there is no more agricultural land in the city, and a general lack of space. This makes it especially crucial to preserve open areas, including remaining public areas as well as vacant private land that is unsuited for constructions. SMPS and SMAPU both described project ideas that would enable temporary use of terrain that is situated below electrical grids, an idea also forwarded by scholars such as de Zeeuw et al (2009). Community gardens would be an optimal land use in those spaces, because it would simultaneously improve the visual and environmental functions of the neighbourhood and enhance the food security of its inhabitants. Moreover, there would be financial incentives for the landowner, with the municipality as the intermediary. De Zeeuw et al (2009) also mention the possibility of using UA for sustainable territorial management of degraded areas, which in BH can be found in SMAPU's Parque do Onça project that involves UA as an element in the reconstruction of the riverbank. Furthermore, municipal authorities (at SMASAN, FPM, and SdG) are considering the possibility of integrating UA into degraded areas of the city's parks, which would improve the land use of those areas without disrupting the preservation of native plants in other areas of the parks. SMAPU on the other hand, while not opposing the idea of UA in parks, believes it would make an even greater difference to implement UA in degraded areas such as those below the electricity grids. Yet, one thing does not exclude the other and these are innovative approaches that would improve both the food and nutrition security of vulnerable populations and spatial and environmental aspects of the city, thereby combining the two policy areas.

Some scholars that are critical to the capitalist development of urban areas, see community gardens as possible "collective and non-commodified" spaces (Harvey 2012: 74) that can counter the social fragmentation and isolation of modern cities and contribute to "recreating the Commons" (Tornaghi 2014: 551). According to Garnett (1996: 25), the (previously mentioned) strengthening of social relations in the

neighbourhood is important as it can "stimulate more involvement in local issues and lead to effective action to defend and improve community amenities". SMAPU likewise highlighted the potential role UA can have to encourage more direct and daily interaction between people and their public spaces. Yet, although Vila Pinho and Jardim Produtivo are situated on public land and seen as green refuges, the gardens are not designed to be public areas open to non-customers. Dubbeling et al (2015a) suggest that the gardens' openness and integration with the communities could be strengthened by including aspects for relaxation or recreation. However in the case of Vila Pinho and Jardim Produtivo there is no more space available, and there could be safety risks involved since crime is already an issue in these areas (although one could also argue that more activity may potentially increase safety, as the establishment of gardens in the first place has shown). It could however be an aspect to include in forthcoming UA projects. Whereas the CEVAEs are currently "far from reaching their potential" (UFMG2), their original vision in fact comes close to this idea of being community spaces connecting people and local entities.

Climate, biodiversity, knowledge, and waste management

While many functions directly affect the urban farmers, climate and biodiversity functions are less tangible and more relevant to the city scale than to individual farmers, and the interviews therefore did not account for these functions as explicitly. However, some reflections can be made based on the farm system descriptions and my observations during the field visits. Although the understanding of agroecology among practitioners and policy-makers in BH differs from the one proposed by most scholars (e.g. Wezel et al 2009; Francis et al 2003; Gliessman 2015), the gardens include some of the same aspects. For instance, the absence of chemicals is positive for both soil health and human health, and high native plant diversity is positive for biodiversity (Altieri & Nicholls 2005), cultural heritage (Lin et al 2015) and food and nutrition security (as the food intake becomes more varied). Lin et al (2015: 189) conclude that "varied vegetative structure, increased native plant diversity, and reduction of urban impervious surface are key features of UA systems that contribute significantly to urban biodiversity and provide important ecosystem services". Furthermore, high biodiversity is instrumentally important to the generation of other environmental functions, because "ecosystem services are often a function of biodiversity levels" (Lin et al 2015: 195).

Crop diversity and agroecological management of crops, along with saving seeds from plants that are native to the area, are also beneficial for educational purposes, as it gives farmers the possibility to teach people about the character and usage of many different plants and about the benefits of agroecological production. Having been brought up in the countryside, the majority of farmers had extensive previous knowledge of farming when they joined the gardens; however this will not be the case for the next generation that is born in the city. Some of the farmers therefore feel a particular interest and sense of responsibility to transfer important knowledge,

especially to young people. While the farmers claim young people have little interest in food production, the presence of the gardens and the farmers' knowledge and willingness to teach might in the long run have positive effects and increase peoples' awareness of food. Many scholars emphasise this type of knowledge dissemination as a key tool to preserve traditional natural and cultural knowledge that might otherwise disappear (e.g. Garnett 1996; Lovell 2010).

Vila Pinho and Jardim Produtivo employ several waste management methods even though they are not referred to as such. Waste reduction is mainly an effect of the on-farm sales, thus direct link between producers and consumers, which reduces the need for packaging, storing, and transporting (FAO/WB 2008). This also contributes to less fuel use, as does the fact that the farmers use only manual labour (no machinery besides irrigation). The reuse of resources is seen both in innovations and garden decorations. In terms of recycling, leaves and other organic material is recycled for compost. There is also a larger recycling loop where the gardens receive manure from farms in the area. Although the loop ends at the garden, it is a good way to make use of resources that are present in the vicinity. McClintock (2010) states that urban gardens have potential to not only be sustainable as a farming system, but also positively affect waste management and sustainability of the city as a whole. SMASAN explains that sustainability is a transversal approach that is integrated into all aspects of the gardens. While the above-mentioned functions do indeed extend beyond the garden limits, the gardens do not seem to be actively advocated as a tool for climate change mitigation purposes at city scale. Dubbeling et al (2015) suggest that a clearer focus on activities addressing urban sustainability is needed to strengthen these functions, as opposed to a more passive approach where these functions emerge as unexpected externalities.

An integrated approach to UA

A shortcoming within the UA work on federal level is according to Santandreu and Lovo (2007) the weak collaboration between different initiatives and sectors and the lack of a clear institutional framework. Likewise, in BH there are many initiatives by different municipal government bodies (as well as private actors, NGOs, and civil society) but there is no platform for these to integrate. Moreover, different areas are sometimes seen as unconnected or even conflicting. This was reflected in the fact that the mayor vetoed parts of the UA policy on the grounds of infringements on urban and environmental policies. Halloran and Magid (2013) and de Zeeuw et al (2009) mean that these situations, where one policy supports and another counters UA activities, are indeed not uncommon. Several departments/institutions in this thesis see especially social and environmental objectives as opposing, and mean that there is not much collaboration across sectors, which is contrary to one interviewee's statement that "UA *is* environment". There are cases where social and urban policies have "married", as one interviewee expresses it, including the Vila Viva and Parque do Onça projects, however these are individual projects and not part of a coherent UA

approach. The CEVAEs are another example of intersectoriality as it combines socio-economic concerns of the population with urban and environmental concerns of the city, however these aspects are rather dormant at the moment. On political level, the multi-stakeholder forum that was established at the end of the CFF project was an attempt to create a platform for UA, but the forum is now inactive. It is also unclear what effects the UA policy has had – nobody in my study referred to it. According to Borges (2013), the comprehensiveness of BH's UA initiatives had started to diminish already in 2012, which she believes had to do with the finalising of CFF and FStT. When non-state local and international actors handed over the responsibility of continued action to the public authorities, momentum was lost, not necessarily due to a lack of engagement from the directly involved departments, but rather because of political priorities in general (Borges 2013). Also the farmers in my study describe the years following the projects as less dynamic. However, the UA work cannot depend on external involvement if it is to function. Several municipal authorities highlighted the lack of human and financial resources as the main obstacle to the advancement of UA, which also Souza and Vasconcelos' (2014) found to be the case. One interviewee in my study meant that a key measure should be to include UA in the budget allocation of various departments. Since resources are determined by political priorities, I argue that it is then necessary to show the importance of UA to various elements of the city, which this thesis is aiming to do. Other interviewees also suggested that not only the public authorities, but also civil society, needs to be more engaged when it comes to advancing the UA agenda. Borges (2013) writes that farmers themselves are not yet organised or strong enough to drive the UA agenda, but some interviewees in my study claim that for instance COMUSAN could have been a more ardent UA advocate.

Both international scholars such as Dubbeling (2011) and national actors such as CONSEA (see ENAU 2015) underline the importance of a political and institutional framework that integrates different areas, in order to optimise the potential of UA. Dubbeling (2011: 123) writes that support to UA should "be made a component of more comprehensive strategies to build sustainable and resilient cities that are socially inclusive, food secure, productive and environmentally healthy". In another publication, she furthermore states that "the synergies between multifunctional properties of food production and other sectoral policies should be simultaneously taken into account" so that they become "more than just a collection of individual projects" (Dubbeling et al 2015a: 1). Also Mougeot (2006) claims that the outcomes of UA activities are more substantial if approached in a more integrated manner. Most departments/institutions agree that any collaboration must be institutionalised in order to avoid a system of services and favours. As Coutinho (2010) suggests, UA can in fact be a tool to connect different policy areas and generate more dialogue in general. For the practical implementation of an integrated approach, Dubbeling (2011) and de Zeeuw et al (2009) suggest selecting a department in charge of coordinating UA activities (which could be either a particular UA department or another relevant department), and forming an intersectoral committee and a multi-stakeholder platform

for the integration work. BH already has a responsible department, and if the inactive multi-stakeholder forum (created during CFF) can be brought back to life, it could mean a new momentum for UA. Interviewees in my study meant that intersectoriality is difficult in practice, because everyone is concerned with accomplishing their own tasks and has no time to engage with the questions of other departments/institutions. It is therefore fundamental that the department in charge of coordination is one that can see UA holistically, and that the integration is created in such as way that all parties feel that they gain from it.

Recognising the farmers' contributions

If UA can in various ways benefit cities and the population, as the empirical and theoretical material of this thesis suggest, should then urban farmers be remunerated? Some farmers in my study for instance called for recognition for the important service they are providing by maintaining a green open space and protect it from construction, for the benefit of the people in the neighbourhood and ultimately the city. Coutinho and Costa (2011: 94) write that "when urban agriculture figure as an activity for beautification, leisure, and environmental improvement of the cities, the fact that it is fruit of manual labour and requires work hours, is not recognised. It seems to be implicit that urban agriculture is a job that does not have a remunerable value, despite its tangible and localised production". How could better recognition and remuneration work in practice? One way of remunerating the farmers for the benefits that they provide to the area and city could be to institutionalise the support mechanisms, for instance by formalising the free access to land, water, electricity, and technical support. Fleury and Ba (2005: 5) furthermore propose that "maintenance of the space's properties through farming activities […] justifies public interventions, like direct financial compensations". By realising the potential of UA to benefit various policy areas and working more actively towards higher multifunctionality at the urban gardens, urban farmers can also be recognised as contributors to the city, not only beneficiaries. To suggest that farmers could become partners in urban sustainable development also implies questioning the hierarchal structure in Brazil that sees civil society as beneficiary and state as provider. Changing deeply rooted cultural structures of society is hard, yet only then can real empowerment occur.

6.2 Implications, recommendations, and research suggestions

With this thesis, I have aimed to make contributions that can be useful both in the real setting of the studied case and theoretically to a broader setting.

First and foremost, I have wanted to bring a different perspective to the UA setting in BH by putting the views of key UA stakeholders in a framework of multifunctionality. The empirical study has shown what motivates urban farmers and how UA affects them personally. It has also increased the understanding of the interrelations between the garden composition and the functions that are generated. Furthermore, the findings have uncovered the potential of UA to be a tool that can contribute to many components of sustainable urban development, beyond being a strategy to improve the food and nutrition security of the population (although this should remain an important aim). If UA is implemented in a more multifaceted, integrated way, it could bring urban farmers forward as not only beneficiaries, but also contributors. Moreover, if UA can benefit the work of more departments, it can be politically legitimised to increase its (human and financial) resources, which is key since a lack of resources is one of the main obstacles to advancement of the UA agenda (Souza & Vasconcelos 2014: 27). To further justify the functions presented in this thesis, I suggest that future research attempts to measure the actual impact of the functions wherever it is possible, for instance by recording plant, insect, and vertebrae diversity, which in turn can indicate the presence of other functions such as cooling effects and air quality (Lin et al 2015). To further investigate the social effects of the gardens, it would be fruitful to interview customers, as well as non-customers in the vicinity, to learn more about their reasons to buy or not buy vegetables at the urban gardens, and how they see the gardens' contributions to the community. I also think it is important to study eventual trade-offs between different functions and how these can be diminished. A third relevant topic would be to study the possibility of green payments in an urban setting, as a way to recognise the farmers' contributions.

Both my findings and previous studies (e.g. Borges 2013) have found that the UA agenda in BH has gained momentum mainly when international projects have been implemented, but that the impetus has not been sustained once the international actors have left. It would therefore be relevant to study what factors are in play when it comes to sustaining such a process, and how project design can be further improved.

While this thesis is based on a case study and empirical results cannot be generalised, I believe that any city could benefit from viewing UA in a multifunctionality framework, to evaluate possibilities and potentials in each specific setting. I also think that urban farmers are often not adequately recognised for the contributions they make to the urban setting, and that by gaining recognition (and maybe even remuneration), more people might be encouraged to becoming urban farmers, which in turn benefits the cities. There is still a lack of young people in farming, at least in the parts of the world where farming has not yet become 'hip', and engaging young people is crucial if we are to feed the world sustainably in the future.

6.3 Reflections on research process and methodology

Flexibility and reflection have indeed been the key words of my research process. While I had a pre-set, detailed plan for the fieldwork, I wanted to be open to what was important in the specific case, at that specific moment. My choice of research questions and theoretical framework are therefore founded on an ambition to present something that can be beneficial in reality to forward the UA agenda in BH, and show a way through which more departments and policy areas can benefit from it.

In any research setting it is key to be flexible and well prepared. Plans will change, things will not go as planned. I made sure to always prepare questions in time – a meeting may happen sooner than expected, or not at all, but showing up without knowing what to ask about would be both disrespectful and to waste a maybe unique meeting. I also made it a point to say yes to everything (visits, meetings, interviews), even when it had no apparent connection to my specific topic. This approach helped me to get a holistic understanding of the situation and context, opened doors and created new opportunities. Moreover, I got useful information for my analysis from sometimes unexpected sources. It did nonetheless create a tougher writing process due to the large amount of data (Bryman 2012: 565). It has been challenging to gain breadth and depth, and to build a holistic, systemic research as recommended within agroecology, while limiting the time and scope to fit a master's thesis. However, my data richness was important in order to gain broader and deeper knowledge of the case and to enable reflexivity.

Overall, I believe my choice of research strategy, design and methods were the most appropriate to answer my research questions. My methods were fine-tuned during the fieldwork as new information and opportunities appeared. Initially, I had planned to do a workshop together with all the farmers to map the flows of their farming systems. However, it became clear during the initial visits to the gardens that a group approach would be both unrealistic and irrelevant for several reasons: The gardens were not managed collectively as I had thought, but divided into individual plots; the gardeners were rarely at the garden at the same time; and language was more challenging than I had expected. All of these aspects called for an approach with individual interviews that better respected the farmers' time, gave me room to ask for clarifications during the interviews, and were more relevant in terms of content. My revised method was to do two interviews with each urban farmer. This was however also modified, because I felt after the first round of interviews that I had reached theoretical saturation (Bryman 2012: 421). It was also unrealistic time wise, since I got the opportunity to do more interviews with municipal authorities than I had expected. Therefore, the eventual two-step approach became 1) interviews with urban farmers at two urban community gardens and 2) interviews at four municipal departments and one municipal institution.

In terms of sampling, even the seemingly most natural selection comes with certain biases. Vila Pinho and Jardim Produtivo were selected on the basis of being the only functioning urban gardens that fulfilled my criteria. I realised after interviews with a

UFMG researcher and with the urban farmers themselves that these gardens are quite overrepresented when it comes to receiving visits and researchers. This needs to be acknowledged, in order not to disseminate these gardens as representative of the broader UA setting, but as unique cases (Bryman 2012: 70). I wish there had been time to visit more gardens, for instance gardens run by civil society, as well as interviewing the Department of Environment, but that remains for future studies.

An unforeseen challenge was voice recording. I had followed the advice in the literature (e.g. Bernard 2006) and done some pre-testing of the recorder, but using it during my interviews was different. To create a relaxed and comfortable atmosphere, I let the interviewees choose the venue, and it so happened that most of my interviews with the urban farmers were conducted walking around in their plots. While this approach was good for the atmosphere and relevant to the topic, it proved to be a challenge during the transcriptions, as radio, dog bark, and not least wind lowered the quality of the recordings. I also learnt to *always* bring the recorder, even when no interview was planned. Taking notes during an hour-long spontaneous but fruitful conversation, in a language that one is not totally comfortable with, is indeed an interesting experience…

7. Conclusions

The overarching research question posed in this thesis was: *How are urban farmers' perceptions of the benefits of urban community gardens represented in the political framing of urban agriculture in Belo Horizonte, and how can these perceptions highlight potential to advance the urban agriculture agenda?* By analysing this question within a framework of agroecology, systems thinking, and multifunctionality, this thesis has aimed to bring a fresh perspective to the UA setting in Belo Horizonte, and highlight how the agenda can progress.

The UA programme of BH is located at SMASAN and UA is thus politically framed as a food and nutrition security strategy. The findings in this thesis suggest that while food and nutrition security is an important motivation for participating in urban gardens, other functions such as improved health and social interactions are almost equally important drivers. The urban farmers also gave accounts of how the gardens benefit social, economic, and ecological aspects of both the community and the city. Some examples are access to affordable vegetables grown without agrochemicals, improved neighbourhood safety, and preservation of green areas. My study showed that the setup and management of the gardens were interrelated with the perceived multifunctionality. For instance, the agroecological features such as the non-use of agrochemicals and high crop diversity are positive both in terms of environment and alimentation. Moreover, the collective yet individual management of the gardens seems vital to maintaining good relations among farmers. Likewise, the element of surplus sales is key both to the farmers' income generation and to the establishment of ties with the surrounding community. These accounts point to the importance of putting things into context and thinking holistically, as stressed by agroecology and systems thinking (see e.g. Checkland 2000; Ison 2008).

Many of the UA functions that the farmers' perceive can be found in ideas and initiatives at various municipal government bodies. However, even though all of the municipal authorities in this study claim that UA elements are included in their work, their initiatives are not related to the official UA strategy at SMASAN, nor developed in an integrated, coherent manner. There have been attempts to better integrate UA initiatives in the city, particularly through the multi-stakeholder forum that was established at the end of the CFF project. However, the forum is no longer active and the momentum has once again waned. Intersectoral collaboration is particularly weak between municipal government bodies from different fields, and some even view social and environmental objectives as contrary, although many also believe that more integration is necessary.

The food and nutrition security strategy that BH initiated in the 1990s was truly pioneering at the time, and has improved the situation for many inhabitants. While the framing of UA as a tool to improve the food and nutrition security of the population is still relevant, local conditions as well as the international UA debate have evolved during the past 20 years. The findings of this thesis suggest that it could be conducive to expand the UA framing to include aspects beyond food and nutrition security, and

that viewing UA through a multifunctionality framework can highlight how UA can benefit various policy areas. I am not suggesting that UA is a panacea that will solve all socio-economic or urban-environmental problems of the city, but that it can be beneficial to explore the question "what can UA do for my city?" and not only "what can my city do for it?" (Mougeot 2006: 62). Recognising the benefits that UA can provide to a wider range of policy areas can legitimise a broader resource provision for UA, which is key to the expansion of UA since a lack of resources, grounded in political priorities, is one of the major obstacles. Moreover, by realising the potential of UA and working more actively to enhance its multiple functions, farmers can go beyond being beneficiaries to becoming recognised as contributors to the city. Finally, I suggest that the concept of multifunctionality can be a constructive tool to explore the possibilities of UA in cities throughout the world.

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Unpublished sources – interviews

Urban gardens

(Names have been altered to ensure farmers' anonymity)

21/11 2015, personal communication, Vila Pinho: Silvio, Márcia, Renato, Eliane, Sandra, Isabel

24/11 2015, personal communication, Jardim Produtivo: Ana Maria, Raimundo, Gabriela, Emerson, Luis, Gilberto

28/11 2015, personal communication, Vila Pinho: Cristina, Edna, Guilherme, João, Fátima

Municipal authorities

SMASAN1	personal communication, 2015-12-17
SMASAN2	personal communication, 2015-11-10 and 2015-12-17
SMASAN3	personal communication, 2015-11-10
SMASAN4	personal communication, 2015-12-03
SMASAN5	personal communication, 2015-11-10
SMASAN6	personal communication, 2015-11-26 and 2015-12-10
SMASAN7	personal communication, 2015-11-12
SMASAN8	personal communication, 2015-11-12
SMASAN9	personal communication, 2015-11-17
SdG	personal communication, 2015-12-11
SMPS1	personal communication, 2015-12-15
SMPS2	personal communication, 2015-12-15
SMAPU1	personal communication, 2015-12-15
SMAPU2	personal communication, 2015-12-15
FPM1	personal communication, 2015-12-18
FPM2	personal communication, 2015-12-18

Researchers at UFMG

UFMG1	personal communication, 2015-11-09, 2015-11-13, 2015-11-17, 2015-11-26, 2015-11-30, 2015-12-09, and 2015-12-16
UFMG2	personal communication, 2015-11-18

Appendix 1: Interview guide urban gardens

(Translated from Portuguese to English for purposes of reader comprehension)

Background

Gender

Age

Profession (current/previous)

Are you from rural or urban area? (City, town, village, countryside)

Labour and motivations

When did you start growing here?

Did you have any previous farming experience?

Why do you want to be part of this garden?

Is it a personal or family plot? How many people are working on your plot? How do you divide the responsibilities?

How much, on an estimate, do you work at the garden every week? (Days/hours)

Are you part of a grower's association? How does it work? What is its purpose?

Crops & resources

Which crops do you grow? Why did you decide on these crops?

How are they grown? Combinations of crops, seasonality.

Do you save, receive, or buy the seeds? From where/whom?

How do you manage the soil?

Which inputs do you use for the plants? Manure, irrigation, other? Where do they come from? Who pays for them?

Do you have any pest problems? How do you manage them?

What tools do you use? Are they shared within the garden or individual? Do you buy the tools, or have you received them? From where/whom?

Do you receive any financial resources?

Consumption, sales, and donations

How much of the products do you estimate that you consume vs. donate vs. sell?

Who consumes? (Individual/family)

To whom do you donate? Why?

Where/to whom do you sell? How do the sales work?

Relations with the community and other actors

Could you describe what this area was like before the garden was created?

How do you believe the garden affects the neighbourhood?

How does the relation to the municipality work? (SMASAN/Barreiro sub-district)

Could you please describe connections that you as an urban gardener have (had) with other actors? (E.g. other urban farmers, researchers etc…)

Challenges and the future

What are the main challenges? (Personal/plot/garden)

Do you have any plans for the future? (Personal/plot/garden)

Appendix 2: Interview guides municipal authorities

(Translated from Portuguese to English for purposes of reader comprehension)

Interview guide: SMASAN (SMASAN1 and the second interview with SMASAN2)

- Could you describe the UA projects for the coming year (2016)?
- Inquiries about recognition of land rights and urban farming as a profession.
- What do you see as the (previous/current/future) main challenges (in practice/policy) for the advancement of UA here in BH?
- What do you see as the potential benefits of UA in addition to farmers' food and nutrition security? (Farmers/community/city)
- How do you view the potential of UA in relation to areas beyond food and nutrition security e.g. social/urban/environmental policy?
- Do you in any way collaborate with other departments on UA / in general?
- What are your thoughts on how the UA work of different departments' could be integrated? Who should lead such collaboration? (Relate to the attempt to institutionalise intersectoral collaboration on UA during CFF – the multi-stakeholder forum)

Interview guide: FPM

- Could you describe the work of the institution?
- Could you describe your responsibilities at the institution?
- Could you describe the current situation/ your current work with the CEVAEs? (How they operate in relation to the original vision.)
- What do you see as the potential benefits of UA in addition to farmers' food and nutrition security? (Farmers/community/city)
- How do you view the potential of UA in relation to environmental policy?
- How do you view the possibilities of having UA in BH's parks?
- Do you in any way collaborate with other departments on UA / in general?
- What are your thoughts on how the UA work of different departments' could be integrated? Who should lead such collaboration? (Relate to the attempt to institutionalise intersectoral collaboration on UA during CFF – the multi-stakeholder forum)

Interview guide: the Municipal Government Department

- Could you describe the work of the department?
- Could you describe your responsibilities at the department? What is the main objective of your work as Drug Policy Assessor?
- How did the idea come about to use UA as a tool in treatment of substance abuse? How was the idea received? How many people are currently trying out this approach? Effects/results so far?
- What do you see as the potential benefits of UA in addition to farmers' food and nutrition security? (Farmers/community/city)
- How do you view the potential of UA in relation to social policy?
- Do you in any way collaborate with other departments on UA / in general?
- What are your thoughts on how the UA work of different departments' could be integrated? Who should lead such collaboration? (Relate to the attempt to institutionalise intersectoral collaboration on UA during CFF – the multi-stakeholder forum)

Interview guide: SMPS and SMAPU

- Could you describe the work of the department?
- Could you describe your responsibilities at the department?
- Does your department have any work related to UA? If yes, could you describe that work? If no, do you think it would be relevant?
- What do you see as the potential benefits of UA in addition to farmers' food and nutrition security? (Farmers/community/city)
- How do you view the potential of UA in relation to *social (SMPS)/ urban (SMAPU)* policy?
- Do you in any way collaborate with other departments on UA / in general?
- What are your thoughts on how the UA work of different departments' could be integrated? Who should lead such collaboration? (Relate to the attempt to institutionalise intersectoral collaboration on UA during CFF – the multi-stakeholder forum)

Other interviews with municipal authorities have been in the form of informal conversations and therefore do not have any interview guides.

Appendix 3: The six branches of SMASAN's food system

1) Promotion of Urban Agriculture
    a. Urban school gardens for learning and community agriculture for home consumption and commercialisation of surplus.
    b. Planting in alternative spaces (e.g. in PET-bottles).
    c. Public procurement from family farms through PAA (federal funds).
2) Supply and Market Regulation
    a. "ABasterCer" programme, with grocery stores offering at least 20 fruits or vegetables to a fixed low price set by PBH (currently 0,99 BRL/kg ≈ 2 SEK).
    b. "Straight form the Field" programme with fairs where family farmers sell directly to consumers in the city.
    c. Fairs where organic farmers sell directly to consumers in the city.
    d. "Free fairs" and "model fairs" with sales of food, flowers, etc. in the city.
3) Subsidised Sale of Foods
    a. Five "popular restaurants" where three healthy meals per day are offered to a low price (free of charge for homeless people) to promote the access to food.
4) Food and Nutrition Assistance
    a. School meals through PNAE (federal funds), composed by PBH nutritionists.
    b. Food delivery to seniors' homes, shelters, and homeless people.
    c. Food Bank aimed at reducing food waste by collecting surplus food from supermarkets, donating what can be used to registered civil society organisations, and sending the rest to be composted and used in the parks.
5) Mobilisation and Education for Food Consumption
    a. Reference Centres (CRESAN) with courses and workshops for children and staff in schools or other public institutions, and training for food handlers.
6) Generation of employment and income
    a. Professional qualification in the food area (bakery, cooking) to improve people's opportunities and inclusion in the workforce.

Appendix 4: Plant species at Vila Pinho and Jardim Produtivo

The following plants can be found at Vila Pinho and Jardim Produtivo, as well as different varieties of these plants. The list is based on interview material and most likely not complete.

Absinthe wormwood, acerola, arnica, arrowleaf elephant ear, arugula, aster, avocado, banana, basil, beet, beggarticks, bell pepper, boldo, busy Lizzie, carambola, carrot, cassava, chayote, cherry tomato, chicory, chilli pepper, cilantro, citronella, corn, crown of thorns, dandelion, eucalyptus, fennel, French marigold, ginger, grapes, green amaranth, honeyweed, Job's tears, kale, leek, lemandarin, lemon, lemon balm, lettuce, lime, macela, mandarin, mango, mint, modiola, monks cress, mulberry, mustard greens, okra, onion , ora-pro-nobis/ leaf cactus, orange (laranja-da-baía, campista, serra d'agua, ponkan, carioca, laranja-da-terra), oregano, papaya, parsley, passion fruit, peach, peanut, pennyroyal, pitanga, pokeweed, prickly pear, pumpkin, purslane, radish, rosemary, rue, saffron, scarlet eggplant, sorrel, sow thistle, spearmint, spinach, spring onion/ scallion, strawberry, sugarcane , sweet potato, tangerine, tobacco, tomato, tropical burnweed, watercress, wild chicory, wormseed, zucchini.