Considering sustainable urban agriculture as spatial planning instrument: a South African framework

K Stander

orcid.org 0000-0003-4951-913X

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Supervisor: Prof EJ Cilliers

Co-supervisor: Prof SS Cilliers

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PREFACE

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"*Why try to explain miracle to your kids when you can just have them plant a garden".*

- Robert Brault -

ABSTRACT

The steady growth of the global urban population exerts pressure on food systems within the urban environments of developed and developing countries alike. Globally, cities experience food shortages, price hikes and unsustainable practices, suggesting a gap within urban food systems for more diversified methods of producing and obtaining food. Urban Agriculture (UA) is presented as a viable means towards more sustainable and resilient urban environments, with the aim of addressing the aforementioned shortfall through policy expansion.

A comprehensive literature study introduces, reviews and presents the correlation between UA and broader sustainability objectives. Through employing theory-based sampling as part of a qualitative enquiry into sustainable UA practices, a list of criteria was developed to guide the planning of UA in urban environments. These criteria were further used for the qualitative analysis of two international case studies, namely Brooklyn Grange Urban Farm (New York) and Homeless Garden Project (Santa Cruz); and two national case studies, namely the Fish Farm (Cape Town) and Harvest of Hope (Cape Town). The case study analysis allowed the compilation of a list of common, underlying qualities of successful UA practices. That will be applied in an attempt to refine the suggested UA criteria and develop a framework to include UA as part of spatial planning approaches. Given the results of both the literature study and empirical investigation, recommendations were made for the planning and implementation of the UA within South African urban spaces, supported by adequate spatial planning policies and programmes concerned with sustainable urban development. Ultimately this research proposed a framework for the South African situation to enhance sustainable urban agriculture as spatial planning instrument.

Keywords:
Urban agriculture,
Sustainable urban development,
Policy implication

OPSOMMING

Die bestendige groei van die globale stedelike bevolking plaas voedselsisteme in stedelike omgewings (beide die van ontwikkelde en ontwikkelende lande), onder enorme druk. Wêreldwyd ervaar stedelike areas voedseltekorte, prysstygings en onvolhoubare praktyke, wat op ’n gaping in die stedelike voedselsisteme dui, dus word ’n behoefte aan meer gediversifiseerde metodes van vervaardiging en verkryging van voedsel erken. Binne hierdie konteks, word stedelike landbou as 'n lewensvatbare praktyk tot meer volhoubare en selfonderhoudend stedelike omgewings aanbeveel, om so moontlik die voorafgenoemde tekorte aan te spreek deur die uitbreiding van relevante beleide.

’n Omvattende literatuurstudie stel, oorweeg en bied die korrelasie tussen stedelike landbou en breër volhoubaarheids doelwitte. Deur teorie-gebaseerde seleksie toe te pas binne ‘n kwalitatiewe benadering to volhoubare stedelike landbou praktyke, kon ‘n lys van kriteria ontwikkel word wat die beplanning binne stedelike omgewings kan lei. Hierdie kriteria was verder toegepas vir die kwalitatiewe ontleding van twee internasionale gevallestudies, naamlik Brooklyn Grange Stedelike plaas (New York) en Homeless Garden Project (Santa Cruz); en twee nasionale gevallestudies, naamlik The Fish Farm (Kaapstad) en Harvest of Hope (Kaapstad). Die gevallestudie-analise het toegelaat dat 'n lys van algemene, onderliggende kwaliteite van suksesvolle stedelike landbou praktyke opgestel kon word. Dit word gedoen in ‘n poging om ‘n verfynde lys kriteria saam te snoer wat sal help in die ontwikkeling van ‘n raamwerk om stedelike landbou binne ruimtelike beplanning te integreer. Gegewe die resultate van beide die literatuurstudie en empiriese ondersoek, is aanbevelings gemaak vir die beplanning en implementering van stedelike landbou in Suid-Afrikaanse stedelike ruimtes, ondersteun deur voldoende ruimtelike beplanning beleide en volhoubare stedelike ontwikkeling programme. Uiteindelik stel hierdie navorsing ‘n raamwerk voor binne ‘n Suid- Afrikaanse omgewing om stedelike landbou as ruimtelike beplannings instrument te versterk.

Sleutelterme:
Stedelike landbou
Volhoubare stedelike ontwikkeling
Beleid implikasies

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CHAPTER 1: INTRODUCTION

1.1 Points of departure

The contribution of Urban Agriculture (UA) to urban food and nutrition security and the possible alleviation of poverty, along with the eligibility of this general belief, has recently become a subject of attention for policy makers and researchers alike. The persistent malnutrition and hunger in a rapidly urbanising world, especially the global south could present UA as an opportune strategy (Thornton, 2012:204), although the implementation of UA within formal programmes, policy and strategies is hampered by formal constraints and institutional inefficiency (Orsini, 2013:696).

In 2010, Buchanan *et al.* (2010:12), described an economic situation referred to as "the perfect storm" of global and food agriculture. This is the description of a hypothetical economic situation which would be the result of a convergence of factors such as economic vulnerability, growing population coupled with the inability of governance to manage the growing demand for food that would provide the perfect conditions for an economic crisis. On this, Hertel (2010) proposes that the occurrence of such a global incident is not a likely phenomenon but concluding that the possibility of smaller, “localized storms" is not to be eliminated. This is a statement which stands to serve as a warning to stakeholders in vulnerable, developing countries and regions. In this sense, the importance of UA as spatial planning instrument is considered which could possibly enhance broader sustainability objectives and contribute towards an increased fulfilment of local food demands.

From this objective arises the need to not only understand the relevance of UA in relation to other food environment related issues, but also to establish UA as an integral part of the national urban system and broader spatial planning approaches.

This research aims to (1) define UA as an integral part of a larger food environment as well as review the benefits associated with UA, so as to reveal the qualities which would present UA as an opportune policy instrument within sustainable development strategies, (2) present a literature study on the current state of agriculture, urban systems and relevant policy considerations, (3) review best practice regarding UA and the employment thereof globally, 4) review the opportunities for UA within South African cities, and 5) make recommendations on general and context specific strategies to incorporate UA in the South African spatial planning policy and legislative framework, as planning instrument to enhance sustainable urban development.

This research started in 2016 as part of research conducted for the partial completion of the degree B.Art et Scien in Urban and Regional planning. The research was further developed in terms of depth and width and is presented accordingly. Most significant alterations include the introduction of new literature to further develop the theory; improvement on language to conform to academic discourse; expansion of empirical investigations and the refinement and accompanying re-evaluation of the criteria to present more significant policy considerations and recommendations. The qualitative 3-level ranking hierarchy applied to the criteria of the case study analysis in 2016 was refined to significantly distinguish recommendations for policy considerations and to create a framework to guide the planning of UA in the South African context.

1.2 Problem statement

While there is a growing awareness of urban farming and agricultural initiatives globally, food security and production within cities of developing countries experiencing rapid urbanisation rates, will become stressed (Haysom, 2009). This is also true in South Africa, where the need for sustainable planning methods are emphasised, due to an urban population that makes up more than two thirds of the total population and is estimated to surpass the three-quarters mark by 2050 (UN-DESA, 2015:22). The benefits of UA are numerous (FAO & WB, 2008:11-17), but the inclusion of this instrument within urban planning policies is neglected, leaving a gap in the process of working towards more sustainable development approaches, especially in terms of poverty alleviation and food security (Faling, 2012:171; RUAF, 2009). While several optimists suggest that these initiatives can be of commercial value to a city or company, there is a controversy whether these urban farming initiatives would contribute to the overall poverty upliftment and sustainability goals in cities as opposed to just benefiting a single social group, encouraging urban exclusivity (Maughan, 2015). Considering the above, the question remains if urban farming could be incorporated into spatial planning practices and policies as an instrument to enhance sustainable urban development for everyone?

1.3 Primary research questions

The primary research questions of this research include the following:

- What are the advances in local and global UA theory and what is the relevance thereof in terms of mainstream spatial planning?
- What are the general objectives of sustainable development in terms of urban development, food consumption and production, and UA?

- Do international and local policy and legislation recognise UA as an instrument of sustainable urban development, and if so, to what extent?
- How can best practices relating to UA be translated to the local context to guide spatial planning approaches to further enhance UA as spatial planning tool?
- How can UA be integrated into spatial planning practices and policies to create more sustainable urban areas and address complex urban problems?

1.4 Aims and objectives of this research

The primary research aim is:

- To consider sustainable UA as a spatial planning instrument in order to create a South African framework for the successful planning thereof.

As such, the research objectives include, to:

- Conduct research on advances in local and global UA theory, and the importance thereof as part of mainstream spatial planning;
- Investigate the general objectives of sustainable development linked to the three themes urban development, food consumption and production; and UA;
- Identify the policy and legislative frameworks that govern urban planning and food distribution globally, and in South Africa;
- Evaluate the current degree to which existing development and spatial planning policy and legislation (in particular those concerned with cities and food) acknowledges UA;
- Identify examples and best practises from international and local case studies to guide spatial planning in South Africa, with regards to UA; and finally, to
- Create a South African UA framework for the strategic and spatial planning of sustainable UA practices.

1.5 Method of investigation

This research comprised of three sections, including the theoretical investigation, the empirical investigation and the findings (conclusions and recommendations) section.

Section A: Theoretical investigation

- A comprehensive literature study was conducted on international and national UA theory and research to compile and prioritise criteria for best practices with regard to UA practices. Theory-based sampling was employed as part of a qualitative inquiry into UA related themes such *inter alia* urban farming and agriculture, sustainable and self-sustaining cities, green infrastructure planning, ecosystem services and sustainable development, to refine the criteria as checklist for the planning of UA.
- Both international and national policies and legislations which guide UA initiatives and the planning thereof, was included, and evaluated in the research, such as Agenda 21 (1992), The New Urban Agenda (2016) and Spatial Planning and Land Use Management Act: SPLUMA (2013). The policy and legislative analysis captured the status quo regarding UA, as well as the level of inclusion within the different policies and legislations considered.

Section B: Empirical investigation (refer to Chapter 5 for comprehensive overview of methodology)

- A case study analysis of purposefully selected international and national cases (good examples) of UA projects was conducted in terms of the theory-based sampling and UA criteria development in the theoretical investigation.
- A qualitative approach was followed to prioritise the aforementioned UA qualities according to their contribution towards the sustainability of these practices. The case study analysis contributed to the refinement of UA criteria in an attempt to create a framework for UA planning as spatial planning instrument.

Section C: Conclusions and recommendations

- Based on the theoretical and empirical investigations, conclusions were drawn with regard to the importance of UA as part of spatial planning practices and policies, along with specific consideration to be acknowledged when creating a framework to guide UA as part of South African planning approaches towards enhancing sustainable development practices.

1.6 Delineation of the Study Area

This research considered UA and the applicability thereof within spatial planning practices and policies by focusing on two international case studies, namely Brooklyn Grange Urban Farm (New York, United States of America), and Homeless Garden Project (Santa Cruz, United State of America) and two national case studies, namely The Fish Farm (Cape Town, South Africa) and Harvest of Hope (Cape Town, South Africa).

1.7 Limitations of the research

- The purpose of this research is to consider UA in spatial development practices and policies, as instrument to enhance sustainable development. This entail a multidisciplinary approach to cover an extensive research theme. A qualitative analogy of respectively the case studies and policies was included as point of departure, but to obtain a comprehensive understanding of the complexities of this research theme, more (similar) studies should be considered as part of future research endeavours.
- This research was conducted within the context of urban areas, and as such the findings can only be applied to development programmes, policies, legislation and strategies pertaining to (similar) urban areas.
- This research focused on the spatial and contextual relevance of UA and the underpinning concepts (such as sustainability theory) in sustainable urban development, acknowledging certain related aspects in the process (such as *inter alia* rural development, food deserts and community development), however these were not included in the scope of this research.
- This research focussed on the most fundamental theories of sustainability and sustainable development to formulate criteria for respectively the policy and case study analysis, and as such limited research on previous and current evaluations, typologies or reporting papers pertaining to, sustainability, sustainable development and urban systems were undertaken.
- There is a restriction on possible cases that could be included in the case study analysis (as further explained in section 3.4). In brief in can be explained as follows: To be eligible for inclusion in the case study analysis, all chosen case studies should exhibit characteristics of a condition which is at once viable, bearable and equitable (the conditions of sustainable development). This restriction is based on the premise that the internal sustainability of any project or programme presented as a contributor of sustainable (urban) development, would influence the sustainability of the urban system holistically (Warren Flint & Houser, 2001:12). Any other cases that exhibit the above characteristics of sustainable development could theoretically be used to perform the same analysis.
- A final limitation is imposed on any person who intends to replicate the case study analysis using the compiled criteria. Such an individual should equip him- or herself with intimate

knowledge of both UA in general and the economic, ecological and social characteristics of the location (as fully explained in section 5.4).

1.8 Structure of the research paper

The following is a summary of the structure and content of the remainder of the research paper:

Theoretical investigation

Chapter 2: Introducing UA within spatial planning

*Literature study***:** This section considers the advances in UA theory and is supplemented by reviewing the current reality of the global and local agricultural sectors, as well as the current reality of global and international urban systems to validate the notion that UA can be applied as an instrument of sustainable development. Further considerations of this chapter include the benefits of planning for UA and the link between UA and sustainable urban development.

Chapter 3: The link between sustainable development and UA

*Literature study***:** This section includes a review on the concept of sustainable development and the related spatial planning concepts. Furthermore, this section presents three spatial planning perspectives of UA and conclude with the importance and relevance of sustainability in spatial planning and how it links with UA. Based on the theoretical investigation, theory-based sampling is employed to determine a list of criteria for the planning of UA as a spatial planning instrument.

Chapter 4: Policies and legislation guiding UA

*Literature study and policy analysis***:** Research supported by a policy analysis, is conducted on international and national policies and legislation such as Agenda 21, the National Spatial Development Perspective (NSDP) and SPLUMA to determine the status quo and level of support for UA practices. A general review on the nature of UA within local policy and legislation is also conducted.

Empirical investigation

Chapter 5: Methodology and delineation

A description of the chosen methodologies: This chapter introduces the chosen methodologies, namely a qualitative approach to assemble the criteria from which the best case would be evaluated, as well as a quantitative approach which introduces the rationale behind categorisation of the criteria into different hierarchical levels.

Chapter 6: Evaluation of international and national case studies

Case study analysis: A case study analysis of international and national examples of cases where UA is presented. Chosen for its unique application of UA, each case is evaluated in terms of the criteria (theory-based sampling) compiled from the literature study against the backdrop of the three sustainability perspectives as presented by the RUAF (2009). This policy-guiding paper distinguishes UA into three main policy perspectives, namely a social, economic-and ecological perspective. It was first presented as a helpful means towards designing scenario-specific policies and used in this research in the formulation of the criteria for use in the evaluation of the selected UA case studies. This case study analysis could present common underpinning qualities of successful UA practices and additionally reveal the hierarchical structure of the compiled criteria in terms of the contribution each makes to the self-sustaining longevity of UA practices in general.

Conclusions

Chapter 7: Conclusions

This chapter address the respective research questions and research objectives by explaining the link between the theoretical and empirical investigation, identifying gaps and opportunities with regard to UA and spatial planning in local approaches by comparing international and local practices.

Recommendations

Chapter 8: Recommendations

Recommendations are given on the inclusion of UA in spatial planning approaches and through local policies and legislation. Specific UA qualities which could contribute to the successful implementation is identified. Ultimately this research recommends a framework for the strategic and spatial planning of sustainable UA practices in South Africa.

1.9 Definitions

The following are important definitions of applicable terminology that were used in this research.

Table 1.1: List of definitions

Community garden	A community garden is a single site, which may or may not be broken into individual plots, that is gardened by multiple people. Produce is consumed directly by the gardeners or shared or donated but is not typically used to generate income (Poulsen *et al.*, 2014).
Food desert	The term 'food desert' refers to a neighbourhood that lacks access to affordable fresh produce, usually due to the absence of nearby supermarkets. Though methods for defining whether a particular neighbourhood is a food desert vary, the characteristics to consider include distance to a supermarket, median household income, vehicle ownership rates, and a measure of the availability of healthy food at local businesses (Poulsen *et al.*, 2014).
Food security	The "physical, social and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO, 2002).
Urban farmer	Broadly refer to the individuals or groups who start and manage an urban farm. This may be an individual or group of farmers, a community-based organisation, or a for-profit company (Poulsen *et al.*, 2014) or a non-profit company.
Famers market	A publicly or privately-operated establishment where primarily agricultural products such as raw vegetables, fruits, syrups, herbs, flowers, plants, nuts or handcrafted items are sold (Goldstein, 2011:66).
Urban farm	Is a use in which plants are grown for sale of the plants or their products, and in which the plants or their products are sold at the lot where they are grown, off site, or both, and in which no other items are sold. Examples may include flower and vegetable raising, orchards and vineyards (Goldstein, 2011:66).
Household	A group of persons who live together and provide themselves jointly food and/or other essentials for living, or a single person who lives alone (Stats SA, 2017b:124).
Household head	A person recognised as such by the household, usually main decision-maker, or the person who owns or rents the dwelling, or the person who is the main breadwinner (Stats SA, 2017b:124).
Household income	All receipts by all members of a household, in cash and in kind, exchange for employment, or in return for capital investment, or receipts obtained from other sources such as social grants, pension, etc. (Stats SA, 2017b:124).
Poverty headcount	This is the share of the population whose income or consumption is below the poverty line; that is, the share of the population that cannot meet its basic needs (Stats SA, 2017b:125).

Ecosystem services	The direct and indirect contributions of ecosystems to human well-being. The concept 'ecosystem goods and services' is synonymous with ecosystem services (TEEB, 2010:197).
Externality	A consequence of an action that affects someone other than the agent undertaking that action and for which the agent is neither compensated nor penalized through the markets. Externalities can be positive or negative (TEEB, 2010:197).
Stakeholder	A person, group or organisation that has a stake in or is affected by the outcome of an activity (TEEB, 2010:198).

Source: adapted from FAO (2002), Goldstein (2011), Poulsen *et al.* (2014), Stats SA (2017b) and TEEB (2010).

1.10 Abbreviations

The following abbreviations were used in this research paper.

Table 1.2: Abbreviations

ALC	Provincial Agricultural Land Commision
BRICS	Brazil, Russia, India, China & South Africa
CABE	Commission for Architecture and the Built Environment
COGTA	Cooperative Governance Traditional Affairs
CSA	Community Supported Agriculture
DAFF	Department Agriculture, Fisheries and Forestry
DEP	Department of Environmental Protection
DFID	Department for International Development
EMF	Environmental Management Framework
EPA	Environmental Protection Agency
ETU	Education and Training Unit
FAO	Food and Agriculture Organisation of the United Nations
FLW	Food loss and waste
GCIS	Government Communication and Information System
GDP	Gross Domestic Product
GIS	Geographic Information System
GSDR	Global Sustainable Development Report
HGP	Homeless Garden Project
HLPE	High Level Panel of Experts
IADFP	Integrated Agriculture Development Finance Policy Framework
ICPH	Institute for Children, Poverty and Homelessness
IDP	Integrated Development Plan
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
IRDP	International Recovery Platform
IUDF	Integrated Urban Development Framework
LDC's	Least Developed Countries
MAFISA	Micro Agricultural Financial Institutions of South Africa
MDGs	Millennium Development Goals

NDP	National Development Plan
NEMA	National Environmental Management Act
NFCS	National Food Consumption Survey
NGO	Non-Government Organisation
NRF	National Research Foundation
NSDP	National Spatial Development Perspective
NUDF	National Urban Development Framework
PAN-RC	Physical Activity Network, Renfrew County
PHL	Post-Harvest Losses
RDF	Rural Development Framework
RDP	Reconstruction and Development Programme
RUAF	Research Foundation on Urban Agriculture and Food Security
SA	South Africa
SACN	South African Cities Network
SAIE	South African Institute for Entrepreneurship
SCP	Sustainable Cities Programme
SDFs	Spatial Development Frameworks
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SoCR	State of South African Cities Report
SPLUMA	Spatial Planning and Land Use Management Act
TEEB	The Economics of Ecosystems and Biodiversity
UA	Urban Agriculture
UAWG	Urban Agriculture Working Group
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
UN-HABITAT	United Nations Human Settlement Programme
UNCDP	United Nations Committee for Development Policy
UNDP	United Nations Development Programme
US	United States
WCED	World Commission on Environment and Development
WRI	World Resources Institute
WWF	World Wildlife Fund

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CHAPTER 2: INTRODUCING URBAN AGRICULTURE

This chapter aims to contextualise UA within the larger food environment it forms part of, with the intent of presenting UA as a means towards achieving sustainability goals, particularly in urban areas. This chapter furthermore aims to unfold the nexus between UA, urban areas, and agriculture in general – the latter being the primary source of food within the context of this research. Regarding the factors which shape the environment for UA, this chapter adds to a more comprehensive understanding of the term as well as its underlying typologies and potential benefits in relation to sustainability objectives. This chapter also present the current reality of urban areas both globally and locally, as well as that of the agricultural sector globally and locally. In conclusion UA is introduced as a prelude to the subsequent chapter (Chapter 3: Understanding UA within sustainable urban development), which will further make the case for UA as spatial planning instrument for sustainable development.

2.1 Defining UA

In an attempt to define UA, it is relevant to have a look at UA in general first. A simple question such as “What is urban agriculture?” would present an answer as follows (**Box 1**):

Box 1: What is urban agriculture?
Urban agriculture can be defined shortly as the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in -and interacting with- the urban ecosystem. Such linkages include the use of urban residents as labourers, use of typical urban resources (like organic waste as compost and urban wastewater for irrigation), direct links with urban consumers, direct impacts on urban ecology (positive and negative), being part of the urban food system, competing for land with other urban functions, being influenced by urban policies and plans, etc.

Source: RUAF (2009)

However, defining UA is a vastly more challenging task, mainly as a result of its multi-faceted nature and the interaction among links (**Box 1**). Possible explanations of this conundrum are that the conceptual essence of UA is rooted within several disciplinary fields (such as *inter alia* sustainability, agriculture and environment considerations) and that UA practices assume many different forms (Dimitri *et al.*, 2016:605). Furthermore, the applicability of rudimentary concepts such as “urban” is variable according to location or culture, and in effect this reduces the degree to which a standard definition is relevant to different situations (Malan, 2015:52).

As such, it is of relevance to this research to firstly address the ambiguity of the defining locality ("urban"). Within the local context of this research, the term "urban" and all its derivatives (such as *inter alia* urban areas, cities, etc.) would denote all urban (inner-core and outer-core) and peri-urban (semi-periphery, periphery and deep-periphery) terms (COGTA, 2016:16). Where international literature is used, the same delineation applies. Henceforth, UA is regarded as all food production systems (including all typologies as discussed in Section 2.2) within the aforementioned urban and peri-urban context. The broader term urban and peripheral-urban agriculture (UPA) is commonly used to describe food production systems of the built-up and peripheral urban areas (FAO & WB, 2008:11). This research paper would apply UA to include both the urban and peripheral areas, to make allowance for the unique spatial and dimensional (social, economic and ecological) qualities of both.

The following is one example of an attempt to define UA: "The production and processing of harvested goods, or in some instances livestock-products, raised within urban areas and locally distributed" (Hendrickson & Porth, 2012; Goldstein, 2011). Another would be: "A distinctly urban livelihood …that takes shape as a result of the environment in which it is found" (White & Hamm, 2014:4). Earlier definitions regarded UA as an economic activity tended towards describing the process of production, processing and distribution of food, non-food and livestock by-products along with urban-specific, agricultural practices. These included aquaculture and horticulture confined to urban spaces (Mougeot, 1996:139-142; Bailkey & Nasr, 1999:5).

The Food and Agriculture Organisation of the United Nations (2008:4) constructed a definition which integrates previous definitions to conclude that UA is "an industry located within cities (intra-urban) or on the fringe (peri-urban) of a town, city, or metropolis; which grows and raises, processes and distributes a diversity of agricultural products; using largely human, land and water resources, products and services found in or around that urban area'', whilst serving a variety of social, environmental, economic, nutritional, and recreational needs (UAWG:2013:3).

From this introductory section, several key concepts and considerations can be identified, including:

- UA forms part of a larger food environment, with defining concepts such as food systems and food security (Bailkey & Nasr, 1999:5; FAO & WB, 2008:4).
- UA has a diverse typology and functions on multiple levels (Hendrickson & Porth, 2012; Goldstein, 2011).

- UA is intrinsically linked to urban areas (as the primary locality) and agriculture (as the *modus operandi*), and as such this relationship warrants further discussion (as done in Section 2.5).
- UA provides several benefits to the physical (the environment and urban area) and socio-economic dimensions (the people and economic systems), as it addresses the social, economic and ecological objectives of the sustainable development process (UAWG, 2013:3).

2.2 Clarifying and classifying UA

UA is not a new phenomenon, nor is it a relic from the past that will fade away as the city expands and modernises (RUAF, 2009). Therefore, it is beneficial to not only review the historical impact of UA, but also to evaluate the potential of UA for future urban development. In order to do this, it is necessary to classify UA practices according to their corresponding attributes, but this is problematic. For example, Goldstein *et al.* (2014:27) found that clarifying UA types were difficult, as there is a preference to use socio-economic attributes (e.g. household income, gender of practitioner, etc.) and crude topological criteria (such as size and location) when composing and defining existing typologies. It is also significant to know that this study by Goldstein *et al.* was conducted to evaluate the environmental influence of different UA types. As such, Goldstein *et al* recognise the value of these UA traits in judging other aspects of sustainability but reject them when evaluating the environmental performance of UA (Goldstein *et al.*, 2014:27). This suggests that researchers, when composing and defining existing typologies, favour the UA traits that best suit their needs. Goldstein *et al.* identified five unique and dominant UA types that could be used to broadly categorize UA practices (Goldstein *et al.* (2014:27-29). These include:

i- Ground-based, non-conditioned (vacant lot farms, community gardens, etc.)
ii- Ground-based, conditioned (greenhouses, etc.)
iii- Building-integrated, non-conditioned (rooftop gardens, green walls, etc.)
iv- Building-integrated, conditioned (rooftop greenhouse, container farms, etc.)
v- Living machine (aquaculture, vertical farming)

Here 'conditioned' refers to a space with controlled settings (such as temperature, humidity, etc.); 'building-integrated' refers to UA practices that achieve a degree of industrial symbiosis with the buildings they are connected with; while 'living machine' types adhere to ecological principles (such as circular energy and material flow) and have very low external demands. This composition uses the location (ground-based, building-integrated) and the control over and interference with natural elements as the deciding factors.

In practice, the deciding factor for the classification is often based on the agricultural type (these include *inter alia* horticulture, home garden, rooftop, aquaculture) and or the scale (that include *inter alia* subsistence farming, household, capital-intensive) of the intended UA site. Whilst simultaneously recognising the intentions of the urban farm, be it a community centre or highly productive growing space (UAWG, 2013:16). The intended purpose of a farm would influence the scale and typology. For example, the intention behind a UA site could be purely recreational or even commercial. A recreational farm could possibly focus on social activities, for which a small community, non-profit garden could be best suited (typology and scale considerations). However, if the intent is to sell the produce or even add value to the produce, it might be found that apiculture would add tremendously to the profitability of the practice (diversity of typology considerations). A study conducted in Seoul, South Korea (Oh and Kim, 2017:131), identified a linkage between the size of the farm and the satisfaction levels of participants. Furthermore, it was found that the contributing factors of participants satisfaction levels differ according to the type of UA. Where UA was practiced as a hobby, harvest yields improved participants' satisfaction level. Whilst education and training improved satisfaction of all participants except the house-farmers Therefore, if community satisfaction where to be the motivator for implementation of a new site, larger farm size could be the deciding factor. Or where research is concerned, these linkages might influence participation feedback. The conditions governing a 'best practice UA site' are essentially its suitability to the context, whilst still being mindful of the intention behind the farm. **Table 2.1** presents different UA typologies as composed and defined by agricultural type, scale and intended purpose.

Table 2.1: UA typologies

<table>
<tr><th colspan="3">Urban Agriculture Typologies</th></tr>
<tr><th colspan="3">Peri-Urban Agriculture</th></tr>
<tr><td colspan="3">Peri-urban agriculture is a term used to refer to farming units or fields that are within short distances from towns or cities, functioning with a commercial purpose. This includes various forms of agricultural activities, such as breeding livestock, production of animal by products, such as egg and milk and the production of vegetables and other horticultures. For example, community gardens, greenhouses and tunnels (FAO, n.d.).</td></tr>
<tr><td>Fields for Agriculture</td><td> 
Source: FAO (2017)</td><td>An agricultural field is an area that is regarded as a resource upon which other resources may be grown through agriculture. These fields typically contain crops planted for human and animal consumption but can be used to grow plants for fibre and fuels (ALC, 2014).</td></tr>
</table>

Enclosed Agricultural spaces	 **Source**: Going to Seed (2015)	**Greenhouses and Tunnels** Greenhouses are translucent structures used to produce horticultures during the entire year, through temperature regulation (Gorjian *et al.*, 2011). Tunnels are temporary structures erected in fields and protect crops from nature's elements and pests (Pool & Stone, 2014).
Urban Agriculture within Urban borders		
Urban Agriculture linked to amenities		
Gardens serving the amenity. E.g. School Garden	 **Source**: Urban Seedling (2017)	These gardens or farms are usually found in close proximity to the amenity that is serves. For example, school gardens that are small farming units bordering or found in close proximity to school grounds and buildings. These cultivated units have less of a commercial function, albeit not excluding profitability, and tend to be used for the production of crops for personal and communal use. These gardens generally serve an educational purpose as well (Sherman, 2010). Less frequently seen, although not uncommon, these units can be on top of buildings in the form of, for example, rooftop gardens or greenhouses. Other examples include *inter alia* hospital gardens, clinic gardens, and restaurant gardens.
Urban Consumer Farm	 **Source:** Ryerson Urban Farm (n.d.)	An urban consumer farm is a piece of urban land positioned within private spaces such as backyards and vacant lots or public spaces such as parks or parking lots. Cultivation of horticultures take place primarily for wholesale and retail sales to urban consumers (EDRS, 2013).
Community Garden	 **Source**: Ed Ritger for San-Francisco Public Press (2010)	Community gardens are shared farming units, usually located on public or undeveloped private land, that are made available by groups of people within the community and are cultivated and tended by families or individuals for personal use or as a group for communal use (EDRS, 2013). The produce may be consumed by the worker or sold for additional income.
Backyard Garden	 **Source**: Modern Garden (2017)	A backyard garden is an agricultural unit for the production of horticultures, located adjacent to a temporary or permanent residence (such as home gardens) or commercial units (such as restaurant gardens) for use by the specific individual group residing or making use of the unit. Domesticated animals are sometimes integrated into the system (Reinhardt, 2005).

Edible Landscapes	 **Source**: https://www.youtube.com/watc h?v=xcvd--W64XM	Edible landscapes are areas in the public realm with unique characteristics, usually aesthetic, as a result of human factors (Ventura, n.d.) that has been designed with consumables, such as nuts and berries for the public's use. The maintenance of these landscapes are generally the responsibility of volunteers, organisations and city management (EDRS, 2013).
Building Integrated Urban Agriculture		
This section will focus on agricultural fields or spaces that produce food and other related services, with the identifying quality being the functional and geographical link or connection to buildings and/or company infrastructure.		
Vertical Farming	 **Source**: Sweet & Mitchell (2017)	Vertical Farming refers to systems organised upward to utilise vertical spaces for cultivation of crops and food. These vertical growing systems can include trays and green walls and are purposed to increase growing efficiency and output in confined spaces (EDRS, 2013).
Edible Walls	 **Source**: SAP (n.d.)	Edible walls are an adaptation of the term Green Wall, which essentially refers to vegetated wall surfaces (GRHC, 2008). These green walls are cultivated with crops and food for consumption and retail.
Indoor Farming	 **Source**: Manning (2016)	Indoor farming entails the production of crops within a building through scientific techniques that include the utilisation of light-emitting diode lighting and mineral-enhanced water, as well as controlling the environment to enhance growth. This technique allows for year-round production of crops, irrespective of season (Spire Research, 2015).
Rooftop Farming	 **Source**: Plaskoff Horton (2011)	Rooftop farming refers to the agricultural practice of cultivating crops within an engineered growing system on top of rooftops of buildings within cities. These systems differ in the fact that it can be enclosed or open-aired but a growing medium and an underlying waterproof membrane material must be present to foster crop growth (Loux, 2006).
Rooftop Greenhouses		**Open Air Rooftop Garden**

Rooftop greenhouses are translucent structures erected on rooftops, purposed for the cultivation of food and protection of crops. These structures can have a commercial or food production function for private or public entities (City of Victoria, n.d.).	Rooftop gardens vary in complexity and can be as simplistic as containers filled with growing medium like soil, or as intricate as specially designed layers are needed to transform the rooftop into the garden and this style rooftop garden is referred to as a green roof system (Chicago Department of Environment, 2016).
 **Source**: Noble Rot (2017)	 **Source**: Peeters (2015)
Potentially Linked and or Integrated	
Aquaponics  **Source**: Pleasanton Patch (2017)	Aquaponics is the deliberate bringing together of edible plants and aquatic species, such as fish, in a system that allows for symbioses between the different elements, that theoretically provides a self-sustaining, food producing system (EDRS, 2013).
Hydroponics	**Aquaculture**
Hydroponics is the process of growing horticulture produce within an aquatic environment (soilless), through the controlled supplementation of nutrient and mineral solutions (Growth Technology, n.d.).	Aquaculture entails the farming of aquatic organisms, such as fish and shellfish for food provision as well as environmental, educational and commercial purposes. Although the term is generally used, it specifically refers to cultivation within freshwater (AGNR, 2005).
 **Source**: Planet Natural Research Center (n.d.)	 **Source**: Bickerton (2017)

Bee-keeping	 **Source**: Bach (2017)	Bee-keeping, or apiculture, entails the manipulation of colonies of honeybees to produce honey and other by-products, for commercial and consumption purposes (FAO, 2011). This practice is often located on rooftop farms and is a good source of value-added products, such as *inter alia* honey cosmetics and honey ice tea.
Livestock farming	 **source**: Rogers (2013)	Livestock refers the controlled breeding of a broad range of animals and poultry in a farm environment, for the purpose of consumption or production of animal by-products for retail (Womach, 2005). These practices can be located within many different urban spaces, even on rooftops. Livestock farming is often frowned upon due to noise, health and pollution concerns. Integrating livestock farming with another UA typology, could positively influence the viability of the farm as animal by-products, such as eggs, could substitute the food production during off-seasons. Furthermore, livestock farming could *inter alia* be used for educational and recreational activities that would bring customers to the site, as well as provide fertilizer.

Source: AGNR (2005), Chicago Department of Environment (2016), City of Victoria (n.d.), EDRS (2013), FAO (2011), Gorjian *et al.* (2011), GRHC (2008), Growth Technology (n.d.), Loux (2006), Pool & Stone (2014), Reinhardt (2005), Sherman (2010), Spire Research (2015), ALC (2014), Womach (2005).

The above table composed and defined existing UA types as a blend between the farming typology; the location of the production site within the city and the relation of said site to the urban environment, infrastructure and community; and lastly, the degree to which the site is conditioned (for example, rooftop greenhouse *versus* rooftop garden). Even though this is a crude composition of types, the table presents the dominant UA typologies on a finer scale than that used by Goldstein *et al* (2014).

Lastly, UA can be specified by using the dimensions shaped by the presence of UA in an Urban area. This classification focusses less on the physical attributes of UA and more on the connections shaped in the presence of UA. These are: types of actors involved, types of location, types of products grown, types of economic activities, the product destination or degree of market orientation and the scale of production and technology used (RUAF, 2009), as seen in **Box 2**.

Box 2: Classification of UA by using the resulting dimensions

Types of actors involved: Large part of the people involved in urban agriculture is the urban poor. Contrary to general belief they are often not recent immigrants from rural areas (since the urban farmer needs time to get access to urban land, water and other productive resources). In many cities, one will often also find lower and mid-level government officials, school teachers and the like involved in agriculture, as well as richer people who are seeking a good investment for their capital. Women constitute an important part of urban farmers, since agriculture and related processing and selling activities, among others, can often be more easily combined with their other tasks in the household. It is however more difficult to combine it with urban jobs that require travelling to the town centre, industrial areas or to the houses of the rich.

Types of location: Urban agriculture may take place in locations inside the cities (intra-urban) or in the peri-urban areas. The activities may take place on the homestead (on-plot) or on land away from the residence (off-plot),

on private land (owned, leased) or on public land (parks, conservation areas, along roads, streams and railways), or semi-public land (schoolyards, grounds of schools and hospitals).

Types of products grown: Urban agriculture includes food products, from different types of crops (grains, root crops, vegetables, mushrooms, fruits) and animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (like aromatic and medicinal herbs, ornamental plants, tree products, etc.) or combinations of these. Often the more perishable and relatively high-valued vegetables and animal products and by-products are favoured. Production units in urban agriculture in general tend to be more specialized than rural enterprises, and exchanges are taking place across production units.

Types of economic activities: Urban agriculture includes agricultural production activities as well as related processing and marketing activities. And inputs (e.g. compost) and services delivery (e.g. animal health services) by specialized micro-enterprises or NGOs, etc. In urban agriculture, production and marketing tend to be more closely interrelated in terms of time and space than for rural agriculture, thanks to greater geographic proximity and quicker resource flow.

Product destination / degree of market orientation: In most cities in developing countries, an important part of urban agricultural production is for self-consumption, with surpluses being traded. However, the importance of the market-oriented urban agriculture, both in volume and economic value, should not be underestimated (as will be shown later). Products are sold at the farm gate, by cart in the same or other neighbourhoods, in local shops, on local (farmers) markets or to intermediaries and supermarkets. Mainly fresh products are sold, but part of it is processed for own use, cooked and sold on the streets, or processed and packaged for sale to one of the outlets mentioned above.

Scales of production and technology used: In the city, we may encounter individual or family farms, group or cooperative farms and commercial enterprises at various scales ranging from micro- and small farms (the majority) to medium-sized and some large-scale enterprises. The technological level of the majority of urban agriculture enterprises in developing countries is still rather low. However, the tendency is towards more technically advanced and intensive agriculture and various examples of such can be found in all cities.

Source: RUAF (2009)

Depending on the purpose, a different composition and definition of UA types could be used as each presents unique insight. For example, when evaluating the economic impact of UA on the urban poor, a researcher might choose to classify UA practices according to the “degree of market orientation”, “type of actors involved” and “type of location” (**Box 2**). While a researcher concerned with the impact of UA on urban heat island attenuation, might prefer to use a broader classification, such as used by Goldstein *et al*. (2014). Therefore, when evaluating the potential impact of UA when integrated in development strategies, it might be necessary to use more than one composition of UA typologies or groupings. More importantly, this section introduced a key attribute of UA; namely, UA’s dependence on the physical and conceptual influences. In other words, its context specific nature.

2.3 Defining the larger food environment: Conceptual background

The following section aims to clarify the interconnected concepts which spatially and dimensionally (socially, economically and ecologically) influence UA, to grasp the importance of these concepts in urban food production environments and as part of the spatial reality.

2.3.1 Food systems

In general, the term "**Food system"** refers to the network in which food travels from the production site to the consumer, which includes the relevant inputs and actors engaged in this process (HLPE, 2017:11). This process includes: production, processing, distribution, access, consumption and waste recovery (R2G, 2016), as seen in **Table 2.2** The definition of a strong local food system (or a sustainable food system) presented at the bottom of **Table 2.2,** correlates with the definition of food security as adopted in 1991 at the World Summit for Food (FAO & WB, 2008:11) which states:

"*Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*".

People buy food based on variables such as, *inter alia;* family needs, food preference, cultural background, religion, nutritional requirements and values, as well as attitudes and beliefs related to food and/or food advertising. Choices are made in this regard within certain constraints such as money, time to shop for food, time to prepare food, skill and confidence in food preparation, facilities available in the home to this end, access to shops and transport. People's individual likes, dislikes and allergies also play a factor herein. Choices are also limited by the food supply available. All of these factors shape the food environment and should be taken into consideration when including UA in mainstream spatial planning. The concept of sustainable food systems (of which food security is the objective) and the link with UA will be clarified as this research paper unfolds.

Table 2.2: Food system as a process

Diagrammatic representation of food systems	
	**Production**: planting, growing, raising and harvesting of food in both rural and urban areas.
	Processing: altering raw foodstuffs to create a different, more refined product by for example: • preserving • cooking/baking • preparation • meat processing • grain milling
	Distribution: This includes the distribution and storage of both raw and processed food. Distribution takes place from farms to processors, wholesalers, grocery stores, markets and restaurants. Other actions include: • wholesaling • retailing • purchasing
	Access: The accessibility and affordability of food as well as the preparation of both raw and processed food. These links include: • farm to grocery stores • farm to farmers' markets

• farm/grocery store to communities and households
Consumption: This includes the consumption of produce in both the public and private realm.
Food Waste Management: Refers to handling organic waste across the food system as well as reducing the amount of waste produced.
A strong local Food System is one in which all residents have access to, and can afford to buy, safe, nutritious, and culturally-acceptable food that has been produced in an environmentally sustainable way and that sustains our rural communities. A strong food system can result in broad environmental, economic, social and nutritional benefits.

Source: Cornell University (n.d) and USDA (2015).

2.3.2 Livelihoods

Swift and Hamilton, as cited by Fraser *et al.* (2003:178), defines a livelihood as the "capabilities, assets (including both material and social resources) and activities required for a means of living", with the added quality of "sustainability" suited to those livelihoods able to "cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base". Livelihoods are interdependent and not isolated from the larger livelihood system within which it is situated, as each given livelihood may rely on several other livelihoods for access to trading platforms, new assets, markets and product processing, all within the competitive nature of the system contributing to the interdependence between livelihoods (IRDP & UNDP-India, 2010:3).

This highlights not only the importance of understanding UA within the larger food environment, but also stresses the interdependency of consecutive links within production chains and the need to address urban food systems as a series of individually functioning units which form part of a multi-chain, in urban planning and policy.

2.3.3 Food loss and waste as an argument for UA

Reducing food waste and food loss in developing countries can help combat hunger in urban areas as well as contribute towards the sustainability of these areas. In contrast to developed countries, the majority of food loss and waste (FLW) in developing countries does not occur in the consumption phase as commonly believed, but rather in the first two links of the food distribution chain (WRI, 2015). These links comprise the first (Production) and the second (Handling and Storage) phases as well as the linking component (Transportation), all of these are responsible for an accumulated 76 % of the total amount of FLW in Sub-Saharan Africa (WRI, 2015). Although there are many arguments to be made in favour of UA, arguably the most compelling argument, would be that it would address the problem of the amount of food waste and food loss occurring at both the consumer and agricultural levels, especially with regard to developing countries. More attention should consequently be given to the amount of food lost in urban areas in Southern Africa. It is suggested that UA can resolve this issue or at the very least

abate it.It is crucial to distinguish between the sources of food loss and waste in developing and developed countries, as these differ significantly. As seen in **Figure 2.1**, FLW shifts from the production stage towards consumption levels as countries and their cities develop. Distinguishing between the sources of FLW in developed and developing regions of the world (see **Figure 2.1**) could thus contribute towards region-specific solutions which target the cause of these problems at their source.

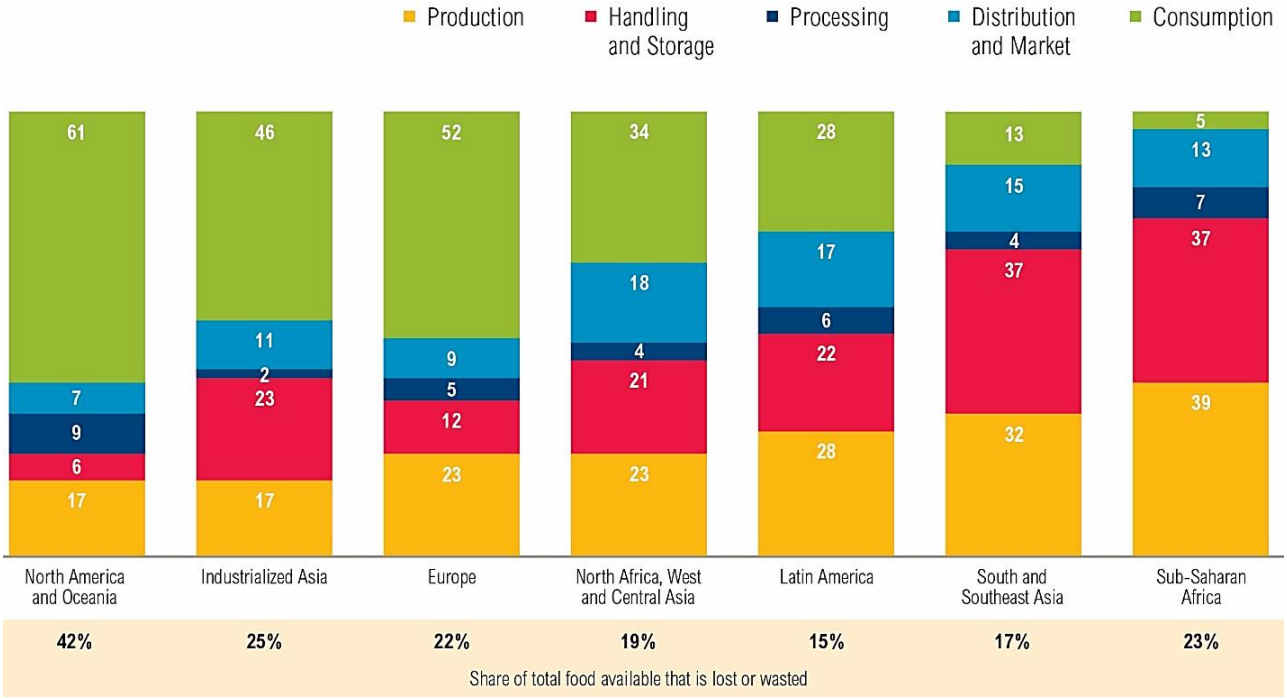


Figure 2.1: FLW by region and stage
Source: WRI (2015)

Developed countries with industrial and highly urbanised areas tend to have more FLW at the consumer level where food waste occurs mainly as a loss of food purchased by consumers and restaurants, which gets discarded before being consumed (**Figure 2.1**). In contrast to this, in developing countries (in particular those in Sub-Saharan Africa) FLW is mainly generated during the handling, storage and transportation stages within the food system (**Figure 2.1**). These losses include, among others: spillage and degradation of produce and animal products, as well as crops lost or left on the stalks as a result of a variety of factors. Such factors causing crops to be left behind at this stage of the food process include but are not limited to: unsatisfactory yields in the production phase (whether from a lack of knowledge, resources or externalities such as weather), poor harvesting skills and a lack of either knowledge or equipment, or both (HLPE, 2014:41). Post Harvest Losses (PHL) account for approximately 33% of total food produced. As such, this has become the primary focus of several programs aimed at reducing the food loss experienced at this stage and to thus combat food system inefficiency in general (WRI, 2015).

Locally, urban areas account for more than 65% of the population in Southern Africa as of 2016 (WB, 2016). This is not only higher than the global average, but also expected to increase as Africa, and by extension Southern Africa, is seeing a continually growing urban population (WB 2016). It is expected that, with the urban-rural shift, a shift in the FLW will correspondingly also occur from the production, handling and storage; as well as PHL components towards the consumer level, similar to developed countries. This shift will be dependent on other factors such as the economy of the country. This means that not only should FLW be addressed at the Post-Harvest phase, but allowance should be made for the growing urban population and impending shift in FLW to the consumers phase as the region develops.

UA shortens food miles, which could *inter alia* reduce FLW, especially in the storage and transportation phase, which in turn form part of stages in the post-harvest phase. Certain UA typologies reduce the need for storage facilities. For example, community supported agriculture (CSA) programs where produce is either collected by the members on specified days, or the produce is delivered on a regular basis. These methods of food delivery thus shorten miles because they are specified to the particular communities needs and are not simply transported in bulk. These UA typologies and distribution methods may even eliminate the need for transportation entirely on the producer's side. For example, a community garden (or shared garden) where the farmers who work the farm also harvest the produce when ready, means that the need for transportation of produce in that context is completely eliminated and consequently also the waste that would be associated with it is also cut out of the equation. Additionally, the notion of farmers' markets held at the farming site not only eliminates the need for transportation but is made possible by the proximity of consumers to the food production site. If integrated into different urban spaces, such as social amenities (which could include *inter alia* schools, clinics and parks), UA could resolve the food waste issues in the post-harvest phase significantly. The degree to which UA can resolve PHL would differ according to the typology as well as other factors, such as good management, the food prices and the scale on which it was produced. However, it can still be argued that UA could have a significant contribution to reducing PHL waste.

In 2014, the African Union, currently composed of 55 African nations, expressed a commitment to ending hunger in Africa by 2025. Considering the amount of undernourished and food-poor people in sub-Saharan Africa (one out of every four), this seems "incredibly ambitious'' and unrealistic (WRI, 2015). Although not within the limitations of this research, it is well worth a thought whether policies and programs built on unrealistic objectives such as these could be realised. UA could be a potential tool towards progressively realising this 'ambitious' objective. More importantly, realising this commitment would need renewed and innovative strategies of

food production and distribution. One such innovative strategy would be the wholehearted implementation of sustainable UA practices.

2.3.4 Food-poor people and poverty on a national level

According to recent studies it has been found that, on a national level, the segment of the population living in poverty stands at 55.5%, which accounts for an alarming 30.4 million people as in 2015 (STATS SA, 2017a). This is calculated using the upper-bound poverty line (UBPL) of R992 per person per month (pppm.) in 2015 prices (**Table 2.3** and **Figure 2.2**). Although this does not equal the 2006 poverty peak which saw 31.6 million persons (66.6%) living in poverty, the growing number of persons within the extreme poverty bracket should be a cause for concern (STATS SA, 2017a). The number of people living below the R441 per person per month Food Poverty Line (FLP) as established in 2015, has been steadily increasing since 2011 (**Figure 2.2** and **Figure 2.3**) (STATS SA, 2017a). This denotes an increase of 2.8 million people, from 11 million in 2011 to 13,8 million in 2015. Even though this is less than the 16.7 million people who lived in poverty in 2009, it should not mar the seriousness of the current poverty situation. This is so because during the period from 2008 – 2009, economies suffered globally in the aftermath of the 2008 food crisis brought on by the worldwide Great Recession originating in the USA at the time and thus increases in poverty were to be expected in any event (Vilar-Compte *et al.,* 2015).

Table 2.3: South African Poverty headcounts (2006, 2009, 2011 and 2015)

Poverty headcounts	2006	2009	2011	2015
Percentage of the population that is UBPL poor	66,6%	62,1%	53,2%	55,5%
Number of UBPL poor persons (in millions)	31,6	30,9	27,3	30,4
Percentage of the population that is LBPL poor	51,0%	47,6%	36,4%	40,0%
Number of LBPL poor persons (in millions)	24,2	23,7	18,7	21,9
Percentage of the population living in extreme poverty (below FPL)	28,4%	33,5%	21,4%	25,2%
Number of extremely poor persons (in millions)	13,4	16,7	11,0	13,8

Source: Stats SA (2017b: 14)

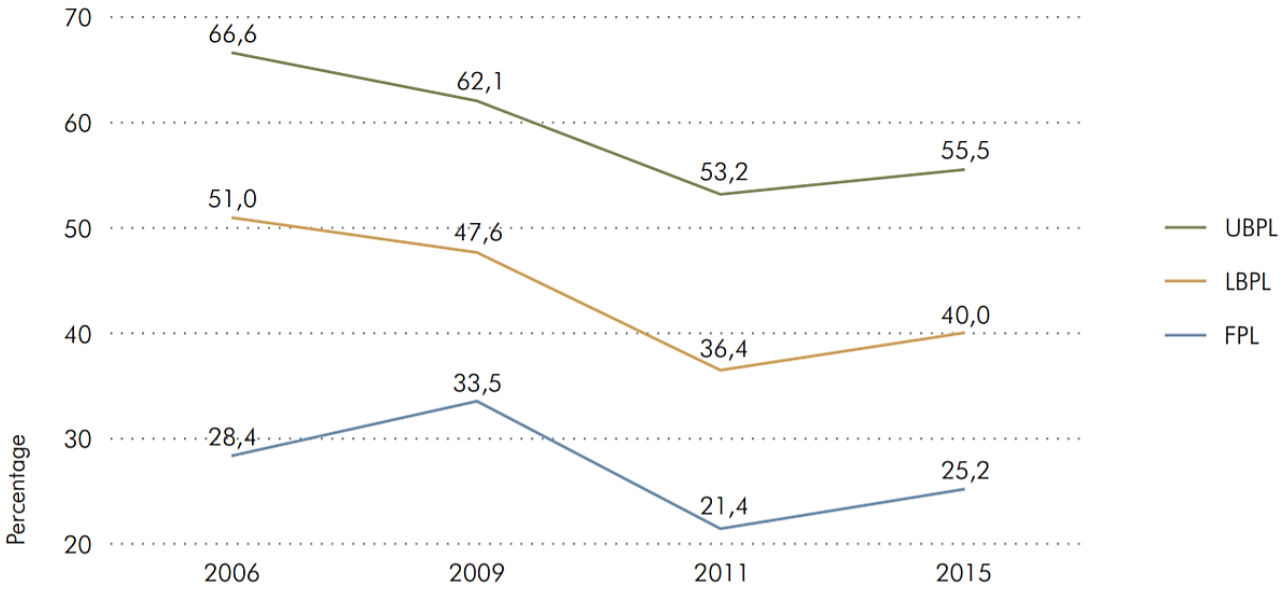


Figure 2.2: South African poverty based on the FPL, LBPL and UBPL
Source: Stats SA (2017b: 15)

Figure 2.3: Amount of poor and non-poor South- Africans (in thousands) (2006, 2009, 2011, 2015)
Source: Stats SA (2017b: 15)

In general, the victims of poverty in South Africa are black South Africans, females, people from rural areas in the Eastern Cape and Limpopo, undereducated individuals (Stats SA 2017b:15-16). Predominantly, and most alarmingly, children younger than 17 years of age also fall in this category as seen in **Figure 2.4**. From this figure it can be seen that poverty levels tend to reduce as individuals get older, while increasing again at the age of 55 and onwards (Stats SA, 2017a). It can be seen that the most vulnerable section of the population, namely the young, seems to be hit the hardest by poverty (**Figure 2.4**).

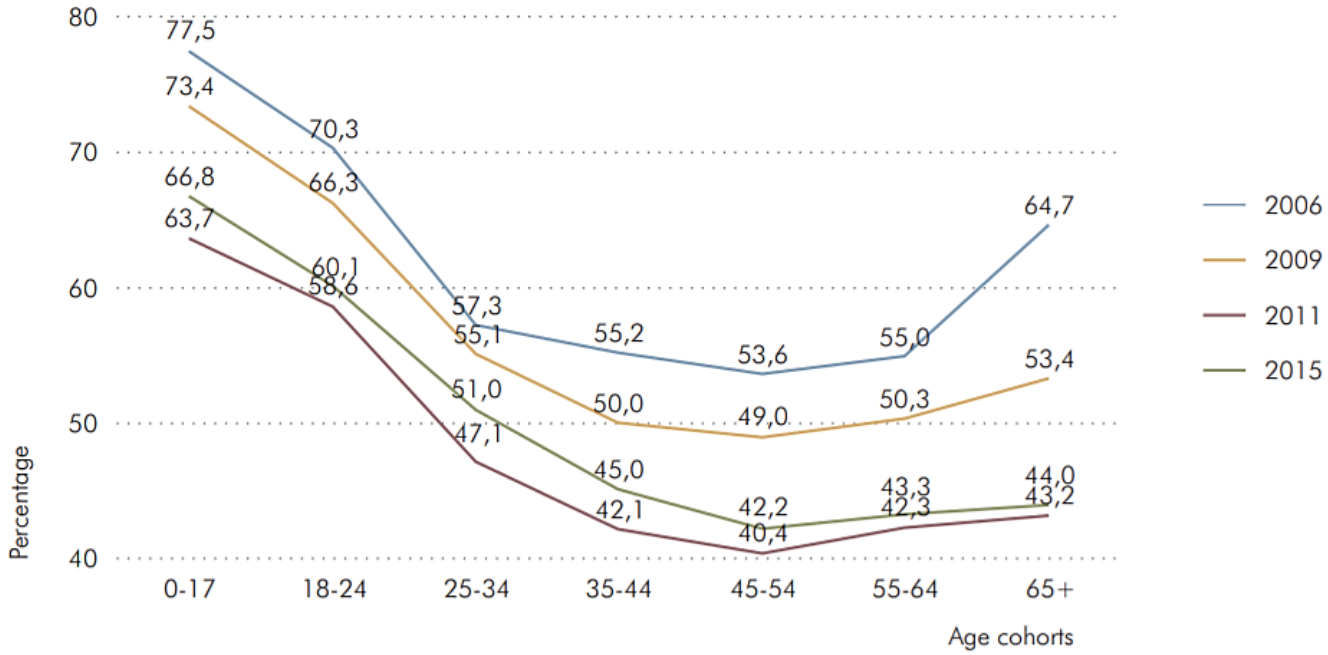


Figure 2.4: South African poverty by age using the UBPL (2006, 2009, 2011, 2015)

Source: Stats SA (2017b:59)

In 2015, the youngest age group (0-17 years) had the highest proportion of people living in poverty, while the age group 45-54 had the lowest percentage for that year. The 2015 increase in the percentage of people per age group living in poverty indicates that poverty has increased since 2011 and that some might be worse off than they were in 2011.

At the peak of poverty in 2009, roughly one in three people were food poor, with that proportion decreasing to one in four by 2015 (slightly lower than 2006 levels, but still higher than the one in five experienced in 2011) (Stats SA, 2017b:15). The rapid upwards and downwards inclinations in the number of food-poor people illustrates the importance of food security programs and policies, especially when the country comes under increased pressure from climate change, water shortages and global economic meltdowns such as the Great Recession during the 2008 / 2009 financial crisis (Stats SA, 2017b: 14). An economy must also be durable – able to withstand outside changes and unforeseen events without collapsing. Bearing these points in mind as well as the information regarding the connection between age and poverty, it can be concluded that preventative and remedial action (in particular with regard to food and food security) should be aimed at women, ethnic groups ('black Africans'), children younger than 17 and the elderly (55-years and older). Geographically, these policies and programs should be centred in the Eastern Cape and Limpopo to achieve maximum results as poverty is most concentrated in these two provinces. Chapter 8 will provide recommendations on the ways UA could be applied to address these problems.

2.4 The larger food environment and the changing role of Agriculture

According to Hertel (2012), the estimated increase in population and consequent increase in demand on food systems and farms will double within the first half of this century. This statistic supports the global concern of whether the agricultural systems of the world, particularly those of developing countries, will be able to match this demand (Hertel, 2012). “Despite a significant growth in food production over the past half-century, one of the most important challenges facing society today is feeding an expected population of some nine billion by the middle of the twenty-first century” (Pretty, 2012:17). Furthermore, for global food systems to meet the demand for food within the next decade, the global food system needs to see an increase in food production by 70-100 percent (Pretty, 2012:17). Meeting the global demand for food will be no small feat, as current food systems produce sufficient food to feed the world population, but an estimated one billion people still suffer from malnutrition and food insecurity (FAO, 2009).

Set against this unfavourable backdrop, the role of UA as a supplemental source of food is increasingly highlighted. Pretty *et al* (2010:220) suggest that the goals for agriculture should not only be focussed on maximization of productivity, but also the optimization of agriculture within the interlocking web of other development outcomes (production, rural development, environmental, social justice and food consumption outcomes). This research will not aim to present UA as a singular solution to the abovementioned problems, but it will be argued that, combined with traditional planning methods and policies, UA could contribute to the enhancement of sustainable development.

This section will aim to provide a brief review of global agricultural trends, as well as a brief literature study on the food environment of South Africa, in particular the agricultural conditions and food production services governing it.

2.4.1 Agricultural challenges as the backdrop for UA

A healthy agricultural industry is essential to developing economies, most importantly by providing employment and contributing toward food security, but there are also several other socio-economic benefits that a thriving agricultural industry brings. These include eco-tourism, social welfare and increased value of products (WWF, 2010). Until now, global agriculture provided sufficient produce to meet food demands by increasing productivity as well as the produce taken off existing available cropland, however, the ability of available agricultural lands to continue meeting demands are questionable. This can be seen in research which demonstrates alarming tendencies supporting it, such as reduced yield on key staple crops (Pretty, 2012; Hertel, 2012). This challenge is further exasperated by dietary shifts, increased purchasing abilities, barriers to food access and the distribution thereof (Pretty, 2012:17) issues which are especially problematic

in developing countries. In this sense, the importance of UA will be stressed as a method of agriculture which could possibly fill the aforementioned gaps and contribute towards an increased fulfilment of local food demands

2.4.2 The current reality of Africa's agricultural position

Even though the global population is experiencing rapid growth, the growth rate is declining, as seen in the 0.06%-drop in the annual global population growth rate between the years 2005 and 2015 (SACN, 2016:18). This, however, is not the case in Africa, which will experience continuous, rapid population growth for the next 84 years, despite the anticipated reduction in fertility levels. (UN-DESA, 2015:2-3). Expected to be the only major area to experience substantial growth after 2050, Africa's position in the global food system will need to be established, especially with respect to its outlooks regarding future food security (UN-DESA, 2015:3). Merely acknowledging Africa's position in the global food environment might not be enough to ensure future food security, for the following reasons. Firstly, least developed countries (LDCs) are projected to experience extreme population growth and 27 of these can be found on the African continent (UN-DESA, 2015: 4-8). This stresses the potential imbalance between demand and supply brought on by the lack of technology, capabilities and resources required by these countries to effectively utilise their food production systems. This is made worse by the expected increase in food demand, but an inability to answer to these demands. Undernourishment are presented in support of the above notion of the LDCs' failure to answer food demands. Of the 27 LDC's in Africa, 12 are experiencing high levels of undernourishment (UNCDP, 2016). This points to a correlation between low levels of development and food related issues (within an African context).

Secondly, based on the 2050 population projection, Africa will be home to a quarter of the world's population, with this share set to rise even higher still in the decades to follow (UN-DESA, 2015). This highlights the important role that Africa will play in global population growth and consequently in food distributions as well. **Figure 2.5** presents the recent changes *per capita* net agricultural production of select countries. It can be seen that Asia as a food region,

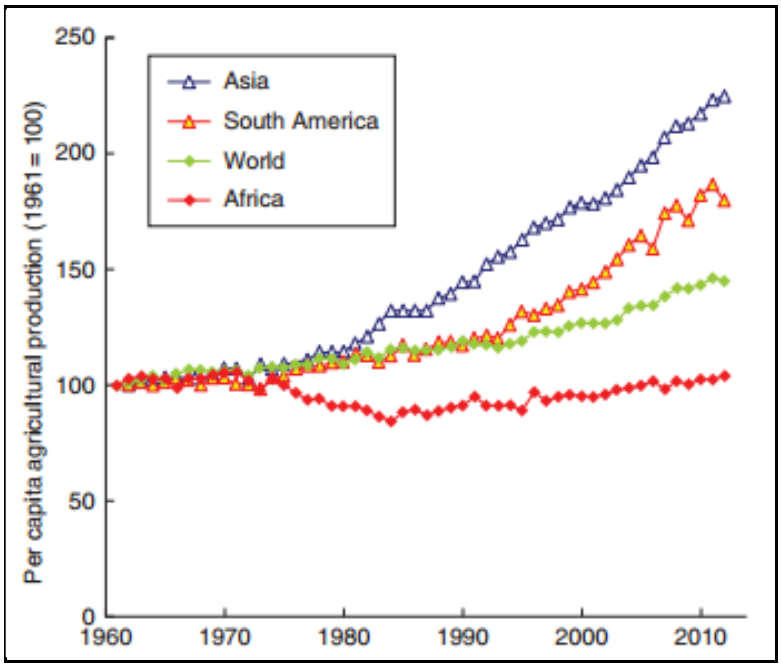


Figure 2.5: Global change in food produce, 1961-2012
Source: Pretty & Bharucha (2014:4).

has experienced a steady and steep rise in per capita agricultural production (**Fig 2.5**). Whereas, Africa, has been experiencing high rates of urbanisation and is projected to experience even higher rates, has not seen a significant increase in per capita agricultural production. However, Africa's per capita agricultural production correlates with the tendencies in the per capita agricultural production, as calculated from 1960. Despite Africa's significant population growth experienced over the last few decades, its food production capacity did not coincide with this growth (**Fig 2.5**).

2.4.3 Current reality of South African agriculture

The agricultural sector of South Africa can roughly be divided into three categories, namely: small-scale subsistence farmers, more developed commercial farmers and the last emerging category, namely beneficiaries of government land reform programmes, even so little data is available on small-scale farmers (Bhorat *et al.,* 2011:18). This makes the interpretation of the agricultural situation and more specifically the conditions governing food production practices, uncertain. The agricultural sector (which include forestry and fisheries) is, however, essentially shaped by numerous interrelated critical issues. These include, *inter alia*, climate change, population growth, changes in consumer customs, economic shifts and market changes (South African Government, 2016). By reviewing these conditions an overview on the trends in the agricultural sector can be obtained.

The South African Department of Agriculture, Forestry and Fisheries (DAFF: 2012) identifies agriculture as an important source of employment within the country's economy, suggesting that agriculture's potential impact on national goals such as empowerment and poverty relief is understated when only considering the data. The primary agricultural sector makes up but a minimal 3% of South Africa's gross domestic product (GDP) and contributes 7% to formal employment. Based on the contribution it makes to GDP when the entire value chain of agriculture is taken into account, agriculture could represent about 12% of the national GDP (GCIS, 2015:32). What is more, the location of agricultural production is dependent on several variables such as climate-soil combinations and demographical placing, based on historic planning practices with water availability being the single most important factor (WWF, 2010:6-7). These considerations coincide and have the effect of dividing the country up into distinct "agricultural regions" (WWF, 20010:7). The spaces available for agricultural practices are limited, as only 12% of the South African land surface can be classified as "arable land", of which a significantly small portion (22%) has the potential for high yields, if effectively utilised (South African Government, 2016). These spatial conditions of agricultural land influence the systems of distribution and in effect accessibility, which is most acutely felt by inhabitants in the middle and lower classes.

The South African Government (2016) recognises the fisheries sector as a natural resource with the capacity for sectoral and national economic growth. As such, the government prioritises development of fresh water and inland fisheries as well as aquaculture; the latter being the most relevant to this research. Both marine and fresh water aquacultures present ample opportunities for diversification of fish production practices to satisfy local as well as an increasing global demand. The Aquaculture Development Enhancement Programme is one of several government initiatives aimed at developing this market and in particular freshwater aquaculture, as "it has shown great growth potential" (DAFF, 2015:58).

The agricultural sector is crucially significant in current day South Africa since agriculture, as the primary contributor towards food security, provides employment to a significant share of the population and as a result contributes considerably towards poverty alleviation (Collett & Lindemann, 2008:12). Globally, 40% of the world's population is dependent on this sector for their livelihoods, while 20% of the South African population makes a living from agriculture in one way or another (De Wit *et al.,* 2015:20). Bhorat *et al.* (2011:1) state that employment in the agricultural sector experienced a rapid decline in 2001. This, coupled with a high rate of vulnerability in the employment sector, contributed little towards poverty reduction in South Africa. This could, in part, possibly be attributed to the "relative decline in commercial farming in the post-apartheid South Africa" (Bhorat *et al.,* 2011:18). Another reason may be that small-scale, "less efficient commercial farmers have been forced out of the sector" and the land consolidated by larger agri-businesses (Bhorat *et al.*, 2011:19). The high mortality rate (farm murders), increasing input costs, uncertain market stability and inability to compete with subsidised imported goods partly relate to the trend in declining farming practices (WWF, 2010:5), as the potential profitability no longer justifies the considerable risks. In economic terms, the potential risk significantly outweighs the potential reward, hence making agriculture in SA a risky business venture with little incentive to continue it for most people.

Credit support for farmers is increasingly important, especially for small-scale farmers, as they often lack the financial and technical capabilities to enter the agricultural and UA market and function beyond the initial survival and subsistence, which often results in failing ventures. Similarly, and on a global level; Cabannes (2011) stated that financial support available to urban producers is limited and consists mainly of credits and microcredits which are but two units within a vastly more complex financing system. This is in turn made up of savings, subsidies, credits, resource mobilisation and non-monetary support. All these considerations further suggest that "financial and political legitimacy" are crucial requirements of successfully increasing UA's contribution to food supplies (Bhorat et al., 2011: 32).

Issues such as these (decreasing number of farming units, associated risks of farming and disheartened farmers, etc.) could inhibit the continuous ability to answer growing demands. This is true especially in South Africa where food systems experience prevailing levels of undernutrition, malnutrition and over nutrition, referred to as the "triple burden" of the food environment (Pretty & Bharucha, 2014:4), whilst price considerations influence decisions regarding healthy diets.

The food system within South Africa forms part of a much larger African food environment, unique to Southern African developing countries, which is comprised of a number of interdependent systems such as energy, water, space and transport (White & Hamm, 2014). As such, it would be relevant to regard the current reality of Africa in this respect as well. Food production and distribution networks are evolving as South Africa's population and social transformations influence food consumption trends, which should be absorbed by the aforementioned networks. Ronquest-Ross *et al*. (2015: 64-75) studied the changing consumer trends in South Africa, and the following conclusions where made from the data presented by them and similar work by others (WWF, 2010:3, Pretty, 2012:17-19).

Post-Apartheid transformation cannot only be seen spatially, but also in consumer trends. These include:

- Dietary shifts away from staple grains (such as bread and maize) to a more diverse diet, as purchasing power increases.
- Although earlier trends proved a decline, overall meat consumption has increased in South Africa after 1994 due to the significant increase in consumption of chicken and pork respectively. Beef, goat and mutton consumption remained relatively constant, despite a significant spike (45.8%) in the consumption of value-added processed meat. Fish consumption increased as well.
- Egg consumption significantly increased post-1994. This trend is in line with global egg consumption increases, "especially in developing countries" (Ronquest-Ross *et al*., 2015:12). Milk and dairy products (such as yogurt and sour milk) increased slightly.
- Despite slight increases in fruit consumption, inadequate fruit and vegetable consumption is a prevailing phenomenon worldwide as well as in South Africa. South Africans residing in “formal urban areas” tend to consume more fruits than their rural counterparts. This can be a result of cost, accessibility and availability factors being in favour of urban residents, such as their increased market connectivity and opportunity, for example the prevalence of street markets in their area.
- Herb and spice consumption doubled as access and the multiple health and culinary benefits associated with this category became increasingly recognised.

Convenient food solutions are an increasing global trend. This is reflected in the increased availability and sales of packaged food and beverages in South Africa (Ronquest-Ross *et al.* 2015). The most prominent consumption increases within this category include baked goods (in particular bread), cereals (in particular 'ready-to-eat' meals), frozen processed foods (such as frozen ready meals), sauces and condiments and canned preserved goods.

These food consumption shifts are concerning to the South African Health Department, as they directly contribute to food-associated disorders like obesity and subsequently, regulating the process towards ensuring availability of healthier food options became a government priority (Ronquest-Ross *et al.* 2015:9). In analysing these trends with the intent of proposing opportunities for expansion in the agricultural sector with particular focus on UA, the following conclusions can be drawn:

- Healthier food alternatives are a government and, to a more minimal degree, also a consumer priority (Ronquest-Ross *et al.* 2015). As such, UA has a comparative advantage to retailers selling unhealthier, processed foods. However, this must be considered within the context of the niche-market where this priority is relevant.
- Convenient food is a trending global and national food niche, and as such UA enterprises could answer this demand through processing and packaging the produce.
- Consumer trends are influenced by availability of products and purchasing power, therefore increasing availability and also the accessibility of produced goods would be beneficial to the UA enterprise. This ties into the following conclusion also.
- Market connectivity influences food choices and, as such, increasing the access of UA enterprises to urban markets would be in line with consumer trends. This can be done whether through *inter alia* revised location considerations; setting up markets at the UA site; or collaborative enterprises, such as vegetable box schemes. (Section 6.2 elaborates on examples of this through case study),
- Small livestock and poultry farming (which includes egg farming) is a potentially rewarding investment as South Africans increasingly consume these commodities.
- Onsite processing of food not only adds value to the product but would answer consumer demands.

In essence, the decline in agriculture employment and diversity of farming goods and famers of such an important sector in the economy may represent several core challenges. Firstly, the lack of adequate support available to small-scale farmers may be an underlying reason for their reluctance to continue farming within a system dominated by larger, more intensive agri-businesses. Secondly, the food productions systems of South Africa are gradually centralising and as a result tending towards exclusivity. Thirdly, the benefits of farms for small-scale farmers

and their communities (such as complementary food sources, reduced income-expenditure, etc.) filter away. Lastly, declining local supplies, even though gross agriculture production volume tends to remain stable, increases the demand for imported goods. As a result, the national food environment becomes less self-sustaining and more vulnerable to global economic shifts. In conclusion, all these factors warrant that alternative and more sustainable agriculture methods should be introduced to the national agricultural sector. It is also important to address the lack of support and prevalent crime.

2.4.4 Opportunity for UA in food production systems

From the above, it is suggested that a move towards more productive and successful food systems should be locally based and driven but supported by global knowledge and experience. Policy intervention should support the efforts of households, complementing the different coping tactics and methods applied by each household into one overarching strategy towards maintaining a household's food security. While the success of each UA practice should be determined according to spatial reference, UA as policy instrument has the potential to improve general living conditions. These include improved health (through, for example, medicinal and nutritional crops) and reducing the negative effects of poverty through the increased consumption of fresh foods which do not have to be purchased but produced or traded by the user.

2.5 The larger food environment and the planning of urban spaces

Population growth and an increasing urbanisation are two crucial issues that have an impact on both UA and the planning of urban spaces. Both of these concepts will be considered accordingly, in an attempt to understand the complexities and challenges when introducing UA as part of broader spatial planning approaches.

2.5.1 Urban spaces as the stage for UA

When attempting to define UA, it is of importance to understand agriculture within the urban context, recognising that farming within an urban environment is subject to unique characteristics. This distinguishes it from its rural counterpart despite the fact that the two-share biophysical and natural determinants. According to Pretty (2012:203), agriculture within an urban classification includes additional attributes to its rural counterpart, such as unique productivity constraints, spatial form, and practical function. Understanding the urban system and the processes governing it would in turn contribute to a larger understanding of UA within urban systems.

2.5.2 Challenges of sustainable urban development

Urban systems are fundamentally consumers and not producers; absorbing energy and resources in most parts from rural areas (Fistola, 2012:200), while an increasingly growing urban population requires a greater energy input (SACN, 2016: 5). This reality is exasperated by restrictive and inefficient urban management processes which fail to address the most basic changes in urban variables, such as population, energy input and consumer habits (Bobbins *et al*., 2014:28). This section briefly discusses these complications.

2.5.2.1 Dissipative urban systems

Past development programmes, as well as urban and spatial planning policies, led to the systematic separation of food production services (mainly farms) from urban areas and, in effect, increased the parasitic nature of urban areas (Fistola, 2012:195). **Figure 2.7** presents a diagrammatic representation of the urban system and the five subsystems. The urban system can be defined as a sum of five main urban subsystems (Fistola, 2012:194-195) namely, first, the physical subsystem which is of material type and formed by the spaces and links of

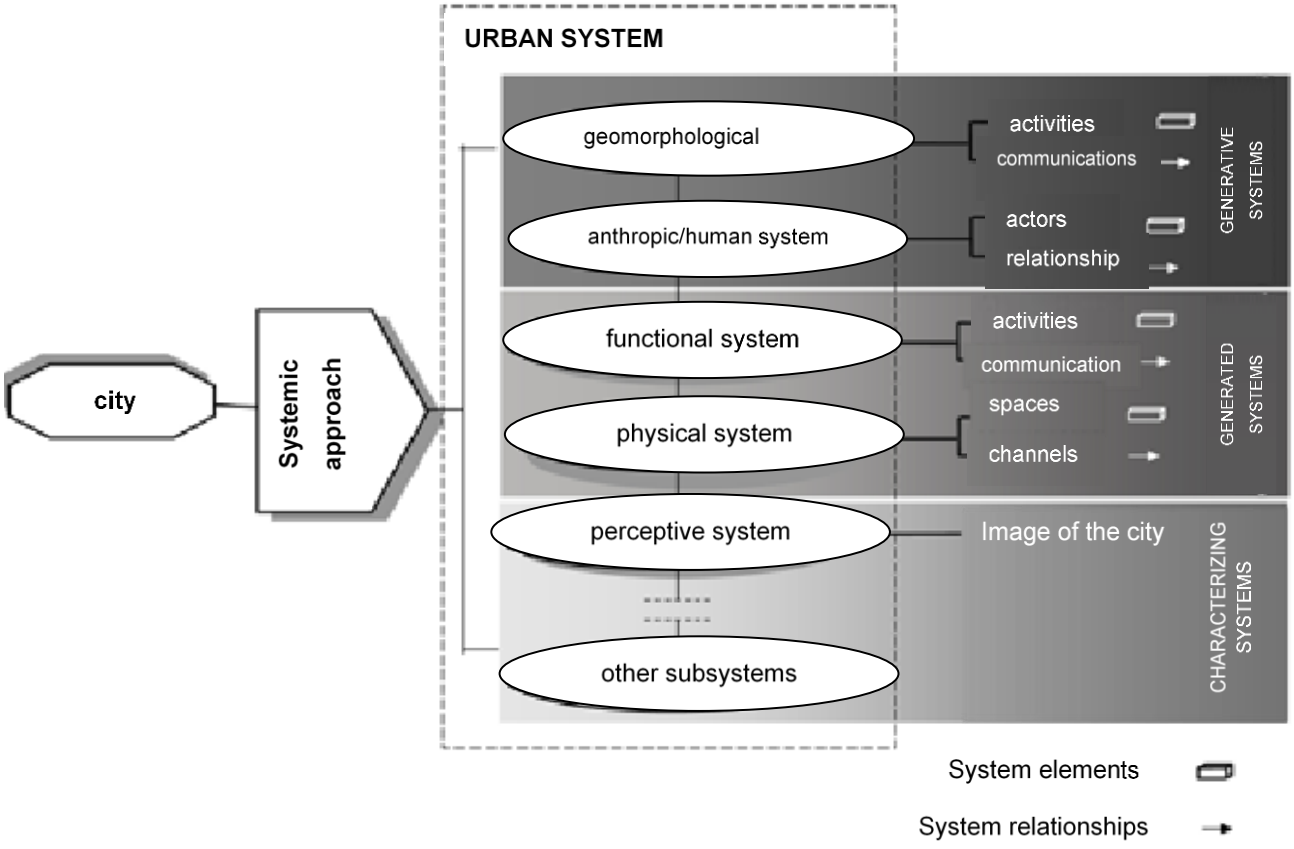


Figure 2.7: Urban systems and subsystems in the systemic approach.
Source: Fistola (2012:195).

interconnectedness between these spaces. Second, the functional subsystem which is of abstract type and is represented by urban activities within and running through the space. Third, the psycho-perceptive subsystem which is of abstract type and is represented by the image each citizen has within him- or herself of the space. Fourth, the geomorphologic subsystem which is of material type and is formed on the environmental layers of the ecosystem. The parts of this subsystem are shaped and identified by defined territories, which include *inter alia* continents, water basins and municipal areas, and the physical connections between these territorial areas, which include *inter alia* roads, railways and energy networks. The final subsystem, the anthropic subsystem is of abstract type and is represented by the human-environment interaction which gives a space its sense of place.

Within each of these subsystems, both the parts and the relationship between these parts are required in order to function sustainably (Fistola, 2012:194-195). If not, the urban system would become subject to entropy. Entropy produced within the urban subsystems (in terms of the physical, anthropic, functional, geomorphological and perceptive systems), is said to be the main antagonist of urban sustainability (Fistola, 2012:195). This approach to understanding urban areas as a dynamic process allows any urban area to be regarded as a dynamically complex system. This system is continuously changing as a result of the changes of it components (subsystems), the relationship between these systems and the externalities (such as urbanisation) pressuring the urban system (Fistola 2012:198). The disorder (entropy) within one system may be carried to the next, much like a virus, which attacks parts in a body (urban system)

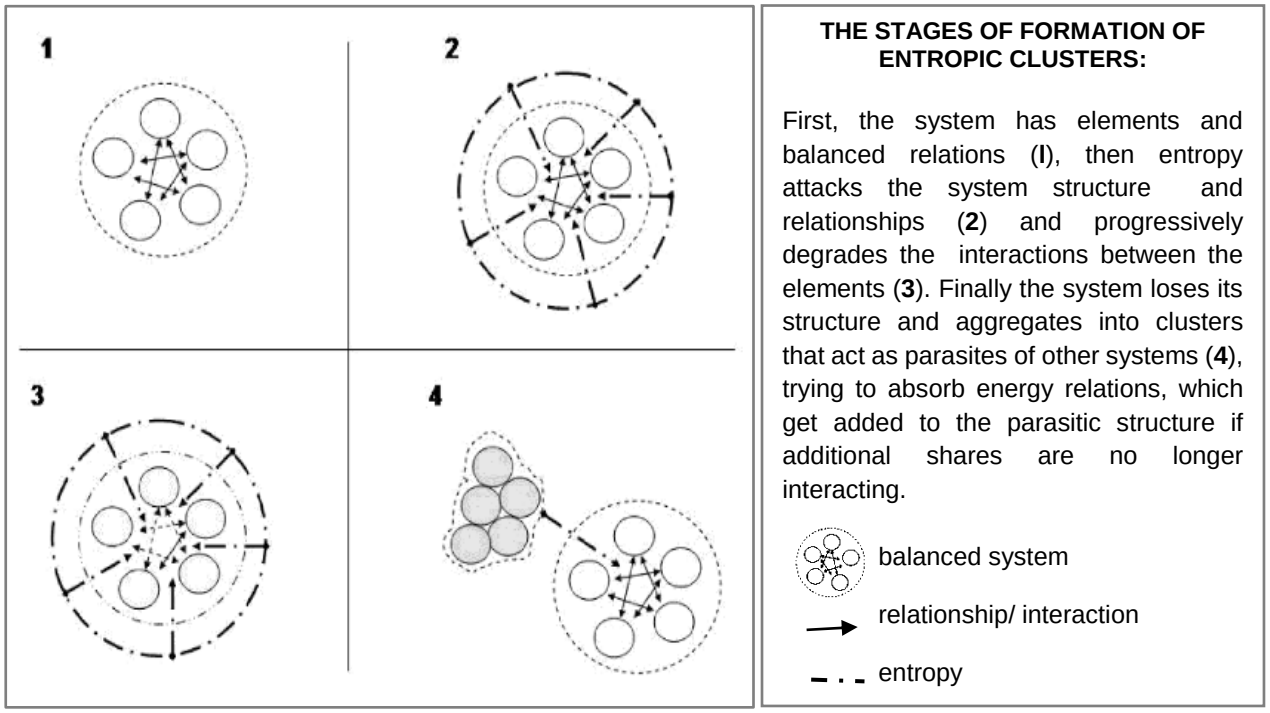


Figure 2.8: Entropy between urban subsystems
Source: Fistola (2012:201)

and reduces its efficiency (**Figure 2.8**). Entropy in the context of this research refers to the lack of a farming site (food production), found within the physical subsystem. In the same way as with a virus, the ineffectiveness of an urban system to produce food would be considered entropy and would systematically spread to, and infect another subsystem. As a result, food would have to be introduced to the system from outside and both subsystems are consequently rendered "ineffective" (Fistola, 2012:200). An example of this would be the lack of activities associated with food consumption, which is a component of the functional subsystem.

In conclusion, urban systems are dynamically complex and change because of the changes within their subsystems (Fistola, 2012:202). Fistola (2012:203) argues that Eco-town planning may represent a possible means through which urban spaces may be concretely organised by implementing actions to hinder, reduce and possibly stop the processes fuelling anthropogenic entropy. One type of Eco-town planning that could address the processes of anthropogenic entropy is UA. For example, UA could *inter alia* restore the functionality of disused areas that causes entropy within the functional subsystem; or recover the loss of decorum and memory of places through a multitude of social and economic benefits. However, it is concluded by Fistola,(2012: 203) that the first step in this process aimed at the reduction of anthropogenic entropy, should be to change the way we interact with environment we live in. In this regard, it is suggested that urban greening can be considered as primary possible counter-mechanism to entropy in urban systems.

2.5.2.2 Formalities restricting effective urban management

Another challenge within urban management is that of managing and governing ever-changing informal urban processes within a primarily formal governing structure, all the while ensuring the longevity of completed work in rapidly changing urban spaces. Bobbins *et al*. (2014: 28) claims that the process of governing resources is largely concerned with the formal aspects of systems (such as the urban system, food systems, etc.), but neglects the normative, cognitive and cultural norms influencing the outcomes of processes within urban spaces. Understanding and accepting urban change and its numerous complexities, as well as the often-overlooked opportunities brought on by urban change, could lead to institutional bodies gaining the capacity to accommodate and progress, regardless of challenges.

In recent years power and functions trickled down from national to provincial and finally to local governments in a process of devolution described by the paradoxical term "decentralised centralism". Consequently, municipalities were responsible for preparing development plans (such as the integrated development plan (IDP)), but successful implementation was hindered by a lack of political support and technical capabilities. (Harrison *et al.*, 2008:8; Turok, 2015:15).

2.5.2.3 Urbanisation trends

Urbanisation is a concept almost as synonymous to UA as “food security” or “urban poor”, in that the one seemingly cannot be discussed without mentioning the other. Developing countries in general are experiencing a high rate of urbanisation (UN-DESA, 2015). On May 7th, 2007, a day referred to by some as ‘Mayday 23,’ the world’s urban population exceeded that of its rural counterpart for the first time in modern history, marking the beginning of a new human settlement demography (ScienceDaily, 2007). This rural-urban turnaround has resulted in urban neighbourhoods becoming the dominant human environment. This demands a reviewed approach towards effective food production and efforts towards obtaining food security in the new urban context, in particular methods of fresh food provision (Haysom, 2009:122; Orsini *et al.*, 2013:696). This urban flow is not necessarily contained to mega cities, as small and medium cities in both developed and developing countries experience an increase in urban population, urban poverty and other urbanisation-related issues. These trends are changing cities from the beacon of prosperity and hope they once were, to a catchment area for the overflow of the world’s poor from rural areas, steadily migrating to the cities (Piel, 1997).

The global urban population is currently spatially and demographically unbalanced, with projections of the 2050 and 2100 population demographics inclined towards a state of even greater imbalance (UN-DESA, 2015). As of 2013, the global population is primarily urban based and continually shifting towards urban areas (ScienceDaily, 2007). This urban growth trend is anticipated to continue, with the global urban population projected to increase from 54.5% in 2014 to 66% in 2050, which means that a two thirds majority of the world’s population would be urbanised. (UN-HABITAT, 2016a:1; SACN, 2016:19; UN-DESA, 2015).

Urbanisation experienced in developing countries is a spontaneous event, brought on by high migration levels and the illusion of urban prosperity, which, coupled by the inability of governments to anticipate and manage the consequences of urbanisation, results in urban chaos. (Orsini *et al.*, 2013:696). Furthermore, population growth tends to peak in areas and environments with the lowest income levels (FAO, 2015). According to FAO (2015:4), this statement is nowhere truer than in cities of less urbanised developing countries. The challenge of coping with increasing urbanisation will thus be greatest for the countries least able to meet the demand. This is so because the reality of the current and expected global demographic profile is that developing countries will face the challenge of feeding and supporting a primarily dependent population (youth and the elderly) within vulnerable situations. The problem is that they will have to do so without the necessary social, economic and institutional capacity. (Desai, 2014:457; UN-DESA 2015).

On a national level**,** the NDP estimates an average urban population increase of 5% per decade, accumulating to shares of 70% in 2030 and 80% in 2050 of the future South African urban population (SACN, 2016:20). These statistics and projections are in accordance with those presented by the UN-HABITAT (2016a) and UN-DESA (2015:1-6), which stress the need to increase food production services.

2.5.3 Changing attitudes towards urbanisation

Clos (2016) suggests that the problems caused by urbanisation can be addressed through spatial planning even if it does not wholly solve the problems, since proactive planning has the ability to cushion the impact of urbanisation. Clos calls on urban planners and stakeholders to no longer regard urbanisation as the sum of the issues brought on by spontaneous urban growth, but instead regard urbanisation as an instrument of prosperity, by planning for urbanisation or in accordance to it. The principle of "planned urbanisation", acknowledges urbanisation as a planning instrument with the capacity to generate opportunities for wealth, employment and to enhance social concepts such as co-existence and cultural interchanges (Clos, 2016). This approach requires that urbanisation and the effects thereof be included into spatial planning processes, rather than omitted. This inclusion can be done through the creation of viable rules and regulations, the implementation of successful urban design principles and the allocation of financial support earmarked for urban design programmes addressing the demand on food systems.

2.6 Current reality of South African urban areas

Urbanisation is a "dramatic and permanent" form of global land-use change (Cilliers *et al.,* 2014:265) and has profound environmental, economic, and social implications for current and future inhabitants. As such, attempts to address the problems associated with urbanisation, increasing global population growth and environmental change, should acknowledge the role of cities "as the main habitation for humans" in finding sustainable solutions (Wu, 2010:2-3).

2.6.1 Historic legacy of planning on South African urban areas

Historically, South African cities were built to exclude and as a result differ from their global counterparts in two respects, namely that the average urban density is lower than cities in other countries with similar income levels and that there is an inverted population density profile which increases as the distance from the centre does (Turok, 2011:470). Backed by Apartheid spatial planning policies, urban development unfolded in a fragmented nature, as decision makers took little regard for the realistic prosperity and longevity of the South African city and how the aforementioned spatial planning directive would affect South African cities in the future (Mabin &

Smit, 1997:193). The Apartheid spatial planning directive left a legacy of spatial complexities which is in some parts still present till this day. But in the same way the post-Apartheid executive crippled urban development in its own way.

Post-Apartheid spatial planning policies, concerned with urban development, advocated "compaction, integration, sustainable and equitable urban environments" (Bobbins *et al.*, 2014:48) and anti-sprawl, although the reality is that these policies have had a limited impact (Harrison *et al*, 2008). Post-Apartheid policies often failed to readdress the spatial inequalities of past planning practices as a result of ineffective policies and (ironically) unsustainable programmes implemented by the post-apartheid government. By developing cities for an exclusive minority (Apartheid planning) and chasing numbers (post-Apartheid planning), both Apartheid and post-Apartheid spatial planning policies and decision makers contributed to uniquely spatially challenged South African cities. These cities are globally recognised as some of the most inefficient and unsustainable cities in the world (COGTA, 2016:22; Schoonraad, 2000:1).

2.6.2 Recognising the role of urban planning in urban development

Urban planning aims to resolve the conflicting demands of users within a continually changing urban environment with limited resources, such as limited space, for example. Cilliers *et al*. (2014:265) state that "based on the principle of sustainable development, urban planning seeks to bring about an organised, efficient and sustainable landscape for the community to live and work in". Governing urban transformation in developing countries proves to be uniquely challenging as the scale and rate with which this process unfolds in these countries brings about complex issues. These issues relate to natural resources such as health, safety, security, rights, poverty, social cohesion and the complications associated with colonial pasts, such as fragmented, dualistic cities in South Africa (Cilliers *et al.*, 2014: 264).

Recently, two approaches emerged in dealing with the population growth challenge in South African cities. Both of these work by accommodating population growth by either extensive or intensive urban development (Turok, 2015:1). The first, extensive planning, is achieved through developing outwards from the dominant urban area by means of satellite cities and new towns, while the second approach intensifies existing land uses by means of higher density redevelopment and infill planning. The latter coincides with the previously expressed notion that urban systems provide solutions for urban growth management, if urban potential is harnessed (Section 2.5.3). The tension between these competing approaches is amplified by the lack of "a national spatial plan or approved urban policy", resulting in national difficulties as both contradictory policies are simultaneously pursued in urban development (Turok, 2015:1).

Furthermore, failing human settlements programmes such as the RDP proved unable to accommodate the growing number of homeless people in urban areas, while more recent urban expansion schemes (mega-projects) of the national and provincial government aim to answer the accommodation exigencies, which are aggravated by failing programmes and prevailing national urbanisation levels (Turok, 2015:2).

The question arises whether these initiatives, designed to accommodate thousands of citizens at the urban edge, are based on sound planning principles or a desperate attempt at readdressing the failing housing programme. Whatever the answer may be, such quantity-driven expansion projects may result in short-term urban development or "patching up" urban issues as it were, whilst disregarding the multiple opportunities of urban transformation and concurrently become yet another problem contributing to unsustainable urban development in South Africa in the first place (Turok, 2015:8). Projects such as these are not in line with contemporary international thinking. Such thinking advocates inclusive, regenerative and intensive urban development (Turok, 2015; UN-HABITAT, 2016a), which suggests that an alternative approach towards sustainable urban development should be pursued in South Africa. Several governing bodies, such as the National Treasury, the Department of Cooperative Governance (COGTA, 2015:14) and numerous metropolitan municipalities, have been advocating a new urban agenda by recognising and strategically developing cities as growth engines and important actors in national sustainability objectives, by means of "urban integration, compaction and densification" processes (COGTA, 2015:14).

Moreover, South African Environmental Management developed several tools and approaches (Strategic Environmental Assessment (SEA), environmental management framework (EMF) and systematic conservation planning) to guide decision making in managing sustainability issues of urban spaces (Cilliers *et al.*, 2014:266). Furthermore, Cilliers *et al*. (2014:266-269), state that sustainable South African urban landscapes on a local scale could become a reality if planning, in practice, could affect some procedural changes. This can be done by firstly, not only acknowledging, but integrating global transdisciplinary approaches in sustainability and further incorporating these in urban planning approaches. Secondly, the unique and complex decision-making environment created by the integration of a multi-level government with the three disciplines pertaining to sustainable urban landscapes (urban ecology, spatial planning and environmental management) must be understood holistically, which would reduce research duplication and inefficiency. Lastly participatory planning sensitive to community needs should be implemented. Jarlov (2001:1) expressed the opinion that the concept for urban planning as widely used is not as effective as urban planners would believe, as it was developed for Western urban system. The Western concept is founded on a “labour-based” employment system,

whereas many inhabitants in developing countries are unemployed and consequently these urban inhabitants implement different coping strategies, such as UA (Jarlov, 2001:1).

2.6.3 Addressing the reality of South African urban areas

Urban spatial reformation, despite progress and transformative actions tackling these spatial issues, is frustratingly slow as South African cities lacks fundamental qualities of sustainability and inclusion. As seen in the State of South African Cities report of 2016 (SACN, 2016:47) policy aspirations for urban development in South Africa (such as those found in the National Urban Development Framework (NUDF), the National Development Plan (NDP) and the draft Integrated Urban Development Framework of (2016)), envisions a future in which South African cities are spatial manifestations of national ideals such as equity, prosperity and sustainability. These objectives are yet to be achieved. It is evident that the current reality of South African urban areas is that they face a number of spatial challenges, whilst inefficient institutional governance and historical legacies aggravate the condition. The following section will review some benefits of UA.

Correlating with the entropic approach, as in section 2.5.2.1, it can be argued that an intensification approach which limits the ineffective use of resources, promotes compact use of land and intensifies connections between urban activities, would potentially be the best practices approach, and as such, should be applied in South African urban planning processes if sustainability goals are to be achieved. Furthermore, contradictorily urban policies, cross-sectional government incoordination and opposing urban development approaches (expansion and compaction) should be reconciled to avoid dissipative South African urban systems.

2.7 UA: Plenty of potential

The notion that participation in UA programmes and practices can be recreational, is *inter alia* offered as a benefit of UA, with additional benefits not only felt by those involved in producing food, but also by other members within these urban spaces. Several programmes within cities of developed countries have seen a wide variety of urban dwellers benefit from these initiatives in one way or another. Farming projects in Chicago for instance, offer urban dwellers, children and UA enthusiasts opportunities to be educated in agricultural practices and consequently offer a tangible means of life-improvement. Programmes such as The Gary Youth Centre Rooftop Garden and The Peterson Garden Project allow active involvement to a wide variety of urban residents, by providing onsite training and plot allotments. Other programmes such as the Global Garden Refugee Training Farm and St. Paul And The Redeemer Food Garden provide food to people in need through several volunteer-outreach projects. In addition, they provide food and income to refugees from Bhutan and Burma (White, 2015). Such best practices could provide a valuable point of departure for the local context to include such initiatives as part of broader spatial

planning approaches. In this sense it would be required to explore the benefits of UA and the linkages to ecosystem services, to build the case in favour of UA as spatial planning tool.

2.7.1 UA and linkages to ecosystem services

Several instruments of modern urban planning are available to those involved. One such instrument which provides a space for UA practices is 'urban greening,' a concept which is often associated with ecosystem services, green cities, green architecture, green design and so forth. Green infrastructure can broadly be defined as multi-functional, strategically planned networks, where supporting land uses, and natural environments are integrated into existing built environments (European Union, 2013:7). This is done through the relationship of planned natural and semi-natural systems, which provides several specialised ecological services within the urban space, such as, *inter alia,* food provision and recreation (European Union, 2013:2-8). UA forms part of the broader urban system, and directly relates to concepts such as green space planning for environmental protection. Ecosystem services form a crucial consideration in this regard as it is fundamentally linked to human well-being, and where the implementation of UA (and related ecosystem services) in human settlements could present monetary and non-monetary benefits to settlements (TEEB, 2010:4-6).

The benefits of urban green spaces are, for the most part, the result of the so-called ecosystem services, as these spaces provide numerous benefits to urban inhabitants and systems alike, as can be seen in **Table 2.4** (TEEB, 2010:4).

Table 2.4: Ecosystem Services

Ecosystem Services	Service Icon	Service Description
Provision Services: Ecosystem services that describe the material or energy outputs from ecosystems.		
Food		Ecosystems provide the conditions for growing food. Food comes principally from managed agro-ecosystems, but marine and freshwater systems, forests and urban horticulture also provide food for human consumption.
Raw materials		Ecosystems provide a great diversity of materials for construction and fuel including wood, biofuels and plant oils that are directly derived from wild and cultivated plant species.
Fresh water		Ecosystems play a vital role in providing cities with drinking water, as they ensure the flow, storage and purification of water. Vegetation and forests influence the quantity of water available locally.
Medicinal resources		Biodiverse ecosystems provide many plants used as traditional medicines as well as providing raw materials for the pharmaceutical industry. All ecosystems are a potential source of medicinal resources.

Regulating services: The services that ecosystems provide by regulating the quality of air and soil or providing flood and disease control, etc.		
Local climate and air quality regulation		Trees and green space lower the temperature in cities whilst forests influence rainfall and water availability both locally and regionally. Trees or other plants also play an important role in regulating air quality by removing pollutants from the atmosphere.
Carbon sequestration and storage		Ecosystems regulate the global climate by storing greenhouse gases. As trees and plants grow, they remove carbon dioxide from the atmosphere and effectively lock it away in their tissues; thus, acting as carbon stores.
Moderation of extreme events		Ecosystems and living organisms create buffers against natural disasters, thereby preventing or reducing damage from extreme weather events or natural hazards including floods, storms, tsunamis, avalanches and landslides. For example, plants stabilise slopes, while coral reefs and mangroves help protect coastlines from storm damage.
Waste-water treatment		Ecosystems such as wetlands filter effluents. Through the biological activity of microorganisms in the soil, most waste is broken down. Thereby pathogens (disease causing microbes) are eliminated, and the level of nutrients and pollution is reduced
Erosion prevention and maintenance of soil fertility		Soil erosion is a key factor in the process of land degradation, desertification and hydroelectric capacity. Vegetation cover provides a vital regulating service by preventing soil erosion. Soil fertility is essential for plant growth and agriculture and well-functioning ecosystems supply soil with nutrients required to support plant growth
Pollination		Insects and wind pollinate plants which is essential for the development of fruits, vegetables and seeds. Animal pollination is an ecosystem service mainly provided by insects but also by some birds and bats.
Biological control		Ecosystems are important for regulating pests and vector borne diseases that attack plants, animals and people. Ecosystems regulate pests and diseases through the activities of predators and parasites. Birds, bats, flies, wasps, frogs and fungi all act as natural controls.
Habitat or Supporting services: These services underpin almost all other services. Ecosystems provide living spaces for plants or animals, they also maintain a diversity of plants and animals.		
Habitats for species		Habitats provide everything that an individual plant or animal needs to survive: food, water, and shelter. Each ecosystem provides different habitats that can be essential for a species' lifecycle. Migratory species including birds, fish, mammals and insects all depend upon different ecosystems during their movements.
Maintenance of genetic diversity		Genetic diversity (the variety of genes between, and within, species populations) distinguishes different breeds or races from each other, providing the basis for locally well-adapted cultivars and a gene pool for developing commercial crops and livestock. Some habitats have an exceptionally high number of species which makes them more genetically diverse than others and are known as 'biodiversity hotspots'.
Cultural services: These include the non-material benefits people obtain from contact with ecosystems. They include aesthetic, spiritual and psychological benefits.		

Recreation and mental and physical health		Walking and playing sports in green space are good forms of physical exercises and help people to relax. The role that green space plays in maintaining mental and physical health is increasingly becoming recognised, despite difficulties of measurement.
Tourism		Ecosystems and biodiversity play an important role for many kinds of tourism which in turn provides considerable economic benefits and is a vital source of income for many countries. In 2008 global earnings from tourism summed up to US$944 billion. Cultural and eco-tourism can also educate people about the importance of biological diversity.
Aesthetic appreciation and inspiration for culture, art and design		Language, knowledge and the natural environment have been intimately related throughout human history. Biodiversity, ecosystems and natural landscapes have been the source of inspiration for much of our art, culture and increasingly for science, through Bio-technology.
Spiritual experience and sense of place		In many parts of the world natural features such as specific forests, caves or mountains are considered sacred or have a religious meaning. Nature is a common element of all major religions and traditional knowledge, and associated customs are important for creating a sense of belonging.
Note: This table is adapted from **Table 1: Ecosystem categories and types relevant to** cities found on page four of The TEEB Manual for Cities: Ecosystem Services in Urban Management (2010:4).		

Source: Adapted from TEEB (2010:4).

The information in this table (**Table 2.4**) on ecosystem services will form part of the case study analysis in Chapter 6, to evaluate the functional value of UA practices to urban areas.

Humans and their well-being can be placed as the focal point within the Cultural and Provisioning Services, the two services where the immediate benefits of UA are easiest to observe (such as *inter* alia food, health, financial gain and recreation) and consequently to promote for inclusion in urban and economic development programmes. However, land restoration and regeneration programmes also present opportunities for UA practices, as these restored places (or land in need of restoration) are often the types of land available for infill planning. Furthermore, whilst it is true that community development and food provision are deemed to be sustainable development priorities (IUDF, 2016:9), the social considerations of UA are still perceived by farmers to be the 'primary' ecosystem services (Camps-Calveta *et al.*, 2016:19) and should thus be a considered as a priority.

Ecosystem services are increasingly recognised in spatial planning and decision-making processes, both on an international and local level. These in turn shape perspectives such as the need for natural capital (water sources), in particular restoration of the sources from which these benefits are derived (Alexander *et al*., 2016:34). Restoration of degraded production lands in urban areas may still be valuable in terms of UA, as the Provisioning Services (such as food and

raw materials) and Cultural Services (such as recreation and tourism) are the first ecosystem services to regenerate, if appropriate restoration and regeneration programmes can be applied (Alexander *et al.*, 2016:34).

2.8 Critique against the implementation of UA

Obstacles hindering the successful implementation of UA, can be classified into two categories, namely physical- and cultural limitations. These categories are (Eliades, 2016):

The first category, the physical limitations to UA, deals with the constraints pertaining to engineering problems, availability of land, water and resources. These limitations are of an **objective nature**, where the challenge is to find solutions to achieve the desired outcome despite the physical constraints on the system. Theoretically, with sufficient physical input (such as resources, funding or energy) these limitations could be minimised.

The second category, cultural limitations, deals with cultural biases, prejudices and opinions that people may have against UA. In contrast to the first, the obstacles within the second category are of a **subjective nature** and as such are vastly more complex. Solving these problems require more complex solutions than mere physical input-output solutions. These limitations should be addressed by changing people's perspectives to eradicate the mental barriers against UA. In other words, without sufficient will to implement UA, the physical limitations when implementing UA would always be considered too big. The following section will consider how the context-specific nature of UA results in disagreements on the true impact of UA.

2.8.1 Making allowance for the context shaping UA

Global studies and research display varying results and point to different degrees of success or failure of UA practices, each attributing these to unique issues and recommending research-based strategies to address the issues presented (Goldstein, 2014:24-27; Warren *et al.*, 2015). This is done even though, in many instances, the same methodologies to address issues were implemented (Warren *et al.,* 2015:55). Warren *et al.* (2015:64) attribute these differences to the **context-specific** nature of UA, further stating that the success and "magnitude of UA varies greatly by location", as UA is predominantly a context-specific concept. Therein lies the setback in boldly claiming the benefits of UA. This dimensional controversy is also the origin of many other problems associated with UA research and implementation, such as *inter alia* defining the concept itself, as shown in **section 2.1**. While a particular attribute of UA might be beneficial, favourable or acceptable in one location, culture or environment, the contrary could be true for another.

Furthermore, when regarding the relationship between UA and its contribution to household income, the authors identified that this contribution appeared much higher in certain African countries compared to other regions (Zezza and Tasciotti, 2010). These variances make the compilation of generalised concepts or strategies problematic and may even result in some countries experiencing research deserts with regard to UA. Other countries have ample opportunity to study UA within the location specific context. This could further aggravate the imbalance in research results and disagreements over the actual impact of UA on urban spaces and surrounding areas. Within this niche of confusion, literature claims regarding UA that are not sufficiently supported by either quantitative support (such as *inter alia* predictions from rigorous models or field experiments) or qualitative results, are viewed in dubiety (Goldstein, 2014:26-27).

2.8.2 Reality of UA in practice

The current extent of UA and related global practices is yet to be fully understood due to a number of problems, but primarily as a result of the incapability to delineate UA, as well as theincreased tendency to represent factoids as facts (Game & Primus, 2015:2). Over the last three decades, a steadily growing interest among many different stakeholders in UA and UA practices evolved which is not limited to any particular criteria or geographic demarcation. Game & Primus (2015:2-4) examined the growth of interest towards UA and complementary concepts by tracking the emergence of UA-related articles published on international databases. They recognised a steady growth from 1995- 2015 with surges in the last two years, thus indicating an increased interest in this emerging area of science, especially as part of a larger integrated global system. A widely cited estimate of the involvement in and practice of UA is that of Smit *et al.* (1996), who state that, at the turn of the twenty-first century, eight hundred million people worldwide actively engaged in or contributed to UA in one way or another. Hamilton (2014:47) cautions researchers not to represent this number as precise evidence, but to use it as a guideline; as the accuracy of the mentioned source cannot be validated. Presenting this estimation as irrefutable evidence within an unsettled, unconfirmed concept such as UA, could lead to misunderstandings and ineffective application.

2.9 Evaluating the impact of UA

Warren *et al.* (2015:56-59) reviewed papers from developing and transitional economies, evaluating the eligibility of research done on the impact of UA on addressing urban problems such as food security, dietary diversity and the nutritional status of participating subjects of UA. To fully understand the impact of this literature review, the definitions as coined by Warren *et al.* for the purpose of their research, warrant explanation. Food security is broadly defined as the "physical, social and economic access to sufficient, safe and nutritious food that meets the dietary needs

and food preferences for an active and healthy life' (Warren *et al.,* 2015:56). From the work of Ruel (2003) it is concluded that dietary diversity can be seen as the number of different food or food groups eaten during a pre-determined time frame by the research subject or subjects. Using the work of Stamoulis and Zezza as framework, Warren *et* al.stated that 'nutritional status' is regarded as the measurements of physical form, "including weight for height (wasting), weight for age (underweight) or height for age (stunting)" (Warren *et al.,* 2015:56). A combined total of 11,192 papers were reviewed by Warren *et al*. These were systematically decreased to include only 13 papers which satisfied all the relevant quality and applicability criteria. The results obtained from that research indicated a lack of evidence to support UA within developing and transitional economies as an effective strategy to improve food security, even though no evidence discouraging UA could be found either.

Alternatively, it is suggested that a relationship exists between households actively involved in UA that are also experiencing economic hardship, receiving low income and in possession of few assets (Warren *et al.,* 2015:57). Complimentary to this is the perceived correlation between the increasing involvement of households in UA (such as the use of food gardens, community gardens, etc.) during times of economic crisis "such as those induced by armed conflict and structural adjustment' which highlights the use of UA as a **coping mechanism** (Egal *et al.,* 2003:1).

Developed countries have also demonstrated an upsurge of interest in UA, with such farming practices ranging from the production of vegetables, herbs and in some cases even livestock and poultry (RUAF, 2009). This interest is fuelled by economic stress and a need to meet the daily needs of households, as well as other issues such as insufficient nutrition, unhealthy diets and consumption related problems like diabetes and obesity (Hamilton, 2014) but also educational and recreational reasons. The motivations behind increased UA practices within developed countries differ from that of developing. In general, very poor households (such as those often more common to developing countries) tend to grow food for personal consumption, with commercial trading and bargaining of UA products being a more common feature among low to medium income households and companies (Egal *et al.,* 2003:3). In the form of subsistence farming, UA does contribute to better living conditions for low income households, as 60-80% of their generated incomes are spent on food procurement, which includes traveling costs (Egal *et al.,* 2003:2). Even if additional income through trade is not made from UA practices, the production of food for own consumption reduces income expenditure, leaving a larger amount available for the procurement of other commodities and opportunities (Egal *et al.*, 2003:2).

The main reasons for the spike in UA within developing countries could be linked to the need for provision of enough food within the economic environment, possibly improving living conditions and earning additional income, whereas the motivations behind the recent increase in interest within developed countries may not be as basic. In 2013, 8.4 billion Euro was spent on "ethical foods" such as free-range, organic and Fairtrade, "making up 8.5% of all household expenditure" for that year within the United Kingdom (Lovett, 2016). Urban farming practices within these countries tend towards novelty practices such as bee-keeping, raising livestock and fish and include practices producing luxury crops such as micro-greens and herbs, exotic mushrooms and otherwise expensive products such as strawberries (Lovett, 2016).

In Europe, the number of urban farms has increased significantly, but a certain degree of caution is required when implementing UA sites. If UA sites and projects become a novelty hobby and exclude lower income groups, this possible spatial planning tool would contribute very little towards the shift in sustainable food systems. (Lovett, 2016). Several urban agricultural practices in developed countries tend to become instruments of social exclusivity, as the focus has shifted from UA as a means of providing food, to UA as an elite, recreational pastime; with companies competing to provide unique UA items and services such as bottle cap herb gardens, living post cards and virtually managed gardens (not unlike a virtual farming game) - each of these being more expensive than the previous one (Sniderman, 2012). "For UA to move beyond serving a niche group of people and make a real impact on the global food system, it will have to engage a wider demographic profile" (Lovett, 2016).

Other reasons explaining the spike in emerging UA ventures are often more radical. These arise from opposing counter-movements challenging the "industrial agri-food system" dominating production networks prevalent in the global North, and to a minimal degree also in the global south (McClintock, 2014:155). In other words, urban farms are made to challenge an increasingly industrial, food-agglomeration. And whilst the increase in urban farms could yield benefits, the intention for building such farms could be in contrast with those farms intended for community development, food supplements or recreation. A farm created to challenge the dominating production networks would possibly have different objectives and would define "success" differently. Furthermore, this could influence studies on UA and present a misleading reflection of urban farms (on matter such as economic success or community development successes). The intention behind a farm greatly influences the shape, services provided by the farm, and possibly the success of the site (**section 2.2** and **section 2.8**).

The association of UA with food security should be reconsidered in the wider context of the urban food environment, but also within the specific context of the locality. This is so, as the existence

of UA practices and the widespread interest in this discipline could point towards a much bigger food production problem in which food systems in general are “unable to provide, through traditional markets, all people at all times with foods that are healthy, safe, and affordable” (Warren *et al.,* 2015:64).

2.10 In conclusion

The last two decades have seen the focus within attempts at defining UA shift from viewing it primarily as an economic activity towards viewing UA as part of a much larger multi-disciplinary, multi-functional, integrated urban process. This process is seen to have benefits lodged within the urban system as a whole and consequently as a means towards more sustainable human living environments. This dissertation identifies a need for integration of participants and identified skills; an integration which should not be guided by the interest of individual stakeholders (such as governing bodies in housing provision), but one which addresses the need of individuals as part of the urban system. Through an integrated, holistic approach these issues and considerations presented should be addressed, as this would allow UA to be seamlessly integrated into urban development processes (Miccoli *et al.,* 2015:130). In order for this to become a feasible reality the multi-sectoral (economic, social and ecological), diverse (several typologies, actors and modes of implementation), and opportunistic nature (the seemingly effortless integration into other components of the urban system) of UA should be incorporated into spatial planning and development systems (Haysom, 2009:131).

Earlier research and guiding literature regarded UA as a functioning project within an urban space, with the bulk of the literature centred on *inter alia* successes, weakness, threats, typologies and the nature of UA, as well as how policy should be adapted to support these projects. Although these works set the tone, shaped, defined and redefined UA and its underlying issues, they often excluded UA from the larger food network both in theory and practice by presenting it merely as an alternative to rural food production services. The premature celebration of successes in practice and research primarily focussed on the links between UA and the food production, sullies the reality and further fuels pro-and-anti-UA debates (Classen, 2015:234). Mattheisen (2015:43) emphasises the reality of UA within recent urban food systems, stating that "the food system itself is complex and many-layered, including flows, exchanges and impacts across rural and urban areas- from food production, distribution, processing, marketing, consumption and waste, as well as supporting infrastructure".

In conclusion, recent literature is increasingly focused on UA as one component of a much larger food environment (urban system). UA within this context is presented as integrally dependent and linked to sectors of human living spaces, not just within an agricultural-, but also an urban- or

food context. This realisation on the perception-evolution of UA suggests that, in order to be sustainable as well as contribute towards sustainable development, UA practices guiding policies and legislation should at all times strive towards aligning UA and all associated UA-components to the last-mentioned larger food system, and not just the urban food system. UA can possibly be successfully included in the food network as a complementary food production source.

2.10.1 Contribution of chapter

Understanding the systemic changes within the food environment, would improve the recommendations for implementing UA as policy instrument of sustainable urban development processes. The most significant qualities of food systems in the context of sustainability, is:

- High levels of interdependency exist between the components of a food system, as food systems are fundamentally networks or processes of interaction.
- In a broader sense, it can be said that a systemic approach, which approaches a larger goal (such as food security) by striving for sustainability, or structural soundness, would be more measurable and in effect, less unachievable.
- Sustainability objectives should be realised by addressing the economic, social and ecological needs of those involved.

This research presents UA as a complementary mechanism of food and nutritional safety priorities, objectives and strategies of international and local policy and legislation concerned with sustainable, agriculture and/or urban development. UA should be explored within broader sustainability objectives in an attempt to build a case for UA as spatial planning tool.

CHAPTER 3: LINKING SUSTAINABLE DEVELOPMENT AND URBAN AGRICULTURE

3.1 Introduction

Two concepts often found alongside that of UA, are sustainability and sustainable development. These two concepts will accordingly be considered with specific reference to qualities which defines each in practice. These qualities will be considered as part of the theory-based sampling and qualitative enquiry to identify a list of criteria for the planning of UA within broader spatial planning approaches.

3.2 Towards understanding sustainable urban development

This section presents a brief literature study on the definition of sustainability and sustainable development; the defining elements shaping both, and the link between these concepts and urban development. The discussion on sustainable development is grounded in the following three basics ideas: humans and their needs as the main subject of development, "intra- and intergenerational fairness" as argument for development, and the combination of economic, social and ecological goals as the three pillars of sustainable development.

3.2.1 Defining sustainability

Sustainability is a relatively new term, adopted by many disciplines in an effort to plan, design and practice ideas with a longer shelf life. The common accepted definition of sustainability (within development) is that which is used in the United Nations report of the World Commission on Environment and Development (WCED), named ‘Our Common Future.’ This definition sees sustainable development defined as that which "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987). According to Harrison (2003), the definition and acknowledgement of sustainability as a noteworthy concept on the agenda of the world came as an answer to address the conflicting priorities and conflicting interests between economic development and environmental protection. This not only highlights the complex interrelationships between the environment and human activities as a system (Zink, 2014:127), but also within urban systems themselves.

Sustainability as an integrative concept acknowledges three dimensions (or famously denoted as three ‘pillars’ of sustainability) which consider development to be a triumvirate; or, put differently, as a body encompassed of environmental, social and ecological aspects "which reflect that responsible development requires consideration of natural, human, and economic capital. Colloquially speaking, this entails consideration of the planet, people, and profits" (Hansmann *et*

al., 2012:451), as well as the bodies governing economic and human capital. Brown *et al.* (1987:717), reflecting on the work of others, defines sustainability on three levels from the common themes and defining elements present in discussions on sustainability. These include: "the continued support of human life on earth, long-term maintenance of the stock of biological resources and the productivity of agricultural systems, stable human populations' limited growth economies, an emphasis on small-scale and self-reliance" and "continued quality in the environment and ecosystems". From these themes, the following refined definitions where derived: “In the narrowest sense, global sustainability means the indefinite survival of the human species across all regions of the world. A broader sense of the meaning specifies that virtually all humans, once born, live to adulthood and that their lives have quality beyond mere biological survival. Finally, the broadest sense of global sustainability includes the persistence of all components of the biosphere, even those with no apparent benefit to humanity” (Brown *et al.,* 1987:717). These definitions put life, and the global capacity to support it, at the core of sustainability.

3.2.2 Sustainability definitions as action guiding beacons

No single suited definition of sustainability has been formulated to date, even though literature is littered with attempts, debates and concluding remarks on the inability to formalise a single working definition and many have tried. Dimitrov (2010:2) put several definitions of sustainability and the conceptualisation of the term under scrutiny in an attempt to review the validity of general definitions and the manner in which they address the issues of sustainability. Definitions on sustainability are often ambiguous, rhetorical, unclear in implementation, subjected to worldviews, tainted by personal priorities and generic (Dimitrov, 2010:3). Dimitrov expressed the opinion that definitions on sustainability influence the public understanding of the concept, which in turn will determine how sustainability will be practically implemented. Therefore, each attempt at defining this complex concept should first and foremost be responsible and accountable (Dimitrov, 2010:3-4). Herein lies the need to understand the fundamental concepts of sustainability, as sustainability definitions become sustainable development goals and, in the context of this research, these in turn act as the benchmark of actions towards achieving sustainable urban development.

3.2.3 The two schools of sustainability approaches

Definitions on sustainability are often framed within two schools of thought, namely sustainability as a state of well-being, and sustainability as an evolutionary process. This is as follows, (Dimitrov, 2010:4-5):

The first perspective (also known as a beliefs approach) presents sustainability as a state of well-being, underpinned by a belief-element of the harmonious coexistence of humans within the

natural environment. Sustainability definitions with a well-being worldview focus on basic requirements for sustained health, cultural identity, personal security, freedom of choice and financial security. A beliefs approach sustainability definition would be criterial rather than definitional, with the possibility of reaching an ideal state of sustainability, provided the criteria are met.

The second perspective (the normative approach) that defines sustainability as an “evolutionary process", presents sustainability as a continuous process which is constantly adapting as revelations from a creating-learning development approach are incorporated into sustainability definitions. The resulting definitions are more complex, shaped from the revelation and integration of knowledge and, in turn, sustainability as a concept evolves; thus, becoming more sophisticated. (Dimitrov, 2010:4-5). In regard to sustainability definitions within the school of sustainability as evolutionary process, Bagheri and Hjorth (2007:84-85) argue that sustainability can merely be defined as "continuous development" and sustainability learning, without the possibility for an ideal state of sustainability to exist.

It could be argued that sustainability definitions formulated within this school of thought would have a certain degree of elasticity, have the capacity to adapt in the face of change and allow input for experienced-based knowledge from actors in the fields of research and practice alike.

3.2.4 The significance of the two-school approach

From this perspective, no single sustainability definition holds the capacity to accurately, and precisely define the concept, even if the only disqualifying quality would be the inability to remain definitional over time. As a result, sustainability definitions would be fundamentally inadequate to ideally describe the concept as a whole. However, each tentative definition could provide a means toward partially defining sustainable development and, from Dimitrov's argument on sustainability definitions (2010:3), act as beacons of communal and institutional sustainability actions - thus achieving sustainable development.

This research therefore proposes that both global and local actions for sustainable urban development be formulated within the “sustainability as evolutionary process” school of thought, which encompasses the ability to utilise urban transformation actors (such as population growth) in aspiring to a state of sustainability. This knowledge will be applied in **Section 4.5** and **Section 4.6**, to review the manner in which these guiding policies and legislation regard UA in the context of urban development priorities. **Sections 4.5** and **4.6** aim to determine the policy support of UA in both local and international policy and legislation towards answering the research question: Does international and local policy and legislation recognise UA as an instrument of sustainable

urban development?. **Section 3.**3 will elaborate on the inclusion of the “sustainability as a process” approach.

3.2.5 Sustainability qualities in UA

Although the literature available is vastly more elaborate than that presented and the discussion in this section consequently reflects the view of a few select authors, several important connections with UA can nevertheless be made from the most basic nature and theory of sustainability. These are:

1. The long-term maintenance of food systems is crucial, in particular with respect to agricultural systems.
2. Urban food production practices which can be classified as “small-scale” can and should be emphasised.
3. There is a global need for components of human activity to be self-reliant, whether this entails a system or a household.
4. Environmental quality should be improved, and not just preserved.
5. Support systems should be put in place and managed to answer human demands (in particular those systems concerned with food).

3.2.6 Introducing sustainable development

The World Resources Institute (as cited by Brown *et al.*, 1987:718) recognises sustainable development as a "development strategy which manages all assets; natural and human resources, as well as financial and physical assets for increasing wealth and wellbeing". Others define sustainable development as "the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, while living within the limits of supporting ecosystems" (Agyeman *et al.*, 2012:2). Ghosh and Desai (2006:47), using the report on sustainable development by the United Nations Commission in 1995 as starting point, state that sustainable human development determines that ongoing development acknowledges humans as "the central subject" and proceeds in such a manner as to ensure access to resources, while at the same time ensuring improved living and health conditions. Sustainable development can therefore be regarded as a process toward attaining sustainability.

3.2.6.1 The Three Pillar approach of sustainable development

Sustainable development as process relies on three basic ideas, namely (Zink, 2014:127-129):

1. The focus on human needs. This denotes the idea that human-beings, and their fundamental right to healthy lives, should be at the centre of sustainable development concerns, policy and legislation.

2. Intra- and intergenerational fairness. Based on the most common definition of sustainable development as coined by the WCED, a normative claim for intra- and intergenerational fairness is one other concept underpinning sustainable development.

3. A synchronisation of economic, ecological and social goals which entails that sustainable development is a combination of three equal components and the need to balance their corresponding goals. These components, alternatively referred to as the 'three pillars' of sustainable development, can be seen in **Figure 3.1**.

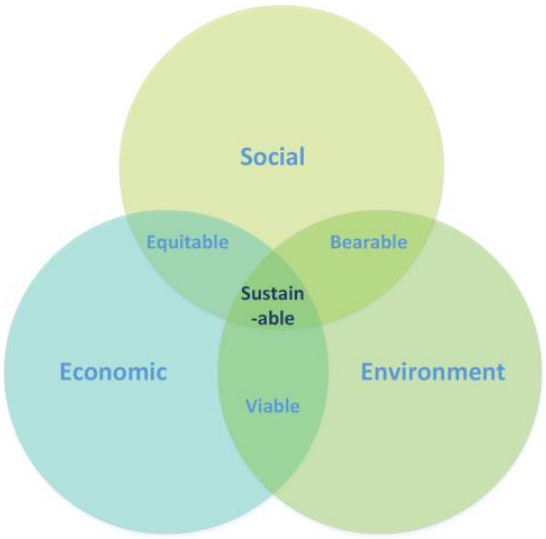


Figure 3.1: Three-pillar approach to sustainable development
Source: Circular Ecology (2015)

3.2.6.2 The systemic conditions for sustainability

The following table (3.1) presents a brief descriptive analysis of the overlapping conditions of sustainable development, namely, "bearable", "viable" and "equitable" (**Figure 3.1**).

Table 3.1: Overlapping conditions of sustainable development

Combination of pillars successfully addressed	Condition achieved	Definition:
Social sustainability and environmental sustainability	Bearable:	The resulting condition would be "capable to be endured".
Environmental sustainability and economic sustainability	Viable:	The resulting condition would be "capable of working successfully" and similar to a result which is "feasible", "practical", "effective", "usable" and "accomplishable".
Economic sustainability and social sustainability	Equitable:	The condition achieved would be "fair and impartial"

Source: Adapted from Oxford Dictionary of English, 3rd ed. (2010a, b, c)

This diagram and **Table 3.1** introduce three new defining elements of sustainable development, namely that it must be equitable, bearable and viable (Circular ecology, 2015). Although each term is extremely relevant to, and even constitutes requirements of, sustainable development; each condition is merely a stepping stone towards the greater goal of sustainability in action.

Consequently, any programme, action or strategic instrument put forth as means to sustainable development, should aim to attain all three conditions simultaneously.

3.2.7 Planning for sustainable cities

Urban areas are unique in many ways and are dynamic in nature despite being grounded to a specific geographical location. In 1991 the United Nations Centre for Human Settlements defined a sustainable city as "a city where achievements in social, economic and physical development are made to last", as presented in the Sustainable Cities Programme (UN-HABITAT, 2016b:2). The Habitat Agenda (1996) adds to the call for sustainable environmental, economic and social development; which recognises the central role of human settlements, and in effect, urban areas as the dominant human habitat in this process (UN-HABITAT, 2016b:2). Commonly mistaken, resilience and sustainability are co-existing concepts not meant as replacements for each other, but rather as supporting concepts, since resilience could be regarded as "the key to sustainability" (Walker & Salt, 2006:43). Applying the work that was done by Bobbins *et al.* (2014:15), on the relationship between resilience and sustainability to an urban context, an interesting perspective on the relationship between urban resilience and urban sustainability is perceived. The result is shown in **Box 3.**

Box 3: The relationship between resilience and sustainability in context
"One way of understanding the relationship between the two terms is to consider sustainability as an essential goal for development and resilience as a way of thinking and acting that would lead us towards achieving that sustainability" (Bobbins *et al*., 2014:15). **Applied to an urban context:** "One way of understanding the relationship between the two terms is to consider [urban] sustainability as an essential goal for [urban] development and [urban] resilience as a way of thinking and acting that would lead us towards achieving that [urban] sustainability" (Bobbins *et al*., 2014:15).

Source: Bobbins *et al.* (2014:15).

From the perspective as explained in **Box 3**, it can be argued that resilient planning of urban activities and programmes should be at the core of sustainable development as it would equip urban spaces with the capacity to endure externalities and structural changes. At a wider level it can be argued that urban activities and systems should have the ability to endure changes or, put differently, that they should possess a degree of resilience, as they are the building blocks of urban areas. Achieving sustainable urban development is not impracticable but would be no

small task as it requires planning which strengthens the linkages between the urban systems, while simultaneously managing the population influx (UN-HABITAT, 2016a).

3.2.8 Critique against the three-pillar approach to sustainable development

These three elements of sustainable development introduce several potential complications revealing short fallings of the most commonly used definition from the Brundtland report (Brundtland Commission, 1987). According to Harrison (2003:1), sustainable development goals are multidimensional (economic, social, ecological), so measuring successes and failure could be problematic. A single measuring tool would not have the capacity to balance and rate objectives across all three sectors. Moreover, sustainable development as concept is inherently normative in nature, which makes it difficult to delineate in theory. It is thus unrealistic to try and develop a single set of criteria capable of evaluating progress across sectors, borders and cultures (Harrison, 2003:2-4; Vitalis, 2003:3). The complex interrelationships between human activities and the environment bring about several challenges and conceptual grey areas insufficiently accounted for by the three pillars. As a result, "sustainability oriented" decision making should attempt to reach a state of substantial coordination (Hansmann *et al.*, 2012:453). This coordination of goals cannot be achieved without inter- and intra-sectoral trade-offs (Brown *et al*., 1987:715; Harrison, 2003; Hansmann *et al*., 2012:453), which is especially true in urban transformation processes, where economic considerations often take precedence over ecological considerations.

Similarly, Redclift (2014:333) cautions against the deceptive simplicity of the commonly known Brundtland definition and the globally accepted goals associated with it. Redclift argues that this well-known and commonly accepted definition is conceptually restricted and does not demonstrate the underlying complexities and contradictions of development and change. For instance, intergenerational needs are subject to change and time and, by proposing that the needs of future generations would be similar to that of the current generation, this could be inaccurate; given that measuring sustainable progress is conditional and should therefore be specific. Lastly the meaning and interpretation of the defining concepts change in tandem with the change in cultural context in any event (Redclift, 2014:333). For example, male-hierarchy might entail that the best morsel be handed to the man of the household, while the woman and children consume less favourable and potentially less nutritious foods. This may be an arrangement which could be frowned upon by outsiders but is perfectly acceptable in the cultural context of those involved. In the same way, the era of globalisation brings about an economic environment with converging economic goals of multi-national stakeholders (Redclift, 2014:335), which in turn emphasises the need to study and apply context-based principles wherever sustainable development is concerned.

3.3 Conclusion

The findings in this **section** of the research are significant as it will set some limitations on the case analyses which will follow. First, in **section 3.2.6** it has been shown that there are limitations on the possible cases available for inclusion in the case study analysis as the internal sustainability of any project or programme presented as a contributor of sustainable (urban) development, would influence the sustainability of the urban system holistically (Warren Flint & Houser, 2001:12). Therefore, in order to be eligible for the case study analysis, all chosen case studies should exhibit characteristics of a condition which is at once viable, bearable and equitable. This is a crucial restriction of the case study analysis as the chosen cases should (in theory) be sustainable; else it may reduce the significance of the entire case study analysis. This analysis will (in the chapter to come) present a list of common underlying qualities of good UA practices, as evaluated in terms of the criteria compiled from the RUAF (2009) article (**Annexure A**) and complimented by the bulk of the literature captured in Chapter 2 and 3. The assumption is that a UA practice which satisfies all the criteria to a demonstrable degree would significantly contribute to local sustainable urban development. A case study lacking one or more of these three qualities would therefore not be considered sustainable and in effect taint the case study findings if included.

Second, UA is fundamentally linked to dynamic urban, agricultural and food systems (as presented in the literature **section 2.4, section 2.5** and **section 2.6**). Applying a "sustainability as evolutionary process" approach to the policy analysis would make allowance for factors not covered by the criteria. This approach not only allows for a study of a wider range and scope of possible policies and legislative documents, but also to provides a scope for the holistic review of case studies. For example, an earlier policy (such as Agenda 21 (1992)) may not be supportive of UA as stakeholder interest in UA only became increasingly recognised in more recent years and therefore, executing the policy analysis from a binary 'yes-or-no' position (regarding inclusiveness) could overlook relevant UA-linked references (such as "urban food production" instead of "UA"). The 'sustainability as evolutionary process' approach allows the policy analysis to be executed at a more refined scale and seeks to accurately answer the research question: Does international and local policy and legislation recognise UA as an instrument of sustainable urban development? Consequently, the policy analysis will be done on two levels, namely:

Direct supportive level: The first level aims to answer the preceding research question at a most basic level through a 'yes-or-no' approach. If the policy acknowledges (denoted by the word "Mention") or even prioritises (denoted by the word "Enforce") UA practices, it would answer the research question positively, and will accordingly be labelled: "Direct Support".

Indirect supportive level: The second level aims to answer the research question, but makes allowance for the dynamic, multi-dimensional (economic, social and ecological) nature of UA, urban areas and food systems and sustainable development (**section 2.8** and **section 3.2**). At this level, the policy analysis allows references made to UA to be included, even if UA was not explicitly mentioned (after making allowance for alternative search terms pertaining to food production within an urban or peri-urban environment). **Section 2.1, section 2.2.** and **section 3.2** presented the rationale for this division of policy criteria, which is accordingly labelled "opportunity-aspects". These are the areas within policy and legislation where UA has potential, even if just on a theoretical level. UA is context specific and susceptible to the physical and conceptual variances of each locality. Therefore, allowance is made in this analysis for indirect support. The aim is to find the potential linkages between UA and sustainable development in policy and legislation, based on theoretical similarities (such as the dependency on context, three dimensions grounding both).

Accordingly, the policies and legislation guiding UA will be considered and evaluated in terms of the broad themes identified throughout the theoretical investigation, including:

- Sustainable urban planning considerations
- Community development considerations
- Environmental focus or protection
- Economic development considerations
- Food provision and food security

CHAPTER 4: POLICIES AND LEGISLATION GUIDING URBAN AGRICULTURE

4.1 Introduction

UA cannot be viewed as a new phenomenon, since its roots are based in ancient practices (Warnes, 2015), however the contribution of UA to urban food security and the possible alleviation of poverty has recently become a subject of attention for policy makers. In order to realistically present recommendations on the incorporation of UA practices as a means towards more sustainable urban development, the decision-making context within which these recommendations should be made, must be considered. The question remains whether sufficient support is provided for sustainable urban development approaches and if current policies and legislation encourage such practices. As such, the correlation between policies and legislation on the one hand and the implementation of UA practices on the other, should be considered. Should UA practices be incorporated within these policies and legislation as a solitary key component in urban development to benefit from the legislative support? Or should UA practices and the actors within these initiatives be content with having UA principles addressed within policies and legislation as a mere part of the **larger** urban environmental space? This chapter seeks to consider the policies and legislation supporting the concept of UA, so as to identify the scope thereof and possibilities for improvement and enhancement of broader sustainability practices through UA.

Chapter 4 provides a background on the state of UA within recent international policies and legislation concerned with overall sustainable development and particularly urban development. Furthermore, this chapter identifies and briefly discusses a number of relevant international and national policies and legislation so as to understand and evaluate the extent to which they address UA. The selected international and national policies and legislation were summarised and evaluated in table format to illustrate the relevance and importance of each, in terms of the current research. The chapter concludes with a comparative matrix of these policies and legislations and a brief discussion on the main findings

4.2 Understanding the policy and legislative context

This section aims to clarify the position of UA as it manifests itself within international policies and legislation, so as to reveal the global approach towards UA practices. The concepts of policy, legislation and civil society should be understood in this sense, to exclude ambiguity and contribute towards a better understanding of the proposed guidelines related to this chapter. From the work of Kleyn and Viljoen (1998)), it can be seen that “legislation suggests a system of rules

and regulations which gives order to society by means of enforcement through various government institutions, while [a] policy is a set of guidelines which is developed in accordance with legislation so as to assist the various role players in legislation implementation" (Cilliers, 2014:47). Often referred to as the ''third sector'' of society, civil society refers to forums and non-governmental organisations in which citizens associate so as to reach a common goal or purpose, "expressing the interests and values of their members or others, based on ethical, cultural, political, scientific, religious or philanthropic considerations" (WB, 2013).

4.3 Challenges of practice-to-policy

Both on an international and national level, institutional bodies reviewed urban and agricultural policy priorities, which led to the inclusion of new actors, alternative food production methods and developing the potential of cities as instruments in sustainable development (Florin & Renting, 2015:7-8). This progress for UA is not without complications and challenges, including but not limited to the following issues:

4.3.1 Ineffective policy and restrictive policy hierarchy

Systems of governance are often constrained by the 'politics of policy and legislation, such as rigid hierarchies, "institutional self-interest", corruption, short-term thinking and planning horizons, sector divides and fragmentation, overregulation, poor engagement between governmental and non-governmental actors, as well as low learning and innovation capacities (Pahl-Wostl, 2009). This is also the case for agriculture-related policies in South Africa, where policy formalities and hierarchies impair effective action (De Wit *et al.,* 2015:55-57).

4.3.2 Environmental goals dependency

Legislation and policies are important, strategic tools available to actors in developmental processes, essential in providing a framework supported by guidelines in which these actors make decisions. While this is the case, environmental goals are often under-represented in urban planning and management processes, due to a number of issues and challenges associated with the integration of the environment into these processes. As identified by Kleyn and Viljoen (1998:12), one such an issue is the dependency of planning for environmental spaces within urban areas on the policies and legislation guiding this development and planning process. Another is the challenge of delineating an extensive issue, such as the environment and the underlying principles associated with it, for use in policies and legislation. Aligning environmental goals with the larger urban development goals could increase the chances of realising these environmental goals.

4.3.3 Lack of financial support in policy

As stated in the literature study (Chapter 2), policy and legislation for UA should address the lack of financial support available to small and emerging farmers as formal policy support for UA farmers in South Africa is not significant.

In South Africa, the financial support system available to small-scale and emerging farmers, include major stakeholders such as banks, agricultural cooperatives and agribusinesses, the Land and Agricultural Development Bank of South Africa (Land Bank), private investors and other credit and financial institutions. However, several of these supporting stakeholders' policies are laden with restrictive and exclusive conditions (restricted to certain agricultural typologies, gender and racial conditions, rural preferences, etc.) (DAFF, 2015). Even more troubling is the reluctance of financially-able stakeholders to participate due to the associated risks. Reasons hindering the involvement of such potential backers are numerous, such as failing practices, uncertain crop yields in the face of climate changes and perceived incompetence of especially subsidence UA practitioners bring UA as economically rewarding investment into bad repute (Cabannes, 2011:33). This results in a financial support deficit for existing and emerging urban farming initiatives.

In 2013, retiring Member of Parliament, Mr. Mangosuthu Buthelezi expressed his opinion that “it is not for a lack of throwing money at our problem that we [the South African government] fail” (News24, 2013). This was said regarding the dismal state of the education system in spite of South Africa having some of the largest GDP percentage expenditure on education of any African country. The same logic applies to financial support provided to small and emerging farmers. It is not that small-scale farmers do not receive support, but rather that support is predominantly monetary, laden with restrictions, and as a result it fails to address the broader range of complications which small-scale and emerging farmers face. Cabannes (2011:23-32) identified the following associated problems and limitations from international case studies, which included the South African city, Cape Town. See **Table 4.1**

Table 4.1: UA financial support complications

Type	**Complications**

Institutional	- UA credits are granted mostly for **commercially oriented activities** such as raising animals, agro-processing or marketing.
	- **Reluctance of credit institutions** to give loans to urban farmers for reasons such as:
	  - Lack of proper title deeds
	  - Lack of suitable collateral
	  - Associated risks are too high (essentially crop failure from climate changes)
	  - High default rate
	  - Limited financial capacities of farmers

Practical	- **High interes**t loans provided by micro financing institutes and conventional banks hinder the shift from subsistence to more market-oriented activities. - Urban farmers are not recognised within the **formal institutional landscape**, an as a result they are ineligible for support from formal banking systems and public institutions.

Urban farmers	- Prevailing **self-financing** methods, although innovative, are not as efficient.
	- Farmers are **reluctant** to seek financial support, for reasons such as:
	  - Unsuitable loans (size and duration)
	  - Exasperated processes
	  - Lack of land titles
	  - High interest rates
	  - Lack of knowledge on credit obtainment

Source: Adapted from Cabannes (2011:32-35).

In order for UA to realistically contribute to urban resilience, self-sustainability and overall increased urban food production an enabling financial support system should be established at national level and implemented locally. Furthermore, such a system should include multi-faceted supporting mechanisms (such as training courses, public-private linkage development, etc.); it should be developed in accordance to the unique localised demands of actors and make provision for commercial and subsidence farmers alike (Cabannes, 2011:34). Both household and communal gardens can be utilised as tools of economic growth; contributing towards improved food and nutritional security for the participants, if sufficient support is provided. Jacobs *et al.* (2010:19) propose that non-monetary social instruments, such as health and education, which develop human capabilities, reduce labour costs and stimulate beneficiary participation in the labour market, should also be included within support systems. Such support could include input vouchers, resource vouchers and institutional support (Jacobs *et al.*, 2010:18) in addition to credits, subsidies and capital investment.

In conclusion, it is not the complete lack of support, but the manner in which it is provided that often erodes the significant impact current support could provide. Effective financial support systems should comprise more supporting methods than that of a merely monetary value. Consequently, the way support is provided to urban farmers and small-scale farmers should evolve to include non-monetary instruments with indirect monetary value.

4.3.4 Institutional reluctance to reform

Spatial transformation is hindered as several public and private institutions are set in their established modes of operation. As a result, the benefits of UA; such as higher density, mixed-use development are said to be a “novelty in South Africa”, in particular in urban sites which are often promoted as opportune locations for urban regeneration, such as brownfield sites (Turok, 2015:15).

4.3.5 Limited policies available for UA

"Urban resilience" (alternative terms associated with this include "resilient cities" and "self-sustaining cities") is a term often used in attempts at defining and understanding the qualities which contribute towards an urban environment that could be said to qualify as “sustainable”. An increased awareness toward this concept within a South African institutional environment is evident as several local municipalities promote urban resilience as an important theme in spatial and urban planning policy. Ranging from a mere inclusionary position (included in strategies and plans for several so-called "smaller municipalities" of South Africa), to that of primary theme in development strategies, urban resilience is gaining "a central place in spatial and urban planning policy in South Africa (Bobbins *et al.,* 2014:1). The increased awareness of self-sustaining cities (and in effect UA) is encouraging, however, the same level of recognition is not found at a national level as it will become clear from the policy analysis (Section 4.7 and 4.8).

4.4 Acknowledging UA within developmental policy

According to Florin and Renting (2015:6) an "enabling political an institutional environment" could contribute towards more sustainable, fair and resilient food systems. Historically, agricultural policies supported industrial and intensive production method agriculture. This led to increased food miles, opportunity for centralised control of urban food chains and disregard for the ecological impacts of planning (or a lack thereof) for current food chains and production networks. As this may be the case, there is a growing global awareness of the benefits of planning urban spaces which accommodate and foster food production systems. The importance and benefits of pro-actively planning for, and in accordance to, rural-urban linkage systems and the need to incorporate these issues into realistic policy has been recognized (Florin & Renting, 2015:6; Mattheisen, 2015:43-44, COGTA, 2016).

In general, the role of UA as potential instrument of sustainability was overlooked since cities, as the catalysts of change and growth, were only relatively recently realised. Thus, solutions for their related issues, such as urbanisation, human settlements, globalisation, and prevailing food and nutrition insecurity for the urban poor, were primarily sought through generic, broad scale strategies; such as increased urban inclusivity (Parnell, 2016:534). Recent policy and agenda

changes, however, take a "zoomed-in" approach to urban development, with more specific strategies (Parnell, 2016). These strategies are focused on achieving sustainable development within each of the three sectors of development, by utilising and integrating the multi-sectoral urban components to achieve greater effect (such as using green urban economy to achieve economic and ecological development objectives). The evolution of how cities as concept was perceived and the consequent development strategies, can be seen in **Table 4.2** (Parnell, 2016:533) and **Table 4.3** (Parnell, 2016:534).

Table 4.2: The Urban Agenda evolution in international policy

Period	EVOLVING CONCEPTIONS OF CITIES *Factual assertions about urban regions & trends*	STRATEGIES FOR URBAN DEVELOPMENT *Theories about how to change factual realities in urban regions*
UNCED 1992 (recognition of "the local")	• Cities and urban growth as problems; sustainable urban and rural development	• Local authority and local stakeholder engagement and collaboration • More integrated local planning
Habitat II 1996 (cities as strategic sites in a globalizing economy)	• Cities as growth centers—as "half the world's population" • Focus on "mega-cities"	• Inclusive Cities • Good Urban Governance • Public–Private Partnerships/Privatization
Rio +20/Current & Next (the world as an urban system)	• Cities as centers of economic, social, and ecological productivity in a global city system • "City as Opportunity" • Cities as "innovation spaces" • "Cities as Development Agents" • Cities as Leaders of Climate Action	• Regional (Rural–Urban) Integration • Green Urban Economy • Transition Theory/Regenerative Cities • Cities for Life (equity and social justice)

WORLD DEVELOPMENT

Source: Adapted from Parnell (2016:533)

Table 4.3: Shifts in political implementations of the Agendas

Habitat II, 1996	Habitat III, 2016
• Goal on sustainable urban settlements • Inequality was not part of the agenda • Agenda focus on poverty • Promotes gender equality & gender-sensitive institutional frameworks • Human rights and freedom • Poverty and HR • Connects rights to participation • Rights and land (evictions) • Promotes and enable environment that resulted in the deregulation of housing market • Migration was considered as a negative aspect of urbanization • Cities were considered as "platforms"	• Connects sustainable urban dev. to sustainable development • Inequality is being integrated into the development agenda • Agenda on poverty and inclusion • Programmatic mainstreaming of gender • Adoption of Human Rights-Based Approach • Promotes a regulatory mechanism and stronger presence of State and civil society • New Urban Agenda promotes policies to foster migration to enable the poor to move to more dynamic areas • Cities are considered as "vectors" of change

Source: Parnell (2016:534)

This changing approach towards achieving sustainable urban development (as seen in **Table 4.2** and **Table 4.3**) focuses on smaller targets and, in effect, improves the measurability of

sustainability progress. Sustainability at a city level is achieved by improving it at a neighbourhood level. As such UA as policy instrument can be a potentially significant contributor towards achieving sustainability on a neighbourhood-level, whilst also enhancing overall sustainability of the urban system.

With the turn of the century came a newfound interest in the application of UA within policies and legislation, with forums reviewing UA within the policy agenda as a product of the farmers' wants and needs. One such platform for discussion came in the form of a virtual conference presented by FAO and ETC- RUAF, from 21 August-30 September in 2000 (Drescher, 2001:7). Although the general themes of the conference (household food security and nutrition, urban and peri-urban agriculture, health and environment and urban planning) did not exclusively regard UA issues related to urban planning, the relationship between urban planning and UA was a key component of the conference (Drescher, 2001:7-8). Consequently, discussions from the 720 participants yielded useful insight into community needs and expectations with regard to UA practice and urban planning integration (Drescher, 2001:7). Earlier approaches at incorporating UA in policymaking relied on the consensus of participatory farmers, institution and consultants. This meant that it was very much a process of experimenting with ideas and themes, based on shared knowledge and experience as the UA movement gained support and motion, with renewed focus on practice supported by policy (Drescher, 2001:7-8). These recommendations for implementing more successful UA environments, from a spatial planning perspective, are presented below, see **Box 4**.

Box 4: Community recommendations regarding practice and policy in 2000

- Strengthen the organisation of UA practitioners (farmers' groups, farmers' associations, clubs, etc.).
- Connect UA to ongoing urban programmes (Sustainable City Programme, Urban Management Programme and Local Agenda 21).
- Strengthen institutional capacity at the local level.
- Develop guidelines for land-use regulations that protect UA uses, encourage investment in UA and make credit use viable.
- Assess land and water tenure/ access conditions -develop policy reform proposals and tools.
- Develop training materials related to planning for UA (including use of GIS and remote sensing for urban planning).
- Organise regional workshops on the integration of UA into urban planning with the broad approach of considering food security, health, environment issues, and sustainable city development.

Source: adapted from Drescher (2001:7)

From the above (**Box 4**), four primary UA farmers' expectations for policy considerations became evident, these are:

- **Formal recognition** in policy and legislation to resolve restrictive conditions such as a lack of land access as a result of tenures, and an improved connection of UA within urban programmes. These would include, *inter alia,* Agenda 21 and the Sustainable Cities Programme.
- **A need for guidance**, training and capability development of all stakeholders involved.
- **Financial support programmes** and initiatives through policy.
- The need for **recognition** within the sphere of larger development decisions.

It is thus evident that urban famers yearn for policy support in the practices, and as such, it is submitted that the prominent position of policy and legislation in successful implementation of UA should be established.

4.5 Former policy considerations

In 2003 the Resource Centres on UA and Food Security (RUAF) published the first edition of a policy-guiding document set in accordance with the community input from, which recognised the importance of multi-level institutional planning in improving UA projects and programmes, identifying the active role of local municipalities (Dubbeling & Santandreu, 2003).

The eight key themes as identified in the guiding document is summarised in **Table 4.4**, along with the underlying policy considerations.

Table 4.4: RUAF Guiding themes and policy considerations of 2003

Theme	**Policy considerations**
1.UA and citizen involvement	• Dialogue between the municipal administration and social actors must be facilitated and supported in the design and implementation of UA projects. • Municipal management planning should provide for local capacity building in UA so as to facilitate processes.
2. UA: **Land use management** and physical planning	• UA should be included as a multifunctional component in municipal land planning and standard development processes concerning land use and environmental protection. • Policies that provide security and incentives for urban farmers should be promoted.
3. **Microcredit** and **investment** in UA	• Local governments should implement credit and financing policies and instruments. • The funding programs should be coupled with actions aimed at strengthening social organisation, technical assistance, training and marketing support.
4. Recycling organic waste in UA	• Ways of using solid organic waste in UA in a sanitary manner should be further studied and validated.

	• Training should also be provided to urban farmers on techniques for reusing waste and the community should be educated at the source. • The creation or updating of efficient standards for fostering and regulating recycling should be promoted.
5. Treatment and use of **wastewater** in UA	• Research, awareness-raising, and training activities should be undertaken concerning the efficient use of water, the application of risk management strategies and the adoption of appropriate technologies for the treatment of wastewater. • The development of wastewater treatment and uses requires the adoption of a facilitating legal framework and the promotion of sustainable financing that would directly link water treatment to its reuse.
6. UA: Fostering **equity** between men and women	• It is important for local governments to recognise and reinforce equitable participation by men and women, promoting gender equity in UA policy design, planning and implementation.
7. UA and **food sovereignty**	• UA should be promoted as a family farming practice that can help meet the family's own nutritional needs, within their own tradition. • UA should also be included into formal, non-formal and community markets.
8. **Processing** and **marketing** UA products	• The public policy on UA should provide for access to capital, inputs, and marketing strategies for the poorer sectors, promote standards to regulate small business initiatives, support promotion strategies and increase producers' organisations' representation in government bodies.

Source: adapted from Dubbeling and Santandreu (2003).

Several new guiding documents, policies and legislations have been developed to date (such as the Growing UA Report (Hagey *et al.,*2012), the Guide to Implementing the UA Incentive Zones Act (Zigas, 2015) and UA Policy, Planning and Practice (UAWG, 2013). Documents such as these identify key considerations and prerequisites of UA related policies and legislation and provide best approach mechanisms on increasing UA policy support. With regard to participation and investment, the Food and Agriculture Organisation of the United Nations (FAO) argued that agriculture investment in developing countries is primarily the work of the farmers actively involved. This highlights the need to include famers in strategies aimed towards agricultural investment (UAWG, 2013:12). This might be said for all matters regarding inputs in UA programmes and policy. UA is for people by people and should be recognised as such in policy and legislation.

Moreover, the systematic integration of these documents should be applied in the formulation of policy considerations suited to the urban context of South Africa, improving the significance of UA implementations. These policy considerations for use in South Africa, are presented in Chapter 8.

4.6 The status and recognition of UA in international and domestic law.

This section will briefly clarify the position of UA in context of the law regarding international policies and agreements as well as domestic policies and legislation. This is done to establish the legal status of UA within the context of the research and demonstrate its relevance. This section argues that, when viewed holistically, the Constitution as well as legislation and international obligations make it clear that UA has legal support in South Africa. And that UA has legal support in South Africa even if only on an indirect level. At the very least, it will become evident that the concepts of both sustainability and UA are fully supported by the aspirations of the Constitution and the law.

4.6.1 The legal relevance of international policies in a South African context

It is important to note at the start of this discussion that the Constitution of the Republic of South Africa is (in terms of its Preamble, section 1(c) and section 2) the foremost law in South Africa which supersedes all other law, conduct and policy. (Constitution of the Republic of South Africa, 1996). Any areas that are inconsistent with it are thus invalid as held in the landmark judgment in the case of Pharmaceutical Manufacturers Association of SA and Another: in re Ex Parte President of the Republic of South Africa and Others (2000). Consequently, any international policies and legislation must also be compatible and find support within the Constitution in order for them to be applicable at all in the Republic.

It is argued that all the international policies, legislation and agreements discussed in this chapter are relevant in the South African context with respect to UA because they are specifically supported and enforced by the Constitution, to greater or lesser degrees. (Dugard *et al.*, 2011:54). This means that, whilst they are international agreements, they are nevertheless applicable in the domestic context due to the nature of the South African legal system and becomes applicable when we ratify them.

The South African legal system is bound to international law. Section 231 of the Constitution (1995) provides that South Africa is bound by, and must ergo adhere to, all international agreements approved by both Houses of Parliament. These Houses of Parliament are the National Assembly and the National Council of Provinces. Moreover, section 232 of the Constitution prescribes that even uncodified (unwritten) customary international law is applicable in South Africa, provided that it is in agreement with the Constitution. A similar provision is contained in section 233, which instructs a court to favour any interpretation of legislation that is in harmony with international legal provisions. In addition, section 39(1)(b) of the Constitution compels courts, when interpreting the Bill of Rights, that the court **must** consider international

law, even that which is not binding on the country *per se* (Constitution of the Republic of South Africa, 1996).

Also, apart from the importance courts place on South Africa's need to fulfil its international agreements (as further explained later in this section), the court in the case of S v Makwanyane (1995) also adopted the view that both binding and non-binding international law has impactful value in interpreting the Bill of Rights. This is in line with the Constitution, which mandates courts to consider international law, wherever relevant. The importance of international law in this regard (as helpful not as binding) is indisputable (Currie & de Waal, 2006:159).

In terms of treaties that have been accepted by the legislature and which South Africa is part of, the Constitutional Court has been vehement about the importance of South Africa honouring these obligations. As seen in the case of Glenister v President of the Republic of South Africa (2011), Ncobo went out of his way to point out that international law has important significance in post 1994 South Africa.

Therefore, it can be argued that international as well as national policies and legislation must be seen together in this context, in that both international and national policies and legislation are mutually supportive of one another. This is further supported by the high demand the Constitution places on adherence to international law, as discussed above. As further discussed, even international policies which are not binding *per se* in South Africa, can find support in the Constitution. This means that, even if international policies do not explicitly mention UA as a practice, they can nevertheless be applicable to and support the South African government's domestic need to implement UA as sustainable policy. As is supported by outcome of the Glenister case (**Box 5**), a possible future agreement or treaty accepted by South Africa which mandates governments to implement UA as policy, could be used as a way to force, via litigation, the South African government to stop dragging its feet in implementing UA as development policy domestically (Minister of Justice and Constitutional Development and Others v Southern African Litigation Centre and Others, 2016). The relationship (and consequently possible legal support for UA) between international and domestic law is explained in **Box 3**.

Box 5: South African law subject to international agreements.
In the Glenister case of 2011, the judgment of the Constitutional Court held that the Hawks which was presented to replace the Scorpions as primary corruption fighting agency in the Republic (2008), was not sufficiently protected from political interference (The Mail and Guardian, 2011; IBA, 2012). The Court made this finding on the strength not of South African legislation alone, but on the fact that an international corruption fighting agreement which South Africa was part of, decreed that domestic governments which are part of the agreement should

create effective corruption fighting units. Essentially, the Constitutional Court found that the Hawks fell short of this international provision precisely because they were ineffectively shielded from political interference, ultimately meaning that they were corruptible (Glenister v President of the Republic of South Africa, 2011). This in turn, gives people some legal demand against government incompetence, should it be present.

This box (**Box 5**) emphasises the influence of international law in South African law. This judgement was made not on the strength of South African law, but it was based on the legal obligations that South Africa as a party of an international agreement was subject to. Furthermore, these cases, and similar ones, are a precedent for other legal arguments in which international law affects domestic rulings.

4.6.1.1 International legal support for UA

Hypothetically, if South Africa should in the future become party to an international agreement concerned with promoting sustainability, for instance; and that agreement has even a single clause which demands that the domestic government party to that agreement **must** promote UA practices, therefore it means that this could be argued in a court. In other words, an interested party could then credibly bring an application to legally force government to adhere to this international requirement, based on the strength of the Glenister judgment, if such an agreement comes into existence.

The overall point in this regard is that there is hope in future that interested parties can argue their right to have government support and promote UA practices, provided that such a right becomes actionable by means of a future international agreement.

Even in the absence of such an agreement, it will nevertheless be argued that sustainable UA as a concept is compatible with and supported by South African law.

4.6.2 The difference in law between policy and legislation

It is important to point out the difference between policies and legislation at national level. Policy is put into practice by the national, provincial and or local executive body. As such, it is of a comparatively less binding nature than legislation, since it entails a set of strategic principles taken by whichever government is in power at the time in order to further its agenda (ETU, 2017). For instance, if placed within the boundaries of this research, such an agenda could include objectives often found within developmental policies and legislation, such as spatial reform, sustainability, food security, economic growth, etc.

Provided that such policy is implemented rationally, within adherence to the law, it is difficult to challenge government on this agenda or to legally force them to carry out a particular policy, as seen in the case of Bato Star Fishing (Pty) Ltd v Minister of Environmental Affairs (2004). This point was made in the Bato Star matter in the context of administrative law, where there was a dispute between the fishing company (Bato Star) and the Department of Environmental Affairs (cited as the Minister in the case). In this case, the administrative body in question dealt with governmental policy regarding fishing quotas in a way that Bato Star thought was unfair, and it hence challenged this in court. What is important for purposes of this section is that the court made it clear that executive policy, which dealt with how fishing quotas should be allocated in this case, can be challenged in court on the grounds of rationality. In other words, if the Department had created a policy which was irrational, at odds with the purpose it had to achieve, or contrary to legislation, it could be set aside in court. That does mean, however, that courts generally defer to the executive when it comes to implementing policy, provided that this is not done irrationally. This means that an attempt to force government to promote and support UA (which primarily is only enacted through policies, as is seen in **section 4.8**) would be difficult.

In contrast, whatever government occupies the executive office at any given political time is **always** bound by law to follow legislation due to the principle of the rule of law (as was concluded in the judgment in the case of Fedsure Life Assurance LTD and others v Greater Johannesburg Transitional Metropolitan Council and others (1999)). In this judgment, the Constitutional Court had to clarify the nature of legislative powers at local governmental level, as compared to the provincial and national levels. What is important in this context though is that the highest court, during the course of its judgment in Fedsure, reaffirmed the importance of the rule of law as a fundamental principle of South African law. In this context, the importance of the rule of law principle is that the law in terms of legislation takes precedence over executive policy and hence such policy must always be constrained by legislation. In contrast to what was said in Bato Star about the courts being submissive to the government when it comes to policy, the courts will not adopt such a hands-off approach when it comes to ensuring that government complies with national legislation.

Therefore, although the executive may make regulations that form a policy framework to accomplish goals set out in national legislation, these regulations must always adhere to and not be in conflict with the legislation. This was held by the Constitutional Court in the matter of Minister of Home Affairs v Eisenberg & Associates: in re Eisenberg & Associates v minister of Home Affairs and others (2003), where the court had to make a determination of the lawfulness of certain regulations on immigration made by the government.

As such, if the government in the future were to make inadequate regulations that were in conflict with legislation dealing with UA, one would be able to legitimately challenge that in court and bring government's implementation back in line with whatever legislation may govern UA in the future. National legislation enjoys superior status over policy regulations. This is so, because legislation is law that is democratically made by Parliament in the form of the National Assembly and National Council of Provinces. Thus, since these bodies comprise of the South African people's elected representatives, they are the Republic's law-making bodies as stated in the Constitution (section 42). The executive, in the form of the President and his cabinet, are elected by parliament in turn and are thus accountable to it, in the same way that regulations are 'accountable' to national legislation as seen in the Constitution (section 85).

This means that, whilst the national executive level of government has a discretion to adhere to its policies or not or to change policies as they see fit, it is always bound legally to adhere to legislation (Rautenbach, 2012:53). Any current or future national legislation which directly or indirectly supports UA must be seen from this perspective. In other words, such legislation must not merely be seen as aspirational or words on paper, but actual legally binding provisions. These provisions could be litigated on in court in the future and thus compel whatever government exists at the time to implement UA measures. Furthermore, in order to enhance the success of UA as a spatial planning tool, UA should be upheld in South African legislation and not just within policies.

4.6.3 The status of legislation with respect to promoting sustainable practices and UA as possible instrument

Given the importance of national legislation and that, as has been established, whatever government occupies the executive office at any given time is legally obliged to follow it, therefore, national legislation which supports UA must be seen from this perspective, as legally enforceable.

One such piece of legislation is the National Environmental Management Act 107 of 1998 (hereafter referred to as NEMA), which was enacted specifically to give effect to *inter alia* the Constitution's principles of co-operative governance between different levels of Government in terms of section 12(b) of the Act and chapter 3, section 40 of the Constitution. Moreover, NEMA also supports the Constitutional right to have the environment protected in a sustainable manner, which is a justiciable right that is specifically imposed in Constitution (section 24(b)(iii)). 'Justiciable' in this context means that it is a right which can be supported by application to a court. (Kidd, 2011: 24).

All this must be seen together in light of section 7(2) of the Constitution, which requires that "the state must respect, protect, promote and fulfil the rights in the Bill of Rights." Given that the

previous section of the Constitution (24(b)(iii)) specifically guarantees citizens the right to have the environment protected in a sustainable manner**,** it should be argued that the state is under a legal obligation to progressively realise these rights. This statement is supported by the judgement in the case of Government of the Republic of South Africa and others v Grootboom and others (2001). The judgement compelled the state to make reasonable arrangements to progressively realise the constitutional rights of the respondents within available resources. Environmental protection does not implicitly pertain to UA, as it can be destructive to natural areas. Hypothetically, clearing wetlands or local vegetation to plant crops for UA, could contribute to environmental degeneration. However, if reasonable evidence can be found supporting the contribution of UA in environmental protection in a sustainable manner, a case could be made for governmental support in implementation.

4.6.3.1 Is there Constitutional support for UA?

From the previous sections it is submitted that a policy tool such as UA, even if not explicitly mentioned in legislation, is nevertheless implicitly supported by international legislation and domestic legislation due to the Constitution's imperatives. Moreover, given the importance of the state to progressively realise rights, it follows that UA as a means towards achieving environmental sustainability which is a right enshrined in the Bill of Rights, is supported by the supreme law of South Africa.

This support can be seen in the Spatial Planning and Land Use Management Act 16 of 2013 (hereafter referred to as "SPLUMA"). In this regard especially, it is submitted that local government is obliged to promote the provisions in the Act because of the language used therein. Arguing that local governments are subject to the aspirations in SPLUMA, it can be said that (**Box 6**) National legislation supersedes provincial and local legislation, where, in terms of section 146 (2)(b) of the Constitution, 1996:

Box 6: An extract from the Constitution- section 146 (2)(b)
"(b) The national legislation deals with a matter that, to be dealt with effectively, requires uniformity across the nation, and the national legislation provides that uniformity by establishing:- (i) norms and standards; (ii) frameworks; or (iii) national policies."

Since SPLUMA clearly deals with such norms and standards, as stated in **Box 6**, an argument can be made that it is directly applicable to local government, and that local government is thus,

bound to follow it. Whilst it is certainly a guiding document to an extent, it is nevertheless far more binding on government at national, provincial and local level than mere policy. This is so because it is legislation, which, as discussed earlier is held in higher regard by the Constitution. As national legislation, SPLUMA also places obligations on government, for instance through the use of commanding language. In section 8(2) of SPLUMA, where it is stated that the norms and standards (which the minister must publicise and put into effect after consulting with provincial and local government) 'MUST' *inter alia* 'promote urban regeneration' (Botha, 2013:197).

The word 'MUST' gives the government no choice. And, an argument can be made that, since UA is integrally linked to 'urban regeneration' in the context of spatial planning, this provides an avenue for a legal obligation on government to also therefore support UA's implementation. Thus, local government, whilst having some form of executive discretion, must still remain true to SPLUMA and the aspirations of this Act.

4.7 Evaluating the current reality

The role of policies and legislation in relation to successful UA implementation is evident. To emphasise the importance and ensure the successful implementation of UA approaches, UA considerations should be included in relevant policies and legislation, addressed on multiple spheres and levels of government. A literature study related to UA practices was conducted to identify and evaluate current policies and legislation focusing on environmental issues, to determine the scope and priority thereof within international and local policies and legislation.

Both International and local policies and legislation were considered and evaluated on two levels (direct and indirect) in terms of the five important aspects pertaining to UA practices and implementation as explained in Chapters 2 and 3. In this chapter it was found that there is potential support for UA within policy and legislation (section 4.6.1, section 4.6.3), but until UA can be empirically proven to contribute to certain key concepts, such as environmental protection, limited legal support can be demanded.

Therefore, the next section attempts to evaluate the degree to which UA is recognised in policy and legislation. "Direct Support" refers to the scope of recognition of UA in international and local policy and legislation, namely the manner in which UA is recognised. In these instances it should either be mentioned or enforced **directly.**

"Indirect support" referred to the opportunity provided for UA as component of umbrella concepts of development planning (section 3.3). For example, if a policy or legislation prioritises the protection of ecological areas within urban spaces by promoting or enforcing green infrastructure planning, it would be assumed UA would be a favourable instrument to reach this objective in

terms of the indirect support level theory. Evaluating UA as policy instrument of sustainable urban development on a general, non-exclusive category such as this is unfavourable. It allows an 'easier' criteria-fulfilment by leaving grey areas for subjective justification towards a desired result, which may taint the credibility of this research. Therefore, the following restrictions will be imposed on this evaluation:

- A criterion within the "Opportunity-aspects" category can only be **satisfied** by a policy priority, objective, goal or supporting phrase which allows realistic and immediate integration of UA. It follows that a policy priority, objective, goal, supporting phrase recognising the implementation of subsidy housing with open spaces as requirement will **not** satisfy the criteria (even though a community garden could be developed on these green areas), unless **specific** mention of UA or UA-related practices is made; such as subsistence farming or home gardening.
- The following aspects were found to be important theoretical concepts for UA practices (section 3.3), but can only be satisfied by a policy priority, objective, goal or supporting phrase meant to be applied within an urban or peri-urban context:
  - Sustainable urban development
  - Community development
  - Environmental focus or protection
  - Economic development
  - Food provision and security

4.8 International policies and legislation identification and evaluation

The following policies and legislation were included as part of the international evaluation, as they are integrally linked to the contextual themes of this study. These themes are urban development, sustainable development, food and nutrition security and agriculture. These can be seen in: Agenda 21 (1992), Habitat Agenda (1996), 2030 Agenda for Sustainable Development and SDGs (2015), and the prospective Habitat Agenda III: New Urban Agenda (2016).

4.8.1 Agenda 21 (1992)

Agenda 21 is the political document adopted at the United Nations Conference on Environment and Development, which was held in Rio de Janerio, Brazil from 3-14 June 1992. This policy is compiled to deal with relevant matters such as poverty eradication, urbanisation (too a minimal degree), poverty eradication, sustainability and adequacy of human living environments and overall health conditions, sustainable agriculture and integration of social and government participation in policy implementation (UN-DESA, 1992). The Table 4.5 evaluates Agenda 21 (1992) with regard to the theory derived aspects deemed as valuable spatial and policy integration

concepts, so as to determine whether this policy is supportive of UA. Additionally, it will also be determined if UA is realised within policy and legislation as a component of the larger sustainability objectives in the social, economic and ecological spheres.

Table 4.5: Evaluating Agenda 21 (1992)

Aspect	Supportive of the specific aspect ✘/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mentions	✘	
	Enforces		
Opportunity-aspects			
Sustainable urban planning considerations	✓		"Undertake activities aimed at the promotion of food security and, where appropriate, food self-sufficiency within the context of sustainable agriculture"
Community development	✓		Empower community organisations and people to enable them to achieve sustainable livelihoods;
Environmental focus or protection	✘		*Makes mention of sustainable agriculture, but not implied towards an urban context. Mostly rural references.*
Economic development	✓		"Establish a long-term strategy for eliminating poverty and sustainability by improving the conditions governing these issues. "The groups will include poor smallholders, pastoralists and artisans, fishing communities, landless people, indigenous communities, migrants and the urban informal sector".
Food provision and food security	✓		"The eradication of poverty and hunger, greater equity in income distribution and human resource development remain major challenges everywhere".

Source: UN-DESA (1992: 1-351).

Mostly concerned with rural development, sustainable agriculture practices and methods and changing consumption patterns, this policy makes no mention of UA. The lack of UA recognition within this policy may be attributed to several factors. One consideration which may be able to elucidate the lack of formal recognition of UA in the Agenda 21 policy pertains to the disciplinary era within which this policy was prepared, as UA only received closer review within the last fifteen to twenty years.

4.8.2 Habitat Agenda (1996)

The Habitat Agenda is the policy document of the Habitat II conference held in Istanbul, Turkey in 1996 with the two central themes being, "sustainable human settlements development in an urbanising world" and “sustainable shelters for all”, rooted in the concepts of equity, sustainability and equality (UN-HABITAT, 2003). At the heart of the document are humans and their concerns, especially the conditions which would contribute towards sustainable and adequate shelter for all (UN-HABITAT, 2003). This is a powerful guiding document for sustainable development, as it addresses the social, economic, and ecological barriers contributing to inadequate human living environments, and present guiding policy to the decision-makers and governing bodies. This policy is extremely relevant as it serves as a foundation from which these governing bodies may strive towards sustainable development, and in effect, sustainable cities. Recognising the problems brought on by a growing urban population and dissipative urban spaces, there is degree of urgency towards urban planners and policy decision-makers to address these issues through “innovative methods of urban planning and design and urban development´ (UN-HABITAT, 2003).

Table 4.6 evaluates the Habitat Agenda (1996) using the same *modus operandi* as that used for analysing Agenda 21 above.

Table 4.6: Evaluating the Habitat Agenda (1996)

Aspect	Supportive of the specific aspect ✗/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mention	✓	“Develop and support the implementation of improved land-management practices that deal comprehensively with competing urban land requirements for housing, industry, commerce, infrastructure, transport, green spaces and forested areas, taking into account the need for spaces for everyday activities - for playgrounds, parks, sports and recreation areas and areas suitable for gardening and UA” “Healthy and environmentally sound agricultural activities and the provision of common land should be integrated into the planning of urban and peri-urban areas”.
	Enforce		
Opportunity-aspects			
Sustainable urban planning considerations	✓		“Bringing the development of urban areas into harmony with the natural environment and the overall system of settlements is one of the basic tasks to be undertaken in achieving a sustainable urbanised world”. ” Sustainable urban development requires consideration of the carrying capacity of the entire ecosystem supporting such development”. “To avoid unbalanced, unhealthy and unsustainable growth of human settlements, it is necessary to promote land use patterns that minimise

		transport demands, save energy and protect open and green spaces. Appropriate urban density and mixed land use guidelines are of prime importance for urban development.”
Community development	**x**	
Environmental focus or protection	✓	“Cities could develop the capacity to maintain their productivity, to improve the living conditions of their residents and to manage natural resources in an ecologically sustainable way”. “National, subnational and local policies and development plans must be carefully re-examined to ensure optimal land use and geographically better-balanced economic development”.
Economic development	✓	“Promoting optimal use of productive land in urban areas”.
Food provision and food security	✓	“Encourage, where appropriate, the establishment of productive and recreational green belts around urban and rural agglomerations so as to protect their environment and contribute to the provision of food products”.

Source: Habitat Agenda (1996: 1-229)

It is of importance to mention that, even though several policy priorities, objectives and goals for community development provided opportunity for UA, no specific one links agriculture/ productive ecological sites or farming in urban spaces with the social goals. It is evident from **Table 4.6** and the literature that Habitat Agenda focuses on human shelters and living environments as the aim, international and intergovernmental cohesion as the catalyst and effective policy formulation as the means to achieve sustainable development (UN-HABITAT, 2003).

4.8.3 2030 Agenda for Sustainable Development and new SDGs (2015)

In September 2015, several nations adopted the 2030 Agenda for Sustainable Development and the associated Sustainable Development Goals (SDGs), subsequently committing to build on the shortcomings of the Millennium Development Goals (MDGs). Even though this Agenda conveys the global commitment to sustainable development, achieving the SDGs might prove an even more troublesome task than achieving the previous MDGs did. These considerations are mainly financial, as the public finance system as is, would be unable to accommodate the additional investments needed to finance this new agenda (Thiaw, 2016). The most relevant goal to this research is goal 11: “Make cities inclusive, safe, resilient and sustainable". The targets for this specific goal take into account accessibility, protection of cultural heritage, affordability of housing and similar issues (UN, 2016).

The following table (**Table 4.7**) evaluates the Agenda for Sustainable Development and new SDGs (2015) using the same *modus operandi* as that used for analysing Agenda 21.

Table 4.7: Evaluating the 2030 Agenda for Sustainable Development and new SDGs (2015)

Aspect	Supportive of the specific aspect ✖/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mention	✖	
	Enforce		
Opportunity-aspects			
Sustainable urban planning considerations	✖		
Community development	✖		
Environmental focus or protection	✓		"By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management ". "By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels".
Economic development	✓		"By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".
Food provision and food security	✓		In regard to urban spaces: "We are also determined to end hunger and to achieve food security as a matter of priority and to end all forms of malnutrition". However, this guiding policy lacks any mention of agriculture in urban areas or urban food production services.

Source: UN (2016)

The 2030 Sustainable Development Agenda and SDGs include a focus on environmental protection, sustainable development, urban growth and associated issues, but little to no reference is made of food producing systems within an urban environment, let alone UA.

4.8.4 Habitat Agenda III: New Urban Agenda (2016)

This policy document is expected to include significant focus on issues related to urbanisation and globalisation. The issues which most probably would receive preference in this regard would be related to matters such as: ensuring safety and security for urban inhabitants, gender and

demographic equity, risk reduction and urban resilience, as well as determining a mechanism to track and measure the progress (Citiscope, 2016). Several complexities and controversies surround the New Urban Agenda, as the scale on which this political document operates has significantly decreased, with the focus shifting from nations to cities. Parnell (2016:536) argues that organised local government would need to realign policies to include the heightened urban priority but, more importantly; the shifting focus from a national to urban level would reveal the efficacy of their sustainable development actions since the achievements would be more measurable. Consequently, inter-governmental cohesion would need to be effective, as the local provincial governments would be increasingly responsible for the implementation of the New Urban Agenda goals and, in effect, the SDGs. Both the New Urban Agenda and 2030 Agenda for Sustainable Development will form part of the policy analysis.

Table 4.8 evaluates the New Urban Agenda (2016-draft) using the same modus operandi as that used for analysing Agenda 21.

Table 4.8: Evaluating the Habitat Agenda III: New Urban Agenda (2016-draft)

Aspect	**Supportive of the specific aspect ✖/✓**		**Quotes from the document indicating support (Only if supportive in terms of UA).**
Direct Support			
Make mention of UA, urban farming	Mention	✓	"We will also support UA and farming as well as responsible, local, and sustainable consumption and production, and social interactions through enabling accessible networks of local markets and commerce as an option to contribute to sustainability and food security".
	Enforce		*N/A as the Habitat agendas are not enforceable.*
Opportunity-aspects			
Sustainable urban planning considerations	✓		"We will promote planned urban extensions, infill, prioritising renewal, regeneration, and retrofitting of urban areas".
Community development	✖		
Environmental focus or protection	✖		
Economic development	✖		
Food provision and food security	✓		"We will also support UA and farming as well as responsible, local, and sustainable consumption and production, and social interactions

		through enabling accessible networks of local markets and commerce as an option to contribute to sustainability and food security". "We will promote the integration of food security and nutrition needs of urban residents, particularly the urban poor, in urban and territorial planning, to end hunger and malnutrition. We will promote coordination of sustainable food security and agriculture policies across urban, peri-urban, and rural areas…" "Strengthening the role of small and intermediate cities and towns in enhancing food security and nutrition systems".

Source: UN-HABITAT (2016b:1-23)

Even though the New Urban Agenda has not been adopted yet, it can be seen that UA receives special priority within this political document, mainly as a result of shifting focus from nations to cities as the main habitat of humans. This gives reason to be **in a state of anticipation** of the potentially consequential UA policies and possibly even legislation that this agenda could give rise to.

4.9 Local Policies and legislation identification and evaluation

The following policies and legislation were included as part of the local evaluation, as they are integrally linked to the contextual themes of this study, namely urban development, sustainable development, food and nutrition security and agriculture. These include the: White paper on Agriculture (1995), National Environment Management Act 107 of 1998, National Policy on Food and Nutrition Security (2013), Spatial Land Use Management Act 16 of 2013, Policy on Agriculture in Sustainable Development (n.d.), Integrated Agricultural Development Finance Policy Framework (IADFP) for Smallholder Farmers (2015), and Integrated Urban Development Framework (2016).

4.9.1 White Paper on Agriculture (1995)

Table 4.9 evaluates the White Paper on Agriculture (1995) with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.9: Evaluating the White Paper on Agriculture (1995)

Aspect	Supportive of the specific aspect ✗/✓	Quotes from the document indicating support (Only if supportive in terms of UA).

Direct Support			
Make mention of UA, urban farming	Mentions	✓	"Food insecurity among the urban poor is the result of low wages and high unemployment levels. Insecurity can be reduced by various short and long-term programmes such as employment programmes and welfare programmes, by low prices for staple foods and by urban food production by means of food gardens".
	Enforces	✓	"The Government should therefore support the full spectrum of production systems and practices, from urban food gardens and small-scale production for household income and food security to large-scale production systems which can add considerably to national food security."
Opportunity-aspects			
Sustainable urban planning considerations			
Community development			
Environmental focus or protection			
Economic development			
Food provision and food security			

Source: DAFF, Department of Agriculture, Fisheries and Forestry (1995)

It is evident from the above table (4.9) that the White Paper on Agriculture recognises the impact of UA in contributing to poverty alleviation, nutritional improvement and food security as well as the social quality of life and equity between urban inhabitants.

4.9.2 National Environment Management Act (NEMA) - Act 107 of 1998.

The National Environmental Management Act (NEMA) is the principal environmental law of South Africa primarily focussing on environmental principles and inclusive participation by recognising the role of all stakeholders, especially vulnerable and disadvantaged inhabitants, to ensure equitable and equal planning and participation (Du Plessis & Landman, 2002).

Table 4.10evaluates the National Environmental Management Act with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.10: Evaluating the National Environment Management Act 107: NEMA (1998)

Aspect	Supportive of the specific aspect ✘/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mentions	✘	
	Enforces	✘	
Opportunity-aspects			
Sustainable urban planning considerations	✘		
Community development	✘		
Environmental focus or protection	✘		No direct reference, although environmental protection and coinciding planning regulations are mentioned.
Economic development	✘		
Food provision and food security	✘		

Source: South Africa (1998)

By subjecting this legislative Act to the boundaries of this research, it could be said that it does not recognise the potential impact of UA, even though the main principles are formulated on environmental quality, nature conservation and habitat diversity. If the boundaries should be shifted a little, it could be seen that even though the word “urban” does not appear anywhere in the Act, the word ‘sustainable’ (in relation to development) or its variations appears 15 times, meaning that an argument can be made that, since UA satisfies and advances sustainable development, it finds support in the Act as supported by the Constitution (see Section 4.6). However, this section of the research is concerned with establishing the real support of UA in South African policy and legislation. It does reveal the vagueness of policies and legislation on this matter.

4.9.3 National policy on food and nutrition security (2013)

This Policy on agriculture in sustainable development recognises the potential significance of agriculture in general towards achieving sustainable development, and also has regard to the objectives in the MDGs. The specific objectives of this policy include poverty eradication,

environmental conservation, ensuring safe and high-quality agricultural products to urban and rural inhabitants and contributing to the economic and social well-being of all (DAFF, 2013:3).

Table 4.11 evaluates National Policy on Food and Nutrition Security (2013) with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.11: Evaluating the National policy on food and nutrition security (2013)

<table>
<tr><th>Aspect</th><th colspan="2">Supportive of the specific aspect ✘/✓</th><th>Quotes from the document indicating support (Only if supportive in terms of UA).</th></tr>
<tr><td colspan="4">Direct Support</td></tr>
<tr><td rowspan="2">Make mention of UA, urban farming</td><td>Mentions</td><td rowspan="2">✘</td><td></td></tr>
<tr><td>Enforces</td><td></td></tr>
<tr><td colspan="4">Opportunity-aspects</td></tr>
<tr><td>Sustainable urban planning considerations</td><td colspan="2">✘</td><td></td></tr>
<tr><td>Community development</td><td colspan="2">✘</td><td></td></tr>
<tr><td>Environmental focus or protection</td><td colspan="2">✘</td><td></td></tr>
<tr><td>Economic development</td><td colspan="2">✘</td><td></td></tr>
<tr><td>Food provision and food security</td><td colspan="2">✘</td><td>Recognises the need to improve food and nutrition security in urban areas, but no further connections to UA can be made.</td></tr>
</table>

Source: DAFF (2013:1-20).

This Policy promotes sustainable agriculture and increased food security for all inhabitants, addressing several inequalities and deficiencies, but its content is vague and generic in terms of addressing the issue. Nevertheless, this policy recognises the need for the formulation of a legislative and policy document addressing these deficiencies (DAFF, 2013: 5).

4.9.4 Spatial Planning and Land Use Management Act (SPLUMA)- Act 16 of 2013

Incorporated into South African law by Parliament in 2013, the Spatial Planning and Land Use Management Act (SPLUMA) is widely acknowledged as a significant spatial transformation instrument set to bring about effective and efficient planning though rigid planning criteria, its primary transformation instrument being in the form of Spatial Development Frameworks (SDFs) (SACN, 2015:6). Intended to shape the content and outcome of planning, this legislation imposes the responsibility of urban transformation on local governments by recognising South African cities as the spheres for spatial and social transformation (SACN, 2015:17).

Table 4.12 evaluates the Spatial Planning and Land Use Management Act (SPLUMA) – Act 16 of 2013 with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.12: Evaluating the Spatial Land Use and Management Act: (SPLUMA)- Act 16 of 2013.

Aspect	Supportive of the specific aspect ✘/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mention	✘	
	Enforce		
Opportunity-aspects			
Sustainable urban planning considerations	✓		"Promote land development in locations that are sustainable and limit urban sprawl". "Land development optimise the use of existing resources and infrastructure".
Community development	✓		"Promote land development in locations that are sustainable and limit urban sprawl; and result in communities that are viable". The norms and standards governing land use management and land developments that "promote social inclusion, spatial equity, desirable settlement patterns, rural revitalisation, urban regeneration and sustainable development".

Environmental focus or protection	✘	
Economic development	✘	
Food provision and food security	✓	"The principle of spatial resilience, whereby flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impacts of economic and environmental shocks".

Source: South Africa (2013:2-70)

This legislation makes no mention of UA or urban food production/cultivation/raising systems. It is meant as a framework for other planning policies and, as such, its lack of recognition given to UA can be understood. The core themes of this legislation are: sustainability, equity and environmental protection as well as providing the restrictions and guidance for other planning policies, especially at a sub-national level. Therefore, the interpretation and realisation of these conditions is the discretion of local municipalities through their SDFs, which reinforces the notion that UA must be locally governed (Cabannes, 2011).

4.9.5 Policy on Agriculture in Sustainable development (n.d.)

The Policy on agriculture in sustainable development recognises the potential significance of agriculture in general towards achieving sustainable development and the objectives of MDGs. The objectives of this policy include, poverty eradication; environmental conservation, ensuring safe and high-quality agricultural products are provided to urban and rural inhabitants; and contributing to the economic and social well-being of all (DAFF, n.d.:3).

Table 4.13 evaluates the Policy on Agriculture in Sustainable development (n.d.) with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.13: Evaluating the policy on Agriculture in Sustainable development (n.d.)

Aspect	Supportive of the specific aspect ✘/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mentions	✘	
	Enforces		
Opportunity-aspects			
Sustainable urban planning considerations	✘		
Community development	✓		"Promote the production and consumption of indigenous foods". "Develop programmes aimed at empowering women, youth and the disabled; and supporting their full participation in the agricultural industry".
Environmental focus or protection	✘		
Economic development	✓		"Improve support to under-privileged farmers' organisations, cooperatives and similar institutions to enable them to extend their mandate to deal with issues of capacity building for their members and broader communities"
Food provision and food security	✓		Recognises agriculture as main source of food for urban dwellers and accordingly recognises the significance of agriculture. "Agriculture can make significant contributions to reduction of poverty levels in South Africa. It is the sector from which most of the rural poor derive their livelihoods, and both rural and urban people obtain most of their food."

Source: DAFF (n.d.: 1-32).

The following was taken from the mission statement of this policy:

"*The Policy on Agriculture in Sustainable Development forms part of the process of incorporating principles and objectives of sustainable development into the ethos of the agricultural sector of this country. It aims at integrating and harmonising the three pillars of sustainable development viz. social (people), environment (planet) and economic (prosperity). Its goals should be to ensure socially responsible economic development while protecting the resource base and the environment for the benefit of future generations* " (DAFF, n.d.: 4)

However, the policy uses all-inclusive terms such as "all people", while referring to the "agricultural sector" as a whole, but no mention of urban or peri-urban farming or farmers was specifically

made in the whole of this policy. Most of the relevant objectives are intended for rural agriculture practices and settlements. The evaluation of the Policy on Sustainable Development confirms this statement.

4.9.6 Integrated Agriculture Development Finance Policy Framework (IADFP) for Smallholder Farmers (2015)

Table 4.14 evaluates the Integrated Agriculture Development Finance Policy Framework (IADFP) for Smallholder Farmers (2015) with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.14: Evaluating the Integrated Agriculture Development Finance Policy Framework (IADFP) for Smallholder Farmers (2015)

Aspect	Supportive of the specific aspect ✗/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mention	✓	On financial support available to agriculture actors "MAFISA. This was the first state-owned micro and retail agricultural scheme that specifically targeted the working poor, household producers, smallholder farmers and micro-agribusiness entrepreneurs in both urban and peri-urban areas" *"A strategy on UA (including peri-urban agriculture) has been identified for development".*
	Enforce		
Opportunity-aspects			
Sustainable urban planning considerations			
Community development			
Environmental focus or protection			
Economic development	✓		On financial support available to agriculture actors "MAFISA. This was the first state-owned micro and retail agricultural scheme that specifically targeted the working poor, household producers,

		smallholder farmers and micro-agribusiness entrepreneurs in both urban and peri-urban areas". Ilima-Letsema is a campaign by the government to stimulate food production through household and backyard activities, creating micro-enterprises through the use of communal land and ensuring productivity of land lying fallow in the peri-urban areas
Food provision and food security	✓	The Ilima-Letsema campaign (financial support and development campaign) aims to counter high food prices by "stimulating an increase in food production and enhance food security", (with regard to peri-urban farming).

Source: DAFF (n.d.:1-140).

This policy goes one step further by acknowledging not only the impact of UA with regard to sustainable development and food security, but also by formalising UA within the agricultural sector, whilst simultaneously including UA in financial support policies.

4.9.7 Integrated Urban Development Framework: IUDF (2016)

Described as a policy initiative of the Government of South Africa, as compiled by COGTA (2016), the IUDF seeks to integrate government and social knowledge towards efficient urban management, in particular with regard to the effects of urbanisation. This policy aims to reach the NDP-goals of "economic development, job creation and improved living conditions" for all South Africans (COGTA, 2016). **Figure 4.1** presents the vision of this policy initiative, as well as the framework suggested to realise the vision; namely strategic goals and levers implemented to accomplish the strategic priorities. Significant to this research are the levers chosen to translate these goals into practice, as these levers regard matters such as financial support and sustainability, effective land governance and urban planning and community involvement; all within an urban context. The IUDF builds on practical work induced by principles of the Sustainable Cities Programme (Harrison, 2003).

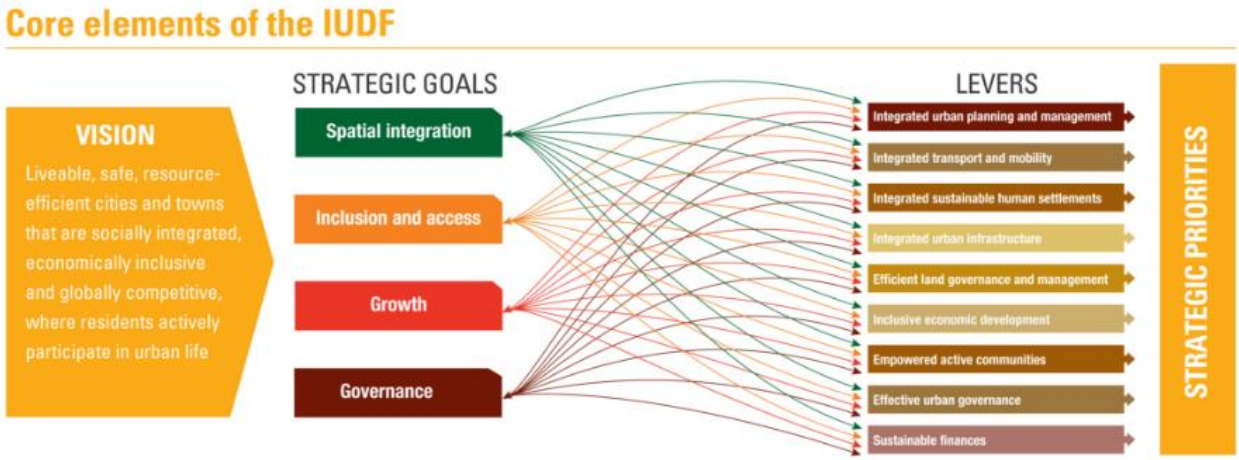


Figure 4.1: The IUDF at a glance (2016)

Source: Adapted from COGTA (2016)

This policy is relevant as it has several contextual similarities to this research that include *inter alia* liveability, safety and resource-efficiency in cities and towns (COGTA, 2016).

Table 4.15 evaluates the Integrated Urban Development Framework: IUDF (2015) with regard to the theory derived aspects deemed as valuable spatial and policy integration concepts, so as to determine whether this policy is supportive of UA, and additionally if UA is realised within policy and legislation as a component of the larger sustainability objectives, such as social, economic and ecological.

Table 4.15: Evaluating the Integrated Urban Development Framework: IUDF (2016)

Aspect	Supportive of the specific aspect ✗/✓		Quotes from the document indicating support (Only if supportive in terms of UA).
Direct Support			
Make mention of UA, urban farming	Mentions	✓	"Land-use planning should consider the needs of all groups of society, e.g. the need for urban farming, recreational facilities for the young and retail space for informal traders", as a short-to-medium policy lever.
	Enforces		
Opportunity-aspects			
Sustainable urban planning considerations			
Community development			
Environmental focus or protection			
Economic development			
Food provision and food security			

Source: COGTA (2016:79).

Taking a top-down approach to urban design, this policy promotes higher-density urban development for all (both governmental and non-governmental) development policies. The IUDF so far is the only multi-sector development policy not merely inclined towards recognising the existence of UA, but also presenting it as a short-to-medium term policy lever.

4.10 Conclusion with regard to policies and legislation as supportive of UA

Table 4.16 includes all the policies and legislation discussed in this chapter, as well as the evaluation of their support for the planning, provision and recognition of UA as instrument of sustainable urban development. In this regard, the policies and legislation are analysed for being capable of providing economic, social and ecological benefits to the city and their inhabitants. It is of importance to briefly discuss one matter pertaining to the functionality of the table, namely the categories labelled “UA enforce” and “UA mention”, which make up part of the “Direct Support” category. In order to realistically present the level of support of each evaluated policy and legislation, the following assumptions will be made

In the category Direct Support:

- If a policy or a piece of legislation enforces the implementation or recognition of UA it would be regarded as a having a Strong level of support and receive a coding consistent with the degree of support, namely a level 3 (as presented by the red colour-coding), regardless of the level of support the said policy or legislation presents to the Opportunity-aspects (Sustainable urban development, Community development, Environmental focus or protection, Economic development and Food provision and food security).
- If a policy or a piece of legislation makes mention of UA, recognises the potential of UA or the implementation of UA, such policy would be regarded as a having a Medium level of support and receive a coding consistent with the degree of support, namely a level 2 (as presented by the orange colour-coding) by default. The level of support said policy or legislation presents to the other aspects (Sustainable urban planning considerations, Community development, Environmental focus or protection, Economic development and Food provision and food security), will influence the final code assigned. The assumption is also that a policy or legislation making mention of UA would also be supportive of the Opportunity-aspects by having realised the possible positive impact of UA in development.

Table 4.16: Policy and legislation matrix

Table key:

Evaluation colour:	Level of support for UA as instrument of sustainable urban development capable of providing economic, social and ecological benefits to cities and their inhabitants.
0	Very weak
1	Weak
2	Medium
3	Strong

Policy and legislation	Aspect							Evaluation
	Direct		Opportunity-aspects					
	UA enforced	UA mentioned	Sustainable urban development	Community development	Environmental focus or protection	Economic development	Food provision and food security	
International policy and legislation								
Agenda 21 (1992)	✘		✓	✓	✘	✓	✓	1
Habitat Agenda (1996)	✘	✓	✓	✘	✓	✓	✓	2
2030 Agenda for sus dev. SDG's (2015)	✘		✘	✘	✓	✓	✓	1
New Urban Agenda (2016)	✘	✓	✓	✘	✘	✘	✓	2
National policy and legislation								
White paper on agriculture (1995)	✓	✓	No contribution as UA is already mentioned as a policy priority					3
National Environment Management Act (1998)	✘		✘	✘	✘	✘	✘	0
National policy on food and nutrition security (2013)	✘		✘	✘	✘	✘	✘	0
Spatial Land Use Management Act (2013)	✘		✓	✓	✘	✘	✓	1
Policy on Agriculture in sustainable development (n.d.)	✘		✘	✓	✘	✓	✓	0

IADFP (2015)	✘	✓	No significant impact as UA is already mentioned as a policy priority	✓	✓	3
Integrated Urban Development Framework (2016+)	✘	✓	No contribution as UA is already mentioned as a policy lever			3

It is evident from **Table 4.16** that most of the policies and legislation recognise the need for equity, equality and food security for all inhabitants towards achieving sustainable development. However, of the 11 cases reviewed, 6 didn't make mention of UA at all and only 3 made mention of food security in an urban context. This means that although these policies used in the case study are generally supportive of the concepts linked with UA (namely sustainable urban development, community development, environmental concerns, economic development and food provision and security), specific support for UA is still lacking. These policies and legislation present human beings and their settlements as the primary focus of development and promote policy, planning and development which acknowledges the indigenous, institutional and academic contribution of all stakeholders.

In general, the international policies promote sustainable urban development and to a degree recognise UA as multi-sectoral instrument for sustainability, while also acknowledging the need for policy and legislation which accommodates UA; whether directly or indirectly so. It was also found that local policies and legislation in general are negligent in dealing with the potential contribution of UA towards achieving sustainability objectives. They do, however, recognise the need to address spatial and social inequalities, which may partially explain the lack of interest in UA within earlier policy and legislation as rural areas take preference over urban areas in relation to development, agricultural, food and nutrition safety policies. Policy and legislation in broad promote sustainable development but is negligent of the possible impact of UA in achieving these goals.

In conclusion, this chapter established the importance of international agreements and their impact on domestic law, as well as the importance of national legislation and policies. Even if UA is not directly supported or mentioned by these policies, it is concluded that they nevertheless find application in South African law due primarily to the Constitution. It is of importance to note that the Constitution and Bill of Rights are inherently aspirational documents. As such, aspirations made towards sustainable UA most certainly is an aspiration that is legally sound in the Constitution and South African law.

SECTION B: EMPERICAL RESEARCH

CHAPTER 5: METHODOLOGY

This research considers sustainable UA as spatial planning instrument in an attempt to enhance the planning of sustainable urban environments. This chapter introduces the methodology employed in the empirical investigation. **Section 5.2** presents the arguments in favour of the chosen research method. The last sections present and elaborate on the criteria and coding scheme compiled from the literature study through means of theory-based sampling, to be further employed in the evaluation of selected cases.

5.1 Case study analysis

Considering the nature of the research, it is fitting that a primarily qualitative case study research method should be used, in order to acquire an understanding of the general conditions which good urban agricultural practices should satisfy. This method of research "focusses primarily on the qualitative, multi-aspect, in-depth study of one or a few cases" (Larsson, 1993:1515) in order to gain a general understanding of the underlying similarities present in cases deemed as successful ventures. According to Eisenhardt (1989:542), the qualitative data presented in a study is a valuable tool in understanding the underlying dynamics of situational relationship; a virtue which fits the aim of this research. However, there is a need to complement the qualitative method with the quantitative method. This will be realised by quantifying the selected cases with the help of a self-compiled criteria table and coding scheme, which will be discussed in Section 5.3.

Based on the work of others such as Lucas (1974), Yin and Herald (1975), Juach *et al.* (1980) and Bullock and Tuba (1987), as cited by Larsson, he argues in favour of the case study method, or the "case survey" (1993:1517) method, presenting several strengths of this method. These strengths make case survey analysis a suitable method to be applied in this research. Among others, it includes: cost reduction of research, a broadened study scope, fusing of complementary research efforts, reduced statistical prejudice, while at the same time allowing for spatial and time diversity and a generally simplistic, commensurable nature (Larsson, 1993:1516-1517). Moreover, this method is known to transcend the fragmented nature of individual case studies by highlighting the relationship between them, if one should exist. This *modus operandi* could reveal patterns of good urban agricultural practices, which would aid in the formulation of strategic recommendations for spatial planning policies and legislation in South Africa. In order to deliver the aforementioned objectives in previous chapters, the next section will present and elaborate on the coding scheme (Larsson, 1993:1516) to be used in the evaluation of chosen cases. Section 5.3 and 5.4 will present and elaborate on the criteria and the "coding scheme" (Larsson, 1993:1516) of the criteria to be used in the evaluation of the chosen cases.

5.2 Research approaches: Qualitative and Self-ranking

The first major research methodology applied, is the qualitative research method, sampling. This is a process by which the cases or data which will be examined during the unfolding of a study, are systematically selected (Cohen & Crabtree, 2006). According to Cohen and Crabtree (2006), a strong study should incorporate more than one sampling approach, whilst oscillating between sampling and analysing data. For this study three main sampling approaches were selected from a wide range of others. These are: Theory based sampling, Criterion sampling and Critical case sampling, all of which will be explained hereafter.

Theory based sampling is the process through which "incidents, slices of life, time periods or people" are selected for inclusion base on their potential manifestation of important theoretical constructs (Patton, 2001:238). Cohen and Crabtree (2006) argue that this sampling approach is an important component in the process of developing grounded theories. Furthermore, this sampling process uses emerging theoretical data to develop a thorough understanding of the dimensions shaping a specific concept.

This particular method was selected for two primary reasons. First, this research aims to further develop the theories and concepts concerning UA, in particular those involved in implementing UA in policy and legislation. Second, theory-based sampling is used to develop theory and concepts that not only connect to real life events and circumstances, but which are also emergent from and grounded in these conditions (Cohen & Crabtree, 2006).

This sampling approach was used in the study in two ways. Firstly, it was applied to the reasoning behind, and process of creating the criteria for use in the case study analysis, which was based on the RUAF guiding work on UA (RUAF, 2009). *Inter alia*, this study focused on the theory and concept development of emerging theoretical concepts surrounding UA, such as policy approaches, shortcomings of the implementation of UA and the link between UA and urbanisation. By so doing, this meant that the approach in question was constantly challenging the theoretical concepts that are associated with UA, such as sustainability. Secondly, theory-based sampling was applied as part of a qualitative inquiry into the case study analysis. The four cases included in the study, namely Brooklyn Grange, Homeless Garden Project, Harvest of Hope, and The Fish Farm were selected for their representation of important predetermined theoretical constructs, such as the boundaries for sustainable development, in order to effectively situate them in the context of this research and its objectives. (**Section 3.3**). Furthermore, these cases were also chosen because they reflect real life events and circumstances, more so than others, hence satisfying the criteria for relying on theory-based sampling as method in the first place. For example, an obvious overlooked case is the world's largest aquaculture company, Marine Harvest. This constitutes an agglomerated practice, which has evolved into a multimillion, highly

technological and financially successful practice. Bearing in mind the end market of this research output, being South Africa, it can be argued that the production methods, technology needed, and skill level of this practice are too advanced for the setting and the resultant analysis would not be "connected to, grounded in or emergent from real life events [or] circumstances" (Cohen & Crabtree, 2006).

Criterion sampling involves a process whereby only cases are selected which meet a predetermined criterion of importance (Patton, 2001:238). This sampling method is useful when attempting to identify and understand "information rich" cases and to identify cases from a standardised questionnaire which could yield further insight into the topic if subjected to a follow-up (as explained in **Section 8.5**). Criterion sampling is also useful when it is used to complement quantitative data with a qualitative component (Patton, 2001:238-239). By selecting only cases that met the criteria to be considered sustainable (or successful), that particular case can be considered as information rich regarding the qualities of sustainable and hence successful UA practices. By using this method, the case with the best results could be identified as a possible subject of a further, more in-depth study. The same could be done with the case which satisfied the case study criteria to the smallest degree. Such studies could even be used as foils to refine the qualities which contribute to successful UA practices. In short, this sampling method not only increases the quality of the case study output, but also allows for subsequent elaborative studies if further research should be done.

Critical case sampling is the process of selecting a few significant cases that are likely to "yield the most information and have the most significant impact on the development of knowledge" (Patton, 2001:236). This method is best applied to the study if dimensions which make a case critical can be identified or funds are limited (Cohen & Crabtree, 2006), as is the case with this research. Furthermore, this method makes allowance for the development of logical generalisations formulated from the rich evidence produced by an in-depth, qualitative study of a few cases (Cohen & Crabtree, 2006). By applying this method to the study, it would be ensured that the case study analysis would yield generalised qualities of successful UA practices across a wide range of settings and conditions.

The second research method applied to the case study analysis, is self-evaluation (self-assessment). Falchikov and Boud (1989) characterised self-assessment to adhere to two main aspects, namely 1) respect a specific performance of standards (in this case the identified best practice qualities from the literature) and 2) elaborate on judgements of performance of standards (in this case the motivation for identifying specific qualities as best-practices).

This method is realised through a ranking system that illustrates the standard of UA best practice qualities, which is used in order to evaluate each case. Adapted from previous research, the

criteria (which will be presented in section 5.3) will be evaluated by means of a refined 5-level ranking system. The initial 3-level ranking system as used in the precursor study as seen in Annexure B (Stander, 2016), had a narrow range to evaluate the cases with. As a result, the statistical variance within the identified best practice qualities presented for policy implementation was not significant (as can be seen in **Annexure B**). The ranking scale was refined in order to establish more significant recommendations.

5.3 Shaping the criteria to be used in the Case Study analysis

The literature study provided several theoretical perspectives with regard to the building blocks of the best urban agricultural practices. This included attempts at understanding UA within the context of urban development and spatial planning. Additionally, the study provides perspectives on sustainability and sustainable development as well as a brief review of possible reasons . It also provides a brief study on the lack of provision in relation to UA within spatial planning legislation and relevant policies in South Africa. The first step of the case study analysis is evaluating the cases chosen for their perceived relevance to the study. Each case will be evaluated in terms of the extent to which it satisfies the given criteria (i.e. “No fulfilment”, “To a minimal degree”, “To a moderate degree”, “To a noteworthy degree” and “To an important degree”).

Additionally, the criteria to be used in the evaluation were compiled from the literature study, with the online paper on UA compiled by the RUAF Foundation (RUAF, 2009), serving as main framework for the evaluation. For background purposes that paper is included at the end of this research paper and can be viewed as **Annexure A**. The most relevant section of the paper is boxed. However, a reader interested in understanding this research within the context that it was written, would find it well worth the effort to peruse this annexure.

Among others, this paper includes an attempt at defining UA, it discusses role-players and typologies, as well as briefly reviews some relevant arguments in favour of and against UA. However, most relevant to this section, is the trisected nature in which UA is viewed, which correlates with the three dimensions often associated with sustainability (Hansmann *et al.*, 2012:452; Harrison, 2003). This paper distinguishes UA into three main policy perspectives, namely a social, economic-and ecological perspective. Each of these can in turn be “associated with different types of UA” and agricultural issues (RUAF, 2009).

Presented as a helpful means towards designing scenario-specific policies, this trisection of UA allows for multidimensional solutions from policymakers and those involved in UA development. In applying these perspectives as underlying foundation in the formulation of the criteria used to evaluate the chosen UA case studies, the aim of this research could be realised. The convergence

of the central concepts of sustainability with the central concepts of UA practices, addresses the two central themes of this research, namely sustainable urban development and the significance of applied UA in achieving the aforementioned. This allowed for the formulation of a list of criteria which would evaluate cases in terms of both themes, and on three different dimensions (**Table 5.1**). As a result, recommendations on good UA practices for sustainable urban development can be made from several different perspectives. This could consequently increase the significance and implementation of UA within urban development and its alignment with supporting policies and legislation.

The criteria are presented below (**Table 5.1**).

Table 5.1: Compiled criteria **Criteria** **An UA food production service,**	**Manner in which case study fulfils the criterion.** Explanation, proving quotation and/or references	**Degree of criteria fulfilment**				
		No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree
		1	2	3	4	5
Social perspectives						
Should positively and actively contribute to community development						
Must be empowering to a variety of stakeholders						
Should be multifunctional in services provided						
Should stimulate social activities and improve social inclusion						
Managerial team should have agricultural and technical knowledge (prerequisite).						
Should enhance food security.						
Should contribute to poverty alleviation.						
Should present health and safety benefits to the community.						
Economic perspectives						
Should give rise to financial gain for those involved.						
Should be financially self-sustaining after a reasonable time period.						
Start-up cost should coincide with the type and size of practice.						
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.						
Should reduce the “food miles” of produce, while also maintaining comparative advantage in terms of food prices.						
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.						
Ecological perspectives						
Should present multiple safety benefits (with regard to the ecosystem and crisis situations).						
Should contribute to urban greening, environmental protection and land rejuvenation.						
In order to improve the viability, should make up part of some larger nature conservation scheme, recreational services and/or tourism services within the urban space.						
Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services.						

Should complete or make up part of the waste management system, be it centralised or decentralised.						
Should make use of a variety of agro-ecological production methods.						
Should create multi-habitat, heterogeneous environments through the use of variant production methods and typologies.						
Should improve the environmental quality.						

Source: FAO & WB (2008:11); RUAF (2009)

The assumptions on which this case study analysis is based, are as follows:

- The cases were chosen not only for their unique application of UA for commercial gains, but also because they were deemed successful business ventures (in terms of growth, economic stability and steady food production, community benefits). In other words, they present the hallmarks of sustainability. Based on this, the assumption that complete fulfilments of the aforementioned criteria would not only make a UA practice sustainable in itself but would also contribute tremendously towards urban sustainability. Therefore, the criteria with the highest levels of fulfilments across the 4 cases would present the most favourable qualities for UA practices as tools for sustainable urban development, since this was the backdrop from which the criteria were developed.
- Consequently, a sustainability-contributing criteria hierarchy will be observed, based on the assumption that each criterion is a requirement for sustainability objectives in UA. This can in turn be garnered from the literature study with respect to the RUAF-principles. The study further divides the criteria into three categories namely, “Lowest policy priority”, “Average policy priority” and “Highest policy priority”. These categories would represent the criteria in terms of policy considerations. This is a way to further refine the recommendations for implementing UA as a policy instrument towards sustainable urban development. The significance of differentiating the criteria into these categories (or levels) would be realised if resources for development purposes are scarce. In order to contribute to sustainable development, the UA practice should also be sustainable. Based on this logic, it is said that the best quality criteria would also have a significant impact. This is often the case in developing countries, especially in terms of the financial burden that achieving development programmes and policies, such as the Sustainable Development Goals (SDGs) would imply (Thiaw, 2016).

5.4 Making allowance for ‘subjectivity’ in the case study analysis

In theory, the application of the literature to the empirical section is rather simple. To start, this research represents a broad, qualitative consideration of the link between UA, agriculture as the main source of food and sustainable development. Subsequently the pivotal link between UA and sustainable development is presented, in particular to sustainable urban development. From the literature study, traits of successful UA practices are identified. These traits are presented as

criteria (**section 5.3**) to be applied in a case study analysis. By preferring only successful UA cases (see the limitation as explain in **section 3.3**), it stands to reason that the prevalence of a criterion in all the cases, could indicate a significant contribution of said criterion in the successfulness of UA practices. Thereafter, UA can be presented as a policy instrument of enhanced sustainable development approaches.

However, this research is subject to resource constraints (most notably financial, experience and time constraints) that limit the depth of the research (the case study in particular) to a sweeping, opinion based analysis. The effect of these constraints is most palpable when regarding the compiled criteria as a tool for case study analyses or as the origin of recommendations. Currently, the case study evaluation reflects the opinion of the researcher and rendered subjective results based on the knowledge and interpretation of the researcher. To have a significant impact, the case study analysis should be completed by nearly all participants intimately acquainted with the selected UA farming unit. The qualitative data garnered, could be statistically analysed to present significant results.

Alternatively, the evaluation of criteria could be made more scientifically rigorous by introducing guiding requirements that should be met for each 'degree of fulfilment' (**section 5.3**). For example, if each criterion were to be expanded to include sub-criteria that should be fulfilled before assigning a code, it could be possible to reduce subjectivity in the results of case study analysis. However, it would demand that all internal and external factors within all the relevant dimension, be included. These sub-criteria will have to include *inter alia* geographical, physical, cultural, perspectival and environmental drivers, influences and variances This would be a responsible task best carried out meticulously by experts in each of the required fields. Additionally, subjectivity and inconsistencies could be reduced by developing a detailed information packet which should be perused before completing the survey. This could include *inter alia* all definitions of words used in the criteria, a detailed list of benefits and disadvantages of UA, different typologies, etc.

It is the opinion of the researcher that the broad, open-ended nature of the compiled criteria addresses to a lesser degree one of the biggest concerns when regrading and implementing research, guiding documents or policy and legislation on UA, namely the concept-specific nature of UA that burdens UA literature and implementation (as discussed in section 2.8.1). This research has the potential, to a certain degree, to transcend the restrictions and requirements of specific localities. If the criteria were to be adapted to be more rigid, the strength of this research output could be undercut as it would possibly forgo the flexibility that allows it suitability for a wider

range of locations. Within the limitations of this research study, it would be impractical to attempt such a task.

5.5 Conclusion regarding the methodology employed

Starting with the international cases and continuing with the national case studies, each case's theoretical background will briefly be introduced, along with their statistical qualities, where after the self-evaluation will be done in terms of the criteria presented in **Section 5.4**. After successfully completing the process for all four chosen case studies, the next chapter will conclude with a brief statement on the findings, making mention of unique and noteworthy appearances. The results of the respective evaluations will be presented in **Table 7.3**.

The case study analysis could present common underpinning qualities of successful UA practices. Additionally, it could reveal the hierarchical structure of compiled criteria in terms of the contribution each makes towards self-sustaining longevity of UA practices, as well as the contribution towards urban sustainability. It is presented that this hierarchical sorting of qualities could be applied in policy recommendations. This is so since the criteria found to be most influential and common in the cases chosen for their successful implementation would be the most important contributors towards sustainable urban development. As such they should receive preference in national UA policy and legislation.

CHAPTER 6: EVALUATION OF RELEVANT INTERNATIONAL AND NATIONAL CASE STUDIES

This chapter will present and evaluate the selected cases included in the case study analysis. The cases were selected for several reasons. These include *inter alia* (1) their perceived success as commercial activities (as based on the sustainable development criteria); and (2) these cases are information rich, in particular on the **qualities of best UA practices**. Another important factor was the availability of information on these cases. Media outputs, social media sites and company websites provided the required information needed to assign a code based on an informed decision. These factors presented the two international case studies, Brooklyn Grange Urban Farm (New York) and Homeless Garden Project (Santa Cruz); and the local case studies Harvest of Hope (Cape Town) and The Fish Farm (Phillipi).

6.1 International case study analysis

The international cases are Brooklyn Grange Urban Farm (New York) and Homeless Garden Project (Santa Cruz). Both cases are located within the borders of the United States, however this would not taint the results as the applied sampling approaches used to identify these cases, allow cases to be chosen according to other predetermined important criteria.

6.1.1 International case study 1: Brooklyn Grange Urban Farm

Firstly, it is of importance to briefly provide reasons for inclusion of this particular case, namely Brooklyn Grange Urban Farm (Brooklyn Grange, 2016). This 8-year old UA organisation is already moderately settled, with recent development and expansion suggesting contingent economic stability and growth, making this case an agreeable study to use in the attempt to **identify key qualities present in successful UA practices**. Furthermore, this case study originates from a developed country, located in a world city, making it a suitable foil for national cases. As well as being unique in location and farming techniques, this rooftop farm served as a precursor for several other UA projects in New York and the surrounding area (Brooklyn Grange, 2016).

Secondly, it should be noted that the term ‘Brooklyn Grange Urban Farm’ is used to denote all major farming sites of the Brooklyn Grange Urban Farm organisation, even though the location of each differs. Henceforth, the term “farm”, in particular when discussing the Brooklyn Grange Urban Farm, will be indicative of the sum of the farming sites managed by this organisation as many of the available articles present data and figures cumulatively.

6.1.1.1 Background

Established in 2008, the Brooklyn Grange Urban Farm served as an entrepreneurial venture for the self-proclaimed “urban farmer” Ben Flanner and business-partner and co-founder, Gwen Schantz (Curbed, 2015). Based on the ground coverage, gross revenue and quantity of crops produced on the respective farming sites, this agricultural venture is widely perceived as one of the largest rooftop farms globally (Brooklyn Grange, 2016). Combined, the Brooklyn Navy Yard Farm and Long Island City Rooftop Farm span two rooftops and cover a little under 10055 square metres of urban rooftop space and produces more than 22600 kilograms of organically-grown vegetables annually (Brooklyn Grange, 2016).

Besides predominant agricultural uses, Brooklyn Grange transformed the organisation into a multi-faceted, commercial entity which “hosts events and educational programming, provides urban and green roof consulting and installation services to clients worldwide, and partners with numerous non-profit organisations throughout New York” (Brooklyn Grange, 2016). The mission of this farming organisation is to raise awareness and promote healthy and strong local communities in New York through sustainable urban greening and food production systems (Brooklyn Grange, 2016).

The flagship site, Long Island City Rooftop Farm, is located in the suburbs of New York in Long Island City, Manhattan, atop a six storey, disused auto parts building owned by Jeff Rosenblum and Ashish Dua of Acumen Capital Partners (Brooklyn Grange, 2016). The site makes up part of the larger economic and social environment resulting from the location atop this particular building, as it shares the space with several companies and a restaurant; even providing products to the latter (Brooklyn Grange, 2016).

The second site, Navy Yard Rooftop Farm, is located in Brooklyn near East River on the formerly unutilised roof of Building no.3. Apparently “the lion’s share of the financing for the installation of the Navy yard site was granted by the Department of Environmental Protection’s (DEP’s) Green Infrastructure Storm Water Management Initiative”, as the site performs crucial ecological functions to an approximate 13 000-hectare municipal area. This includes the management of more than three and a half million litres of storm water annually, which Red Hook Wastewater Pollution Control Plant would have otherwise been burdened with (Brooklyn Grange, 2016).

Table 6.1: International case study 1: Brooklyn Grange background	
Spatial qualities	
Name of farm	Brooklyn Grange Urban Farm with two sites: Long Island City Rooftop Farm Navy Yard Rooftop Farm

Physical location	Long Island City Rooftop Farm: 37-18 Northern Boulevard, Long Island City, New York City 11101 Navy Yard Rooftop Farm: Clinton and Flushing Avenue, Brooklyn, New York City 11205, Brooklyn Navy Yard Building 3
Location within urban space	Long Island City Rooftop Farm: Located on the rooftop of Standard Motor Products building, hosting offices and a restaurant. Navy Yard Rooftop Farm: Located within a navy yard, on top of a multi-storey, primarily office-use building
Land/Area coverage (approximate/m^z)	Long Island City Rooftop Farm: approx. 3994.8m^2 Navy Yard Rooftop Farm: approx. 6038.7m^2 Total: 10033.5m^2
Organisational structure	
Functional operation	Twelve full-time employees as well as over 30 seasonal part-time staff are employed here.
Owner(s)	Benn Flanner- Founder and President Anastasia Cole Plakias- Co-founder and Vice President (current)
Stakeholders actively involved	Numerous non-profit organisations in New York
Type of organisation	Commercial Private
Profitability	Yes, Brooklyn Grange broke even in October of their first operational year, 2010.
Year site opened	2010
Year of first harvest	2010
Start-up amount or resources	The Flagship Farm was financed through a combination of private equity, loans, grassroots fundraising events, and the crowdfunding platform Kickstarter.com. The Brooklyn Navy Yard farm was made possible in large part through the support of the Department of Environmental Protection's Green Infrastructure Storm Water Management grant programme.
Produce and services	
Agriculture typologies practiced	- Horticulture (Non-certified organic practices applied) - Bee-keeping - Flowers
Annual produce (in kg if available)	22679.619 kg
Comparative price of produce	*Unavailable*
Distribution points and clients	Brooklyn Grange offers a CSA shares programme consisting of 55 clients receiving weekly produce of some sort, collected at the sites. Weekend markets at the respective sites. Distribution of produce to approx. 35 restaurants and retailers.

Programmes presented	No internship opportunities presented. Several educational programmes: • refugee and immigrant programme • workshops and conferences • city growers
	Brooklyn Grange partners with *inter alia* several educational entities, such as schools and universities, to provide educational classes according to the agreed curricula.
	Yoga classes available to all ages and genders.
	Composting of materials with the intend of future commercial production
	The respective sites can be hired for events such as weddings
	Consulting services on agricultural and urban greening issues
	Installation services incl. the installation of apiaries, rooftop gardens, greenhouses and restaurant gardens
Mission	
"We believe that this city can be more sustainable; that our air can be cooler, and waterways can be cleaner. We believe that the 14% of our landfills comprised of food scraps should be converted into organic energy for our plants and plants around the city via active compost programs. We believe that food should be fresh, not sitting on the back of a flatbed for two weeks. We believe that food should taste fresh. At the end of the day, that's what it's all about: sitting down with our family, admiring that sunset over the city skyline, snacking on a perfectly ripe, sweet tomato and remembering, this is what real food is".	
Notes: Most of the information was retrieved from the Brooklyn Grange website (2016), substantiated by the below mentioned sources. Much of the information was retrieved from the Electronic Press Kit, available upon request, as done on 9 September 2016. It should further be noted that much of the data and statistics as presented in available articles and resources, either cite or use the data and information as provided by Brooklyn Grange.	

Source: Adapted from Brooklyn Grange (2016), Curbed (2015), Jouan (2014: 1-2), Optigrün (2018)

It should be noted that, in recent years, Brooklyn Grange established several new agricultural initiatives, including development of a third farm, the installation of a vertical community garden demo at the Clifton Place Memorial Garden and Park in Brooklyn and a rooftop meadow with herb and vegetable patches at the Vice Media office in Brooklyn (Curbed, 2015). Although possibly relevant, these sites will not be included in the evaluation of UA qualities, as they are still in varying phases of development.

6.1.1.2 Evaluation

The self-evaluation for this case study is completed for the entire Brooklyn Grange Urban Farm, which includes both major sites as reviewed above. The following table captures the evaluation of this farm, which will form part of the conclusion in Section 6.3.

Table 6.2: Evaluation of Brooklyn Grange Urban Farm							
Criteria An UA food production service,	**Manner in which case study fulfils the criterion.** ***Explanation, proving quotation and/or references***	**Degree of criteria fulfilment**					
		No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree	
		1	2	3	4	5	
Social perspectives							
Should positively and actively contribute to **community development**	- Educational programmes. - UA-related consultation services. - Community upliftment.						**5**
Must be **empowering** to a variety of stakeholders	- Community empowerment by providing opportunities for training, education and knowledge acquiring. - Refugee Programme aids immigrants by providing food for volunteer work on the farm. - Additionally, these volunteers receive in-field agricultural training. - Provides employment opportunities.						**5**
Should be **multifunctional** in services provided	- Retail services of UA produce. - Variety of services other than UA produce, such as event management and yoga classes. - Both commercial and non-profit services. - Provides processed products (value increase)						**5**
Should stimulate **social activities** and improve social inclusion	- Refugee programme - Educational programmes - Creates opportunities for low-budget recreation and sight-seeing - Serves as a platform for social interactions and events - Serves a variety of users and clients - Provides for users of all ages						**5**
Managerial team should have agricultural and technical **knowledge** (prerequisite).	- Practical experience. - Interdisciplinary knowledge exhibited.						**5**

Should enhance **food security.**	- Increases access to safe and nutritious food. - Increases food preferences. - Serves a variety of users. - Year-round production. - *However, food prices are still relatively high and as such would not benefit the urban poor. Based on the definition of food security (Section 2.3.1 and List of definitions) as well as the accompanying discussions, a reasonable argument can be made that enough other requirements (*inter alia *social access, economical access, increased preference) were met.*				**4**	
Should contribute to **poverty alleviation**.	- Employment is the main contributor towards satisfying this criterion, but others include the refugee programme and lower food prices on select products.			**3**		
Should present **health and safety** benefits to the community.	- Improved air quality. - Reduction of waste products through composting. - Provides multiple recreational services which could contribute to health benefits.				**4**	
Economic perspectives						
Should give rise to **financial gain** for those involved.	- CSA-programme members save money - Managerial team and staff receive payment. - Retail services contribute to long term savings for restaurants. - Installation services contribute to long term savings for restaurants.					**5**
Should be **financially self-sustaining** after a reasonable time period.	- Self-sustaining practice. - Broke even within one year of operation. - Practice is experiencing reasonable economic security. - Tends towards long term financial security.					**5**

Start-up cost should coincide with the type and size of practice.	- The start-up costs were significantly high, but still in line with the uniqueness and type of practice. However, both governmental and institutional support was received.				**4**	
Should attempt to **reshape underutilised urban** space in order to contribute to area-profitability.	- Farms located on the roofs of previously underutilised buildings. - Increases commercial use and desirability of urban space for other commercial uses. - Increased aesthetic value.					**5**
Should reduce the "**food miles'** of produce, while also maintaining comparative advantage in terms of food prices.	- Shortened production chains. - Comparative advantage in terms of local food prices in the long term. - *No comparative price advantage on novelty products*				**4**	
Should provide **financial benefits** (in varying degrees), from position in **market value chain**, compared to rural counterparts.	- Installation of restaurant gardens reduces long term running costs. - Stimulate new markets. - Location in city allowed for new business ventures, such as the installation of restaurant gardens. - The different activities accessible to customers promote the support of other. For example, someone might come for the yoga class and buy a product they wouldn't have otherwise bought. - *Transport costs are less than those of food from rural areas, but the organic farming methods increase overall higher product price which counteracts some of the advantage, but not all.*				**4**	
Ecological perspectives						

Should present multiple **safety benefits** (with regard to the ecosystem and crisis situations).	- Additional food sources.			**3**		
Should contribute to **urban greening**, environmental protection and land rejuvenation.	- Greening of rooftops. - Increased volume of urban soft spaces. - Habitat increases. - Educational programmes create awareness and in effect also environmental stewardship.					**5**
In order to improve the viability, should make up part of some larger **nature conservation** scheme**, recreational services** and/or **tourism services** within the urban space.	- Provides multiple recreational and tourism services although the site does not formally forma part of such services. Does not form part of any nature conservation scheme, although in line with ecological conservation initiatives and programmes.		**2**			
Should be multi-functional in terms **of ecosystem service**s provided. Evaluated in terms of Table 2.4: Ecosystem Services.	- Provisioning services provided - Habitat and supporting services provided - Cultural services provided - Several regulating services provided					**5**
Should complete or make up part of the **waste management system**, be it centralised or decentralised.	- Both internally and externally, with the added financial implications (composting and city waste management).					**5**
Should make use of a variety of **agro-ecological production methods.**	- Several production methods used, but most relevant is organic and less technology-dependent methods.			**3**		
Should create multi-habitat, **heterogeneous environments** through the use of variant production methods and typologies.	- Improvements of habitats and introduction of multi-habitats attribute towards a more heterogeneous environment.				**4**	
Should improve the **environmental quality**.	- Urban upgrading, high variety of ecosystem services provided as well as the increase in soft spaces and the benefits associated with them.					**5**

Source: Brooklyn Grange (2016); Curbed (2015)

Overall, the Brooklyn Grange urban farm scored well in all perspectives, with the social perspective having scored best and the ecological perspectives lowest. Possibly, this is a result of the numerous activities, programmes and services provided by Brooklyn Grange. These activities not only attract customers but could keep them engaged and invested in the company. A possible successfulness contributing factor not included in the evaluation, is media exposure. Overall, Brooklyn Grange has received a lot of media attention (Brooklyn Grange, 2016) which could contribute to their success.

6.1.2 International case study 2: Homeless Garden Project

The following section will introduce the Homeless Garden project (Santa Cruz).

6.1.2.1 Background

The Homeless Garden Project (HGP) was founded by a Santa-Cruz County Non-profit organisation, the Citizens Committee for the Homeless, in May 1990 and has for over 25 years, steadily provided support services and occupational-training by providing transitional employment to homeless and previously homeless citizens (HGP, 2010). Initially described as a commercial mini-urban farm (Smit, 1998), the project has expanded to a multi-retail urban organisation with the aim of securing jobs and providing trainees with a financial means to improve self-sustainability, within this urban environment (HGP, 2010). This Pelton Avenue, Santa Cruz, based organisation's executive director, Darrie Ganzhorn, emphasises the synergy between the agricultural practices and the social ideals, existing at the intersection between UA and food-justice initiatives, as the underpinning concept for the prosperity and sustainability of this project (Zimmern, 2013). A review of this case study could offer insight into interdisciplinary connections between food production services and social services, as a **key factor** in the development of sustainable UA practices.

HGP's sustainability is remarkable and within 6 years from kick-off, the project received the Harry Chapin Self-reliance Reward for its pioneering project (Smit, 1998). Recently, the company has seen their successes celebrated at the 36th Annual EcoFarm Conference and the project received the The Advocate of Social Justice Award (EcoFarm, 2016).

Table 6.3: International case study 2: Homeless Garden Project background	
Spatial qualities	
Name of farm	Homeless Garden Project (HGP)
Physical location	Near Long Marine Lab and Natural Bridges state beach on Delaware Avenue and Shaffer road, Santa Cruz, California, USA.
Location within urban space	This farm is located on the edge of Santa Cruz City

Land/Area coverage (approximate/m2	Approximately 12140.6m^2
Organisational structure	
Functional operation	
Owner(s)	Darrie Ganzhorn (executive director) supported by a team of 8 managers and assistants. These include members with knowledge in a variety of disciplines, such as development, social work, agriculture, marketing, etc. They are all part-time staff. Additionally, the organisation has a board of 11 members who have varying degrees of experience in agriculture or related fields, but who are all highly qualified. For example, the Board Chair, Cathy Calfo, has served *inter alia* as the Deputy State Treasurer between 1999-2004. He is also a founding member of the City of Santa Cruz Commission for the Prevention of Violence against women, has a Bachelors of Arts degree in American Studies and served as the executive director of a national alliance (Apollo Alliance) promoting clean energy and decent paying jobs.
Stakeholders actively involved	The organisation relies on staff, social work interns, other interns (for marketing, web development, social media, business and non-profit administration skills), weekly volunteers from the community, the members of the Community Supported Agriculture service (essentially community members who rent a share of the land and consequently the resulting produce) and job-training and transitional employees.
Type of organisation	Charitable organisation with commercial spinoffs, which include value added products sold at the Homeless Garden Project Store as well as online.
Profitability	Yes, even though commercial gain is not the objective.
Year site opened	1990 – The first site opened 1994 – Expanded to include a second site at natural Bridges Farm 1998 – The first project site was moved to allow the land to be sold, as it was city property intended for housing development. Future: The Homeless Garden Project is to receive a nine-acre (36421.7m^2) parcel of land in a greenbelt near Pogonip, as included in the Master Plan of the City of Santa Cruz.
Year of first harvest	Inconclusive, although it is said that the project sold its first produce to local restaurants and farmer's markets in the year of 1991, only one year after the first organic garden was opened.
Start-up amount or resources	*unavailable*
Produce and services	
Agriculture typologies practiced	Horticulture- vegetables, herbs, fruits such as strawberries and raspberries, and flowers.
Annual produce (in kg if available)	*unavailable*
Comparative price of produce	*unavailable*

Distribution points and clients	Community Supported Agriculture: Community members buy a share of the land and collect their portion of the harvest at the farm during the harvesting season. The *From Our Garden* gift shop and Holiday store: The ***From Our Garden*** shop is located at 110 Cooper Street, approximately 4.4 km away from the site and serves as an outlet for the value-added products. Online store: Accessible to all, but online products are only shipped to clients within the United States of America.
Programmes presented	Women's Organic Flower Enterprise: Trainees and job-transition employees learn to dry and arrange herbs and flowers into ornamental wreaths. This is a value-added enterprise aimed at extending the harvest season for trainees. Training and income for the homeless: Homeless people and people who are in between jobs (so-called 'temps') receive payment for working on the farm. Cultivating Community: This is an educational programme for all ages, individuals or groups aimed at teaching a wide variety of knowledge and skills. These include knowledge on environmental issues, sustainable agriculture techniques, the environment and civics either through hands-on experience or in-depth training sessions. Century Certificate Program: The two major objectives of this transitional job training programme are to improve attendee experience of this transition period (through support, free lunches and an improved civic sense) and training in retail, gardening and organic farming by means of a three-month lecture series, on-site work and professional networking. Individuals who complete this programme receive a printed certificate of reference to assist in their job search. Internships: These internship projects include CSA management, creation and maintenance of a kitchen garden, work with trainees on nutritional issues and nursery building. They are currently expanding to include additional internship positions which would include projects for marketing, web design and social work.

Additional services provided	Events include: -lecture sessions -Sustain Supper events which include speakers and gourmet food made from the produce collected from the garden and prepared by local chefs. Services include: - From Our Garden Shop and online shopping site. Products include value-added products such as beeswax candles, flower wreaths, savoury herb biscuit mixes and other Homeless Garden Project merchandise and gifts.
Mission and vision	
Mission: *"In the soil of our urban farm and garden, people find the tools they need to build a home in the world."* **Vision:** *"We envision a thriving and inclusive community, workforce and local food system, whilst valuing the capacity of every individual for growth and renewal; the joy that comes from growing and sharing healthy food; and the well-being created by vibrant social and natural ecosystems."*	

Source: Adapted from EcoFarm (2016), Elder (2012:18-22), Grusauskas (2012), Homeless Garden Project (2017), McKenzie (2015:13-14) and Zimmern, (2013).

It should be noted that Homeless Garden Project receives substantial support from the community and the municipality. Among others, this project is to be given a 9-acre (36421.7m^2) plot of land within a proposed greenbelt in the City development plan which will improve future security for this organisation (Elder, 2012:18-22; Mckenzie, 2015:13-14). This is significant if considered that this is a charity, non-profit organisation which has continued to provide this service for 27 years (HGP, 2016).

6.1.2.2 Evaluation

The following table (**6.4**) captures the evaluation of this farm, which will form part of the conclusion in **Section 6.3**.

Table 6.4: Evaluation of the Homeless Garden Project

Criteria An UA food production service,	**Manner in which case study fulfils the criterion. Explanation, proving quotation and/or references**	**Degree of criteria fulfilment**				
		No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree

		1	2	3	4	5
Social perspectives						
Should positively and actively contribute to **community development**	- Through their homeless support programmes, this organisation helps to improve the community, as homelessness is often linked with increased crime rates, poor school attendance and youth crime (Homeless Garden project, 2017; ICPH, 2017). - They provide several other community programmes (See **Table 6.3: International case study 2: Homeless Garden Project background**). - The garden kitchen alone provides a meal for 50 people each day (Zimmern, 2013). Improved community well-being. - Events aimed at exchange of knowledge and social interaction (such as the Sustain Supper bi-annual event) enhance the sense of place and community value. - The creators of the Finding Flatmates initiative attempt to connect homeless with benefactors who would provide accommodation for free or minimal rent.					5

Must be **empowering** to a variety of stakeholders	- The Homeless Garden Project's biggest selling point is their intense and continued **support programmes for homeless persons**. They **empower** the homeless with skills, education and help them transcend the homelessness gap (Homeless Garden Project, 2017). - They provide **free food** to volunteers. This also provides the opportunity for people from different social groups to interact, leading to the **transfer of knowledge** as an obvious occurrence (Homeless Garden Project, 2017). - Most significantly, the organisation provides skills and knowledge on a variety of agricultural and related fields to any person willing to join. The volunteer program has benefits in that knowledge is freely shared in exchange for working hours. Any person willing to work can apply. - This organisation has a variety of educational, skills and experience programmes. These programmes serve seniors, students from preschool through graduate programs, individuals with developmental disabilities, church groups, business volunteer groups, families, interns and more (Zimmern, 2013).					5
Should be **multifunctional** in services provided	- A variety of community development programmes. - Events and social activities. - Charity services provided. - Permanent and holiday shops. - Weekly Farm Stand - Recreational services. - CSA service. - Finding Flatmates.					5
Should stimulate **social activities** and improve social inclusion	- Besides all the programmes, events and projects managed by this organisation, the daily kitchen also creates an **inclusive environment** for					5

	the homeless as volunteers and trainees would prepare and share meals together with the homeless. “Often visitors will comment that they couldn’t tell who was homeless’’ (Zimmern, 2013). - A **variety of events** and programmes which transcend ages and social groups and stimulate social interaction. - Social inclusion of people with **developmental disabilities**. - An active **social media connection** and constant updates to inform involved and potential stakeholders of upcoming events. For November alone, their Facebook site has four events shared. - A strong and active **volunteer program** - **Finding Flatmates** initiative					
Managerial team should have agricultural and technical **knowledge** (prerequisite).	- All staff members had experience or knowledge of either agriculture or business management; (retail, marketing, non-profit, administration, etc.,) or in some cases both, before they joined the staff. - Additionally, some of the staff members also have experience and / or formal education in social justice initiatives. - The project is managed by a board of highly qualified members. Even though most of the board members are not all trained or experienced in agriculture, most are qualified and experienced in disciplines related to this study, such as urban planning, social justice and community development, organic farming, *etc.* (Homeless Garden Project, 2017).					5

Should enhance **food security.**	- Free meals in exchange for work. - Increased consumer choices on fresh produce. This is mostly appreciated by those able to afford the organic produce. - Homeless people involved in the project are ensured of regular meals. - Diversified nutrient intake for participants.					5
Should contribute to **poverty alleviation**.	- Provision of work for homeless and unemployed people. - Several programmes easing participants and trainees out of unemployment, the most significant being the work done with and on behalf of the homeless. A second is the Century Certificate Programme of which the primary objectives are to increase attendee knowledge and skills through training and to provide support.					5
Should present **health and safety** benefits to the community.	- Several participants reacted positively to horticulture therapy and claimed to have an improved sense of mental well-being (Elder, 2012:19). - Additionally, the produce is shared with youth, hospice patients and domestic violence victims. - Improved diets and nutrient consumption for trainees within the homeless centre - *It could be argued that providing homeless people with meals and accommodation is integral to their safety. However, even though the daily meal for trainees is a guarantee, the accommodation is not. It is subject to availability, meaning that a homeless person within the training programme could try to get in touch with a renter, but if no willing individuals offer affordable accommodation this benefit would not realistic.*				4	

Economic perspectives						
Should give rise to **financial gain** for those involved.	Homeless Garden Project ensures: - Indirect and direct immediate gain for the homeless trainees; - Possible improvement in living conditions; - Improved qualification and experience that could give rise to better job opportunities.				4	
Should be **financially self-sustaining** after a reasonable time period.	- Even though the exact date on which the project broke even could not be established, the organisation has been making a profit and been operational for 27 years. A quarter of the profit comes from the CSA program and the sales from the From Our Garden Shop (HGP, 2017). - Homeless Garden Project often receives donations. By providing certain services to volunteers, they benefit from the free labour given in exchange. This arrangement allows them to save on certain expenses (such as worker wages). The reliance on donations decreases the self-sustaining quality.				4	
Start-up cost should coincide with the type and size of practice.	- *None of the resources studied provided precise information regarding the start-up costs of this study. This might be a result of aged data, as the project is nearly 30 years old. However, perusing the sources did provide an overview on the humble origin and slow start of the business. It's here that an educated guess is made.*			3		

Should attempt to **reshape underutilised urban** space in order to contribute to area-profitability.	- Homeless Garden Project merged with the Natural Bridges Farm and by definition the site couldn't be characterised as underutilised. However, the site does attract a lot of customers and potential customers who could potentially spend money at other businesses in the area. Also, improving the percentage of homelessness within an area could improve the area's worth.		2			
Should reduce the "**food miles"** of produce, while also maintaining comparative advantage in terms of food prices.	- No real advantage in terms of food prices, although CSA program members benefit by having local food at a reliable price.		2			
Should provide **financial benefits** (in varying degrees), from position in **market value chain**, compared to rural counterparts.	- The peri-urban location eases the sale of value-added products within the city as well as increasing the market for clients onsite and at the shop. - The location allows the organisation access to a volunteer labour market, without which much of the initiative's progress would have been lost or additional labourers would have had to be hired. This would, in turn, have resulted in additional expenses.				4	
Ecological perspectives						
Should present multiple **safety benefits** (with regard to the ecosystem and crisis situations).	- Additional food sources provided to consumers, but also to volunteers, trainees and staff members. For the members of the homeless program it presents a stable source of food, which does not have to be purchased in times of economic crisis.		2			
Should contribute to **urban greening**, **environmental protection** and **land rejuvenation**.	- The farm serves as an ecosystem for animals not included in husbandry. - Through the social and commercial enterprises on the farm (such as the events, the farmers' market and the CSA project), a parcel of land previously only used for farming, has been rejuvenated. This site now serves people from different social and demographic groups while			3		

	contributing to an increase in the social and economic activities of the area. - *See further discussions on this criterion and analysis in Chapter 7.*					
In order to improve the viability, should make up part of some larger **nature conservation** scheme**, recreational services** and/or **tourism services** within the urban space.	- Does not form part of any nature conservation scheme, although in line with ecological conservation initiatives and programmes. - The site is located near several educational facilities (such as universities and research centres) and the National Bridges State Beach area, but it does not form part of these sites.	1				
Should be multi-functional in terms **of ecosystem services** provided. Evaluated in terms of Table 2.4: Ecosystem Services.	- Provisioning services provided - Habitat and supporting services provided - Cultural services provided - Several regulating services provided					5
Should complete or make up part of the **waste management system**, be it centralised or decentralised.	- *No data found to support this, although urban soft spaces tend to act as waste management systems. This cannot be assumed, however, as there is no mention of composting sites or other similar waste management activities.*	1				
Should make use of a variety of **agro-ecological production methods.**	- A variety of methods are used.				4	
Should create multi-habitat, **heterogeneous environments** through the use of variant production methods and typologies.	- Variety of production methods - A remarkable variety of agriculture typologies, which include *inter alia* flower gardening and herb gardening. - Although no mention of livestock farming was made, mention is made of animals found on the site. (Elder, 2012:18).					5
Should improve the **environmental quality**.	- The site contributes to the environmental quality by serving as a sanctuary for animals and birds in the			3		

	area. Responsible, natural farming methods used.					

Note: The management was unavailable and failed to reply to personal correspondence on matters such as start-up costs and other.

Source: Adapted from EcoFarm (2016), Elder (2012:18-22), Grusauskas (2012), Homeless Garden Project (2017), McKenzie (2015:13-14) and Zimmern, A (2013).

From the table (6.4), it can be seen that Homeless Garden Project ranked lowest in criteria within the ecological perspectives. In particular the criteria pertaining to its role within the larger ecological environment. It is interesting to note that not only is Homeless Garden Project the oldest farming project evaluated, but that they also have the strongest social media presence, as seen on their Facebook group. The site is regularly updated on events, gatherings and pleas for volunteers. Furthermore, the offer of "simple, nourishing and delicious food" in exchange for work, provides volunteers with a short-term investment which isn't binding (Zimmern, 2013). The drop-in-drop-out volunteer system, coupled with incentives such as food and experience, ensures that this project has constant volunteers and support from the community; thus, ultimately ensuring its longevity.

6.2 Local case study analysis

6.2.1 Local case study 1: Harvest of Hope

The case of Harvest of Hope is included here because it demonstrates the unique application of urban farming for commercial gain through market expansion of community gardens. The name 'Harvest of Hope' does not refer to the farming sites producing the food *per se*, but rather the marketing unit within a larger non-government organisation (NGO) named Abalimi. This case is also regarded as a successful UA practice, as it was found to be viable, equitable and bearable, as per the criteria presented in **section 3.2.6**.

6.2.1.1 Background

The **Harvest of Hope** system manages the vegetable box scheme operating in and around Cape Town (Small & Hoekstra, 2010:18). Abalimi, or in full *Abalimi Bezekhaya*, meaning "Farmers of Home" in Xhosa, is a civil society organisation which has been operational for 33 years (Harvest of Hope, 2016). During this time, it has been working towards empowering the impoverished community of the Cape Flats, with their newest programme being Harvest of Hope. This is an umbrella company which is aimed at developing agricultural and market opportunities for the actors, who are mainly small-scale women farmers in Kayelitsha, Nyanga (Small & Hoekstra, 2015). In short, "Harvest of Hope manages the packaging, marketing and selling of products, while Abalimi provides producers with technical support, production plans, seeds, organic fertilisers, and the maintenance and repair of irrigation equipment" (Small & Hoekstra, 2015:16).

The success of this particular UA programme can be attributed to the strong commercial component, but also the non-profit commitment, which allows Abalimi to provide services at a profitable rate by combining the small-scale practices within a system able to promise more secure food productions to retailers and consumers. By contrast, the individual farmer would have been unable to do so (de Baat & Renting, 2014:23). The following table presents a brief background study for this case study.

Table 6.5: Local case study 1: Harvest of Hope background	
Spatial qualities	
Name of farm	Abalimi Bezekhaya's Harvest of Hope Marketing unit for small-scale farmers.
Physical location	The farms are situated in townships around Cape Town, in particular at Kayelitsha, Nyanga.
Location within urban space	Peri-urban farming sites with the marketing unit distributing collective produce to all spaces within the Cape Town.
Land/Area coverage (approximate/m^2)	*Inconsequential*
Organisational structure	
Functional operation	Non-profit civil society operating a distribution network for famers. Harvest of Hope's functional team includes a marketing manager; part-time staff consisting of field workers, a book keeper, packers and drivers.
Owner(s)	Rob Small in collaboration with micro-farmers at the urban edge
Stakeholders actively involved	- Farmers - Abalimi Bezekhaya - Harvest of Hope was launched in partnership with the South African - Institute for Entrepreneurship (SAIE) and Business Place Phillipi, with support from the - Ackerman Pick n Pay Foundation.
Type of organisation	Commercial enterprise– Harvest of hope Non-profit- Abalimi
Profitability	Yes, but in varying degrees as seasonal changes and market prices influence the product. However, small-scale farmers experience larger returns on their practices through this system.
Year site opened	Inconclusive as the farms are collectively regarded within this analysis. However, the Harvest of Hope enterprise was established in 2008.
Produce and services	

Agriculture typologies practiced	Horticulture Mostly organic
Annual produce (in kg if available)	Varying.
Distribution points and clients	Clients are mostly middle and high-class clients signed into the vegetable box scheme, including indirect clients purchasing from satellite markets and farms, such as Oranjezicht City Farm. There are 25 collection points around Cape Town, usually schools, university buildings, business and government offices, and shops.
Programmes presented	Training for farmers
Additional services provided	No additional services are provided, other than the market chain development for micro farmers.
Mission	
The main goals of the Harvest of Hope initiative are to: • create a sustainable and expandable market for producers in and around Cape Town; • use this market as an engine for growth and an instrument for poverty alleviation in poor communities; • give customers access to fresh competitive organic produce and contribute to fewer food miles (Small & Hoekstra, 2015:17).	

Source: Table adapted from Small and Hoekstra (2010: 17-20; 2015:14-17), de Baat & Renting (2014:22-23) and Harvest of Hope (2016).

6.2.1.2 Evaluation

The evaluation for this case study is completed for the entire Harvest of Hope farming initiative, which includes the community gardens and marketing unit. The following table captures the self-evaluation of this farm, which will form part of the conclusion in Section 6.3.

Table 6.6: Evaluation of Harvest of Hope

Criteria An UA food production service,	**Manner in which case study fulfils the criterion. Explanation, proving quotation and/or references**	**Degree of criteria fulfilment**				
		No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree
		1	2	3	4	5
Social perspectives						

Should positively and actively contribute to **community development**	- This scheme allows for community building, personal growth and self-esteem by equipping these farmers with real market access. - "Building a sense of place and strengthening community ties" (Small &Hoekstra, 2015:14)					**5**
Must be **empowering** to a variety of stakeholders	- The enterprise empowers disadvantaged farmers (as the main producers), building their confidence and capacities in farming. - This includes job creation and capability building for other staff members, not just farmers. - The marketing sector gives the farmers access to better markets and improves their influence in the community.					**5**
Should be **multifunctional** in services provided	- Harvest of Hope (Distribution network) - Abalimi People's garden centre - "Abalimi's and Harvest of Hope's activities help to introduce elements of community organisation and 'rootedness' in the land, to the black townships of Cape Town" (Small & Hoekstra, 2015: 17). - "Harvest of Hope centred on agriculture and food, - manages to blend socio-cultural and lifestyle elements across the rural–urban divide and combine the best of both worlds (Small & Hoekstra, 2015: 17). - Provide services to both the consumer and (significantly more pronounced) the farmer.					**5**

Should stimulate **social activities** and improve social inclusion	- "The main beneficiaries are the vegetable producers, mostly older women and some dedicated younger producers, as well as the customers" (Small & Hoekstra, 2015:16). - Inclusive of the elderly. - Serves as a social platform, although little organised activities exclusive focus on social interactions are initiated. - Promotes the social inclusion of poorer urban (and peri-urban) dwellers, into the formal working sector.				**4**	
Managerial team should have agricultural and technical **knowledge** (prerequisite).	- Both farmers and managers have sufficient knowledge.					**5**
Should enhance **food security.**	- The gardens supplement the household diets, as well as improving household food and nutritional security, mainly for women and children, since most of the micro-farmers are woman. - Provides securer income to the farmers and consequently the purchasing power of these households also increase. - Improving accessibility to ecological produce for the consumer. - "Ensuring that fresh ecologically friendly produced food is available year-round for producers, their families and local communities" (Small & Hoekstra, 2015:16)				**4**	

Should contribute to **poverty alleviation**.	- This scheme provides a sustainable additional income by providing access to a platform and increased security for produce to be sold. - "The enterprise develops short marketing chains that would support the move from subsistence farming to (semi-) commercial farming" which would result in better income and purchasing power (Small & Hoekstra, 2015:16). - "Using this market as an engine for poverty alleviation" (Small & Hoekstra, 2015:16). - There is a focus on enabling township farmers to have dignified livelihoods. - As well as sustainable livelihoods.				4	
Should present **health and safety** benefits to the community.	- Improved air quality. - Reduction of waste products through composting. - Provides multiple recreational services which could contribute to health benefits. - Increased purchasing power which could contribute to better health.			3		

Economic perspectives						
Should give rise to **financial gain** for those involved.	- Provides more secure income to the farmers and as a result the purchasing power of these households increase. - "The enterprise develops short marketing chains that would support the move from subsistence farming to (semi) commercial farming" and in conclusion, better income and purchasing power (Small & Hoekstra, 2015:16). - *The non-profit is seen as a community service and should therefore not be taken into consideration.*					5
Should be **financially self-sustaining** after a reasonable time period.	- This is true in respect to improved market access to farmers, in turn allowing better practices and per annum increases experienced by farmers. As such this case study fulfils the criteria to an important degree, **however**, the Harvest of Hope unit which brings about these benefits, is dependent on the support from partners. Thus, in case of a collapse of this particular unit, farmers might experience losses and setbacks. High risk.			3		
Start-up cost should coincide with the type and size of practice.	- Start-up cost coincides with the non-profit nature of this enterprise, as the initial capital was sponsored.					5
Should attempt to **reshape underutilised urban** space in order to contribute to area-profitability.	- Farms allotted to vacant lots. - Previously unused land used for UA in townships, and as such the area-profitability increases to a minimum degree, although other factors, such as high levels of township associated crimes, might diminish this influence.				4	

Should reduce the "**food miles'** of produce, while also maintaining comparative advantage in terms of food prices.	- Increasing "consumer access to ecological produce with less food miles and at competitive prices" (Small & Hoekstra, 2015:16). - Compared to other organic retailers, these farms have a significant price advantage (Harvest of Hope, 2016). Competitive prices in the organic sector, not market prices.				4	
Should provide **financial benefits** (in varying degrees), from position in **market value chain**, compared to rural counterparts.	- Significant advantage, especially to producers and consumers.					5
Ecological perspectives						
Should present multiple **safety benefits** (with regard to the ecosystem and crisis situations).	- Additional food sources, both to consumers, but also to small-scale farmers through increased income and a direct food source which does not have to be purchased in times of economic crisis.				4	
Should contribute to **urban greening**, environmental protection and land rejuvenation.	- Increased volume of urban soft spaces. - Habitat increase, and land protected. - This enterprise raises awareness and effectively promotes environmental stewardship. - These programmes create awareness and as such increase the numbers of active farmers, especially older women.				4	
In order to improve the viability, should make up part of some larger **nature conservation** scheme**, recreational services** and/or **tourism services** within the urban space.	- Does not form part of any nature conservation scheme, although in line with ecological conservation initiatives and programmes. Organic farming methods have a small contribution towards conservation initiatives. - Doesn't form part of tourism or recreational services.		2			
Should be multi-functional in terms **of ecosystem services** provided. Evaluated in terms of Table 2.4: Ecosystem Services.	- Provisioning services provided - Habitat and supporting services provided, but not promoted or actively included. - All cultural services provided, although informal infrastructure decreases the enjoyment of aesthetic services. - Several regulating services provided				4	

Should complete or make up part of the **waste management system**, be it centralised or decentralised.	- Both internally and externally, although no study on this area could be found in terms of the financial waste management benefits, but it is found to be in accordance with ecosystem services in general (table 5.1) it can be said that these farms do contribute to the waste management within the area, passively through the benefits of ecosystem services. Some mention is made of waste used for compost by a few individual farmers, but this is not a prevalent habit. But no significant contribution.			3		
Should make use of a variety of **agro-ecological production methods.**	- Several production methods used, the most relevant of which is reliant on organic means and less technology-dependent methods, However, Harvest of Hope have no formal organic certification, mainly due to the lengthy and complicated nature of the process of requirement.			3		
Should create multi-habitat, **heterogeneous environments** through the use of variant production methods and typologies.	- Improvements of habitats and introduction of multi-habitats contribute towards a more heterogeneous environment. - Chicken farming, mainly for the eggs and not by all the small-scale farmers, also contribute to a more heterogeneous environment				4	
Should improve the **environmental quality**.	- Urban upgrading, high variety of ecosystem services provided and increase of soft spaces and their concomitant benefits.			3		
Notes:						

Source: Table adapted from Small and Hoekstra (2010: 17-20; 2015: 14-17), de Baat & Renting (2014:22-23) and Harvest of Hope (2016).

6.2.2 Local case study 2: The Fish Farm

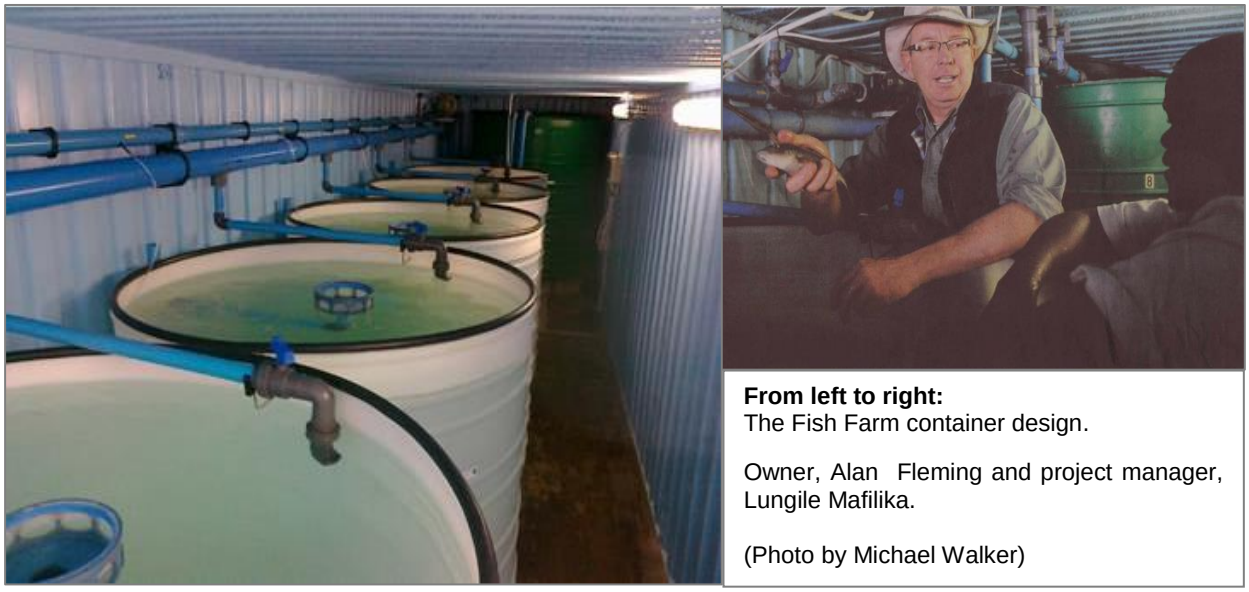
The Fish Farm employs a unique application of an urban farming typology (aquaculture), specifically designed to fit the requirements of the locality in the way that it is located within a container (The Fish Farm, 2016). Additionally, its relatively close proximity to other UA farming practices (such as the previous case study, Harvest of Hope), is supportive of certain theoretical concepts. These entail, among others, the benefits available to entities within the urban food system. This farm could supply nutrient rich waste fluids to farms within the area and in return receive worms and worm-tea from urban farms in the area as a *quid pro quo.* Aquaculture and

small-scale farming initiatives are seen as government priority, as is the expansion of this particular agricultural sector, as mentioned in **Section 2.4.3** (DAFF, 2015:58; South African Government, 2016). Therefore, a case analysis review of The Fish Farm could present the economic, social and ecological impact of this UA typology. If found to be positive and significant, this can be used in recommendations for the implementation of UA. The Fish Farm case is furthermore regarded as a sustainable practice, as it was found to be viable, equitable and bearable, as per the criteria presented in **Section 3.2.6.2**.

6.2.2.1 Background

This farm is a unique UA practice in Phillipi, Cape Town. The initial farm site comprises of six tanks of 1 500 litres each placed in a row as well as a circulation pump, several filters for managing solid and fluid waste and an aerator, as seen in **Figure 6.1** (The Fish Farm, 2016)**.** Developed in response to observed environmental, economic and social trends in poor communities, this farming type is for the most part a private, commercial activity with intentions of improving the community well-being, created by entrepreneur and businessman, Alan Fleming (The Fish Farm, 2016).

Figure 6.1: The Fish Farm at a glance



From left to right:
The Fish Farm container design.

Owner, Alan Fleming and project manager, Lungile Mafilika.

(Photo by Michael Walker)

Source: The Fish Farm (2016).

Through this initiative, The Fish Farm seeks to address several of the problems associated with the growing population and urbanisation (The Fish Farm, 2016). It intends to promote a culture fostering more responsible consumers and production methods. This small-scale farming practice is contrasted against the more prevailing aquaculture practice which tends to be restricted to large, low-employment operations in need of high financial and technical inputs and barriers. Against this backdrop, the aim is to provide local communities with job opportunities by decreasing

the scale and required inputs and increasing the amount of people involved. The container design allows this initiative to be “profitable, affordable, repeatable, transportable, lockable and stackable” (SA Info, 2013). The following table presents a brief background study for this case.

Table 6.7: National case study 2: The Fish Farm background	
Spatial qualities	
Name of farm	The Fish Farm
Physical location	Phillipi, Cape Town
Location within urban space	Located on a vacant loft within an disused shipping container. Placed in impoverished communities, with the fish farm model designed accordingly.
Land/Area coverage (approximate/m^{z})	The barrel-system fits within a 12-meter container
Organisational structure	
Functional operation	Mainly functional structure, several full-time employees
Owner(s)	Alan Fleming
Stakeholders actively involved	National development agencies, Deep Blue Aqua, Ackerman Pic and Pay Foundation
Type of organisation	Commercial Community-model
Profitability	Yes
Year site opened	*unavailable*
Year of first harvest	*unavailable*
Start-up amount or resources	*unavailable*
Produce and services	
Agriculture typologies practiced	Aquaculture
Annual produce (in kg if available)	Produces 1814,37kg fish, with the capacity to double this amount
Distribution points and clients	Local restaurants Households involved have direct access
Programmes presented	Unavailable, however this company presents an opportunity for implementing the design within other urban areas via supporting partners.
Additional services provided	Very little additional services are provided, although the most mentionable service in this category is the nutrient rich fluids which can be used by local farmers as an alternative to regular composting products.
Mission	

Prosperity through community-based aquaculture.

Note: The data was collected from several sources and interpreted accordingly.

Source: Own creation, adapted from The Fish Farm (2016) and eNCA (2013).

6.2.2.2 Evaluation

The evaluation for this case study is completed for the entire The Fish Farm enterprise. The following table captures the self-evaluation of this farm, which will form part of the conclusion in Section 6.3.

Table 6.8: Evaluation of Fish Farm

Criteria An UA food production service,	**Manner in which case study fulfils the criterion. Explanation, proving quotation and/or references**	**Degree of criteria fulfilment**				
		No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree
		1	2	3	4	5
Social perspectives						
Should positively and actively contribute to **community development**	- Previous nominee in a global entrepreneur competition fulfilling the criteria of “easily implementable, low cost, community upliftment project” for the “empowering people Award” - Located in an impoverished area in Cape Town with the aim of implementing similar projects in similar areas. - Community upliftment is a driving force behind this project. - Improves the social and economic status of the area. - Local employees employed and educated.					5

Must be **empowering** to a variety of stakeholders	- Human capacity building for employees (such as project manager and former gardener, Lungile Mafilika). This includes training and skill acquirement. - Future plans exist to implement other projects such as this, which would potentially feed more people and provide fish at a more affordable price.			3		
Should be **multifunctional** in services provided	- Services provided are mostly food and employment related, with any prospective growth in human capacity limited to the little amount of people actively involved. - No additional services such as training, event management and no extra organised activities for different age groups.		1			
Should stimulate **social activities** and improve social inclusion	- *No available data suggesting this*.	1				
Managerial team should have agricultural and technical **knowledge** (prerequisite).	- Yes, both project manager and entrepreneur were involved in agricultural and cultivation endeavours before this current innovation. - Fleming had technical and business knowledge before starting this project.					5
Should enhance **food security.**	- Alan Fleming: "I'm trying to reach a situation where it gives four people (or maybe one family) an income and/or high-quality protein, right where they live." (SA Info, 2013). - The Fish Farm is also designed to meet the livelihood and food needs of poorer urban families or farming collectives, and whilst it only provides these benefits to one such family, it has the potential to do so for many more. - Provides a situation of intensive protein production with increased access. - Accessibility improves. Dietary					5

Should contribute to **poverty alleviation**.	- Regarding employment benefits, the farm can be stocked with tilapia, a hardy fish that feeds on phytoplankton, microscopic plants. This is cost-effective for a cash-strapped collective or family. - Current and future employment opportunities and significant, safe income source (if future farms are as successful in their operations as the first). - Even though this is on a small scale, the impact on the families involved is mostly positive. For now, and potentially in the future for others, the income source is secure, and the training and knowledge retained are assets.					5
Should present **health and safety** benefits to the community.	- Intensive protein production, providing accessibility to a healthy food source in abundance. - Additional food source.					5
Economic perspectives						
Should give rise to **financial gain** for those involved.	- Presents new livelihood which creates new sources of wealth. - New opportunities for household livelihoods. - Practice is experiencing reasonable economic security. - Tends towards long term financial security.					5
Should be **financially self-sustaining** after a reasonable time period.	- The available sources suggest that these farms are financially self-sustaining, easy to duplicate in similar spaces and a profitable “investment”. High risk for accidents, as happened here as well. The financial implication should be considered.				4	

Start-up cost should coincide with the type and size of practice.	- Mostly a private initiative with no apparent government financial support. - The start-up cost significantly reduces from the first container to the next and could possibly decrease even more for consecutive farms. Therefore, the initiative is realistic with respect to the economic situation of the households for which it is meant.					5
Should attempt to **reshape underutilised urban** space in order to contribute to area-profitability.	- The space required for the container is minimal, and it can operate on solar power. - Reuses old containers. - Commercial activity stimulates other activities, such as street markets.			3		
Should reduce the "**food miles'** of produce, while also maintaining comparative advantage in terms of food prices.	- Yes, reduction of food miles for both the households in the immediate area making use of the farm, but also for restaurants. - Yes, comparative advantage in terms of food prices perceived, but not confirmed Talk of potential competitive/comparative prices.				4	
Should provide **financial benefits** (in varying degrees), from position in **market value chain**, compared to rural counterparts.	- Yes, targets inner city impoverished communities and as such provides an opportunity for them. Them to create new markets. - Restaurants and consumers have to travel smaller distances. - Increased, responsibly sourced products are provided, and these would enjoy consumer preference (especially among organic and eco-friendly activists). - Nutrient rich waste water can be used as an alternative for other composting products, if local households and gardeners utilise the opportunity. - No added value in terms of processing.				4	
Ecological perspectives						

Should present multiple **safety benefits** (with regard to the ecosystem and crisis situations).	- Very little benefits provided.	1				
Should contribute to **urban greening**, environmental protection and land rejuvenation.	- To a degree the farm contributes to land rejuvenation, although this cannot be confirmed as the degree would vary from container to container depending on the site - Advances environmental protection by providing supplementary fish stock as an alternative to those taken from current marine resources. - This site doesn't contribute to urban greening.		2			
In order to improve the viability, should make up part of some larger **nature conservation** scheme**, recreational services** and/or **tourism services** within the urban space.	- No available data suggesting this, however media coverage might increase the amount of site visits which could result in a tourism niche.	1				
Should be multi-functional in terms **of ecosystem services** provided. Evaluated in terms of Table 2.4: Ecosystem Services.	- Several provisioning services provided, although to a lesser degree than the Brooklyn Grange Urban Farm. - Cultural services provided, but to a select group. - Moderate degree of habitat and supporting services provided, the most significant of which are the artificial, but still influential, increase of species' habitats. - Little regulating services provided as the container operates within a closed off system/ sealed environment.			3		
Should complete or make up part of the **waste management system**, be it centralised or decentralised.	- Re-use of farming waste, since the nutrient-rich water can be supplied to vegetable farmers as an additional source of income.		2			

Should make use of a variety of **agro-ecological production methods.**	- The space required for the container is minimal and it can operate on energy obtained from solar power. - Little variance in agro-ecological production methods.		2			
Should create multi-habitat, **heterogeneous environments** through the use of variant production methods and typologies.	- Mono habitats created as only one fish species can be accommodated in a tank. - Introducing the chosen fish species to the area would to some extent provide an increase of heterogeneity in the environment, but there is little contribution towards enhancing the overall heterogeneity of environment. - Little variance, but the methods coincide with the type of farm and as such most of the available production methods are used. Introduction of new fish types might require new methods.	1				
Should improve the **environmental quality**.	- Creates a situation where inhabitants are less reliant on a depleting marine environment. - Reduces energy costs by means of solar power.				4	

Source: Own creation from The Fish Farm (2016) and SA Info (2013)

6.3 Conclusion regarding the case study analysis

This section provides the findings from the case study analysis as presented in the table below. To allow for variations, the following assumptions were made:

- A criterion which was satisfied by all four case studies will be most influential, and as such the best practice qualities will be formulated from the criteria with the most significant impact, i.e. where all four cases satisfied the criterion to an important degree.

- Based on the assumption of success (sustainable development) as mentioned in Chapter 5, the stipulated line (as seen in **Table 7.1**) loosely divides the priorities into three categories according to the frequency of criteria fulfilment experienced. Therefore, if a criterion has more X's within the first category (called interval in the table), its contribution would be least significant for inclusion in policy instruments towards sustainable urban development and should receive less preference if resources are scarce, as is often the

case. It could raise the question that if a criterion is not fulfilled by any of the case studies, then it's contribution should be negligible. However, all the criteria were found to be important considerations to be include in UA policies, as proven in this research and by RUAF (2009). This is analysis is not the weed out the weak criteria, as all were already proven to be valuable and as such, every criterion included in the analysis is significant. By applying this ranking system to the criteria, the criteria with the biggest impact towards success of a UA practice, could be identified.

- The aim of this research is not to review whether or not these criteria should be included in policies, but rather to identify the best practice criteria for more effective policy implementation. Also, if a criterion has more X's within the second interval, its contribution would be moderately significant and should be considered when implementing UA policy. Criteria within the last interval should be regarded as highly significant and should hence receive more preference if resources are scarce.

During completion of the case study analysis, it was found that a small degree of ambiguity in certain criteria clouds the interpretation and the clarity of the result. For example, the first criterion from the economic perspective namely, "An UA food production service should give rise to financial gain for those involved", has too many actors included in "those involved". Should the customer or the staff experience financial gain in order for this to be a contributing criterion; or both client and staff? Conjoined criteria also suffer a degree of ambiguity. The criteria can be refined in order to reduce confusion and improve implementation.

The results of the case study analysis can be seen in Chapter 7.

SECTION C: CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 7: CONCLUSIONS

This chapter aims to draw conclusions based on the theoretical background and empirical investigation included in this research, in line with the respective research questions and objectives as captured in Chapter 1.

7.1 Concluding on the advances of UA theory and importance to include such as part of mainstream spatial planning.

Acknowledging the position and possible impact of UA within the larger food environment is potentially significant for mainstream spatial planning. This is because UA is intrinsically linked to urban areas (as the primary locality) and agriculture (as the *modus operandi*) and makes up an important part of urban food systems where such practices are presented. Recognising the seamless integration of UA into a food system is potentially significant, as UA not only forms part of the larger urban food system, but a single, well-managed UA site can be a food system (**Section 2.3.1**). From the theoretical and empirical investigation, it was evident that a single well-developed UA site could provide all the phases within a sustainable food system including **production** (as from the farming site), **processing** (which could be realised through value-added products), **distribution** (which could be realised through CSA or delivery services), **access** (which could be improved by a farmer's market), **consumption** and **waste recovery** (which could be realised through a composting site). Furthermore, changes within a livelihood (which UA as food provision services entails) would impact not only the single livelihood directly, but also several others within the larger interconnected web of livelihoods (refer to section 2.3.2). Also, advances in UA theory suggest that UA has the potential to reduce Food Loss and Waste within the Post-harvest phase of the food distribution chain, which accounts for more than half of all wasted food in Sub-Saharan Africa, as discussed in **Section 2.3.3** (WRI, 2015). This research therefore concludes that UA could possibly fill the deficiency in food demands globally and locally and contribute towards an increased fulfilment of local food demands (as substantiated in **Section 2.3**). However, it is essential to recognise the impact of UA as part of the larger urban food system, but also as a singularly functioning unit that influences other links within the larger urban food system. In essence it is confirmed that UA is capable of improving food security and nutritional diversity (Egal *et al*., 2003:1-3; Warren *et al.* 2015:57).

Within this notion, UA forms an important consideration of spatial planning, aiming to create sustainable living spaces and cities. It is also aligned with the UN's Sustainable Development Goals which prioritises the objectives of 'Sustainable Cities' globally (UN, 2016). UA should be explored within these broader sustainability objectives in an attempt to build a case for UA as spatial planning tool and strengthen the benefits provided by UA.

7.2 Concluding on the interface between sustainable development and the three themes urban development, food consumption and production; and UA.

Urban systems act as consumers, absorbing energy and resources in most parts from rural areas, as well as the sub-systems within the urban system. These energy exchanges happen in a space where energy and resources are finite, and as a result any imbalances in energy flows result in areas of deficiencies or entropy (**Section 2.5.2**). Coupled with this, it was found that high levels of urbanisation are experienced globally, of which the most significant growth is expected to happen in the Africa (UN-DESA, 2015). This worsens the imbalance of energy and resources between systems and within the subsystems of cities (**Section 2.5**). In urban areas, the condition of entropy reduces the urban system's ability to be sustainable or develop in that way. This is counterproductive to urban development actions, policy and legislation, that all contain one or more reference to sustainable development as a policy objective (**Section 4.10**). The reality is worsened by ineffective urban management processes (**Section 2.5.2**).

Correlating with the entropic approach, as in **Section 2.5.2.1**, it can be argued that an intensification approach should be applied in South African urban planning processes if sustainability goals are to be achieved. Furthermore, there should be a reconciliation between contradictory urban policies, cross-sectional government incoordination and opposing urban development approaches to avoid dissipative South African urban systems. In this regard UA is presented as a possible solution for the unsustainable conditions which results from entropy in cities.

7.3 Concluding on the policy and legislative frameworks that govern urban planning and UA globally, and in South Africa.

Not all of the respective policies and legislative frameworks included in this research indicated a satisfactory level of support for UA as instrument of sustainable urban development capable of providing economic, social and ecological benefits to cities and their inhabitants. Some policies and legislation had very weak support for UA (most notably the National Environment Management Act (1998) and the National policy on food and nutrition security (2013)). International policies and legislative frameworks included Agenda 21 (1992), the Habitat Agenda

(1996), the 2030 Agenda for Sustainable Development (2015) and the New Urban Agenda (2016). Local policies and legislative frameworks included the White paper on agriculture (1995), the National Environment Management Act (1998), the National policy on food and nutrition security (2013), the Spatial Land Use Management Act (2013), the Policy on Agriculture in sustainable development (n.d.), the IADFP (2015) and the Integrated Urban Development Framework (2016+).

Both international and local policies and legislative frameworks were evaluated against the 5 core aspects, including: Sustainable urban development, community development, environmental focus or protection, economic development and food provision and food security. It was evident that although most policies and legislative frameworks contributed to these broad criteria that was theoretically derived, the inclusion and specialisation of UA was still limited. All policies and legislative frameworks considered, focussed on food provision and food security as primary concern. **Table 7.1** captures a broad comparison of the local and international approaches in this regard.

Table 7.1: Comparison of international and local policies and legislative frameworks in support of UA

	Sustainable urban development	Community development	Environmental focus or protection	Economic development	Food provision and food security
International (4)	3 (75%)	1 (25%)	2 (50%)	3 (75%)	4 (100%)
Local (6)	1 (16%)	2 (33%)	0 (0%)	2 (33%)	3 (50%)
Total (10):	4	3	2	5	7

This research concluded that UA can successfully be incorporated in spatial planning practices as an instrument towards sustainable urban development. Both local and international studies illustrated adequate scope to support the inclusion and alignment of UA as part of broader spatial planning approaches.

7.4 Concluding on the criteria for development of policy and legislation to support UA as spatial planning tool

Based on the theoretical investigation specific requirements and considerations were identified to support the successful application of UA in practice, and to support UA as a spatial planning tool, the point of departure is that food security should be a priority of any development objective. A three-pillar approach to sustainable development, addresses the dynamic and complex needs of humans, as well as the system under scrutiny. Therefore, sustainability objectives should be

realised by addressing the economic, social and ecological needs of those involved. The impact of UA is most significant when applied to urban systems from this three-pillar approach.

Subsequently, this research employed theory-based sampling as a qualitative inquiry into UA as spatial planning tool. From this sampling, specific criteria were identified for sustainable UA practice.

Table 7.2: Criteria to support UA as spatial planning tool

Perspective	Criteria
Social perspective	• Should positively and actively contribute to community development • Must be empowering to a variety of stakeholders • Should be multifunctional in services provided • Should stimulate social activities and improve social inclusion • Managerial team should have agricultural and technical knowledge (prerequisite). • Should enhance food security. • Should contribute to poverty alleviation. • Should present health and safety benefits to the community.
Economic perspective	• Should give rise to financial gain for those involved. • Should be financially self-sustaining after a reasonable time period. • Start-up cost should coincide with the type and size of practice. • Should attempt to reshape underutilised urban space in order to contribute to area-profitability. • Should reduce the "food miles' of produce, while also maintaining comparative advantage in terms of food prices. • Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.
Ecological perspective	• Should present multiple safety benefits (with regard to the ecosystem and crisis situations). • Should contribute to urban greening, environmental protection and land rejuvenation. • In order to improve the viability, should make up part of some larger nature conservation scheme, recreational services and/or tourism services within the urban space. • Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services. • Should complete or make up part of the waste management system, be it centralised or decentralised. • Should make use of a variety of agro-ecological production methods. • Should create multi-habitat, heterogeneous environments through the use of variant production methods and typologies. • Should improve the environmental quality.

7.5 Concluding on the examples and best practises from international and local case studies to guide spatial planning in South Africa, with regards to UA

The literature study provided several theoretical perspectives with regard to the building blocks of the best urban agricultural practices. Complemented by a policy-guiding document of the RUAF (2009), the literature study distinguished UA into three main perspectives of policy objectives, namely, social, economic and ecological. This trisected nature from which UA is viewed, correlates with the three dimensions often associated with sustainability and sustainable development, as well as policies aimed towards achieving these conditions. More importantly, by applying these perspectives as underlying foundation in the formulation of the criteria used to evaluate the chosen UA case studies, it was able to identify the best practice qualities within each dimension. Consequently, the representation of policy considerations refined into a social, economic and ecological perspective, increases the significant recommendations for implementation of UA within urban development and its alignment with supporting policies and legislation.

All cases included in the case study analysis were deemed as critical cases and selected according to the sampling approaches: **Theory based sampling**, **Criterion sampling** and **Critical case sampling** (as discussed in **Section 5.2**). This means that all cases were selected because each represented an important predetermined theoretical construct (namely the ability to be sustainable within itself according to the theoretical requirements of sustainable development); consists of the ability to manifest the dimensions of good UA practices by being information rich (with regards to the qualities of successful UA practices); and the ability to represent these dimensions in such a manner that they are not location specific. Therefore, the evaluation presented generalised qualities of successful UA practices across a wide range of settings and conditions.

A synthesis of the four case studies and evaluations in terms of the re-coded design elements led to the identification of best practices. **Table 7.3** captures the combined core best practice qualities evident in all four case studies with a five-ranking system. These best practices were considered in the development of a framework to guide UA as part of broader spatial planning approaches.

Table 7.3: Identification of best practices of case studies

Table key:						
Brooklyn Grange		Concentrated colours: Best practice qualities				
Homeless Garden Project		In the first interval: Lowest policy priority In the interval: Average policy priority In the last interval: Highest policy priority	1st	2nd	last	
Harvest of Hope						
Fish Farm						

Criteria An UA food production service,	Degree of criteria fulfilment: (ways in which the case study meets the requirements of the criteria)				
	No fulfilment	To a minimal degree	To a moderate degree	To a noteworthy degree	To an important degree
	Lowest policy priority		Average policy priority		Highest policy priority
Social perspectives					
Should positively and actively contribute to community development					x x x x
Must be empowering to a variety of stakeholders					x x x
			x		
Should be multifunctional in services provided					x x x
	x				
Should stimulate social activities and improve social inclusion					x x
				x	
	x				
Managerial team should have agricultural and technical knowledge (prerequisite).					x x x

					x
Should enhance food security.				x	
					x
				x	
					x
Should contribute to poverty alleviation.			x		
					x
				x	
					x
Should present health and safety benefits to the community.				x	
				x	
			x		
					x
Economic perspectives					
Should give rise to financial gain for those involved.					x
				x	
					x
					x
Should be financially self-sustaining after a reasonable time period.					x
				x	
			x		
				x	
Start-up cost should coincide with the type and size of practice.				x	
			x		
					x
					x
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.					x
		x			
				x	
			x		
Should reduce the “food miles’ of produce, while also maintaining comparative advantage in terms of food prices.				x	
		x			
				x	
				x	
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.				x	
				x	
					x
				x	
Ecological perspectives					
Should present multiple safety benefits (with regard to the ecosystem and crisis situations).			x		
		x			
				x	
	x				

Should contribute to urban greening, environmental protection and land rejuvenation.					x
			x		
				x	
		x			
In order to improve the viability, should make up part of some larger nature conservation scheme, recreational services and/or tourism services within the urban space.		x			
	x				
		x			
	x				
Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services.					x
					x
				x	
			x		
Should complete or make up part of the waste management system, be it centralised or decentralised.					x
	x				
			x		
		x			
Should make use of a variety of agro-ecological production methods.			x		
				x	
			x		
		x			
Should create multi-habitat, heterogeneous environments through the use of variant production methods and typologies.				x	
					x
				x	
	x				
Should improve the environmental quality.					x
			x		
			x		
				x	

Source: Compiled from the selected case studies

From the case study analysis, it was evident that certain criteria were fulfilled by the case studies to a higher degree than others. For example, criterion-satisfaction seems to be highest in the Social perspective category, and lowest in Ecological perspective category.

The case study offered insight on the effect of inter-disciplinary connections between food production services and social services, as a key factor in the success of UA practices. While all cases fulfilled the criteria within the economic perspective to a moderate degree, the cases with the highest social service presence, also had the highest fulfilment of economic criteria. For example, as seen in **Table 7.3**, the two case studies that fulfilled most of the criteria to a noteworthy or important degree, namely Brooklyn Grange Urban Farm (Brooklyn Grange, 2016; Curbed, 2015) and Homeless Garden Project (EcoFarm, 2016), also provide the most social services. These include *inter alia* job training, recruitment and support of homeless people, free educational classes, food donations to health facilities and free daily meals for volunteers

(EcoFarm, 2016; Elder, 2012:18-22; Grusauskas, 2012; Homeless Garden Project, 2017; McKenzie, 2015:13-14 and Zimmern, 2013). The significant fulfilment of economic criteria could be a secondary benefit from the social services provided to the community. For example, social activities, such as free yoga classes at the site, would attract potential customers who could support other economic facilities at the site, like a shop or farmers market if these facilities are available. Even though the criteria are too general to identify specific complementary activities (such as given in the example), the case study evaluation and accompanying literature study presented the following general similarities:

- Cases that had the highest fulfilment of criteria within the Social Perspective also fulfilled the criteria within the Economic perspective significantly (Brooklyn Grange, Homeless Garden Project and Harvest of Hope) as seen in **Table 7.3**.

- Cases that were multi-functional in social and economic services provided (Brooklyn Grange, Homeless Garden Project), had best overall criteria fulfilment as seen in **Table 7.3**.

Furthermore, it was noted that the oldest case study (Homeless Garden Project) had the strongest social media presence, as seen on their Facebook group and website (Homeless Garden Project, 2017; Zimmern, 2013). These sites are regularly updated on events, gatherings, promotion and pleas for volunteers, whom they heavily rely on to continually provide the services they do. Considering these phenomena, it can be concluded that social services as well as social media activity could contribute to the successful implementation of UA.

7.6 Concluding on the need for a South African UA framework for the strategic and spatial planning of sustainable UA practices.

The importance of UA is well document and motivated from a theoretical point of view. The empirical investigation included in this research substantiated this viewpoint with adequate evidence of the impact of UA in practice. UA could be employed as a spatial planning tool to address broader urban problems relating to food securities and poverty. The current policy and legislative framework relating to food securities in South Africa provide adequate scope to further consider UA as part of spatial planning. However, as seen in the policy analysis, there is currently no real support or legislation that could be enforced concerning UA. Even though there is scope for this. Therefore, these policies and legislative frameworks would need to be enhanced and placed central within spatial planning and land-use decision-making. This research however emphasises the need for such a South African UA framework to guide strategic and spatial planning of sustainable UA practices. The following chapter will provide planning recommendations in an attempt to contribute to such a framework.

CHAPTER 8: RECOMMENDATIONS

This chapter aims to provide planning recommendations in line with the research questions and objectives captured in Chapter 1. Recommendations are based on the conclusions drawn and captured in the previous chapter and presented accordingly:

8.1 Recommendation 1: Acknowledging the advances in local and global UA theory and including such as part of mainstream spatial planning

The advances in local and global UA theory should be acknowledged and included as part of mainstream spatial planning to enhance the multiple benefits and promote urban areas supportive of, and in harmony with the natural environment. Including urban agriculture on a local scale would require more specific implementation techniques and context-based planning relating to the specific needs of the area. **Table 8.1** illustrates the context-based needs along with specific planning interventions that could be explored in this regard.

This table does not include ecological benefits as a separate category, as the Ecosystem service and related benefits as discussed in Section 2.7.1 is a direct outcome of these planning interventions proposed.

Table 8.1: Context-based implementation of UA

Context-based needs	Immediate benefit:	Planning intervention
Health impact		
Improved food security	● Increased food choices, and greater accessibility of food. ● Increased control over the nutritional balance of the family diet. ● More expensive food items such as fruit, vegetables, and meat can be supplied through home production. ● Improved nutritional balance reduces protein and energy malnutrition. ● UA provides fresher food. ● Reduced prices, as food passes through fewer middlemen. ● Improves children's access to food, enhances their health status, and contributes to empowering women.	Create special zoning categories in spatial development frameworks to include: ✓ Community farms ✓ Household garden ✓ Middle-income kitchen garden ✓ Community kitchens ✓ Neighbourhood markets
Increased food and health awareness	● Increased nutrition awareness and resulting healthy cooking and eating practices	Consider education approaches relating to spatial planning disciplines and sensitize future planners and decision-makers on the importance of

		UA as part of spatial planning. Specific focus to be placed on: ✓ Literature on healthier food alternatives ✓ Educational programmes
General health and well-being improved	• Stress reduction and improved overall well-being associated with farming.	Planning for 'healthy cities' should be emphasized within the broad sustainability thinking. Specific focus to be placed on: ✓ Activities promoting physical activities ✓ Creating healthy city and spaces through integrated spatial planning approaches
Social benefits		
Creating safe places	• UA farms create safe spaces to recreate and improve the physical space of the neighbourhood. • Urban beautification improves resident pride and attachment to the area, and as a result vandalism and crime decreased as communities took ownership of the area.	Spatial planning approaches should attempt to create safe places for UA practices, supportive in terms of accessibility, visibility and needed infrastructure. Such approaches should include: ✓ Urban beautification initiatives ✓ Design approaches to enhance safety and perceived safety ✓ Enhance the usage UA areas
Community Development	• Reduced social isolation for community gardeners. • Increasing social interaction, and community interaction.	Specific community development initiatives should be explored as part of broader spatial planning, that include the planning of: ✓ Community gardens ✓ Distribution networks ✓ Organised social activities
Education and youth development opportunities	• Increased awareness of environmental and social justice (where modules focussed on environmental issues and ethics, sustainability and food systems). Subsequently, • Participants are empowered to take responsibility of change and actively address issues, such as inequities. • Improved environmental attitudes and stewardship.	Education and training of the importance of UA should be enhanced, focussing on UA farms as learning medium. This should include: ✓ Education services ✓ Youth leadership opportunities ✓ Nutrition education programmes ✓ Job training opportunities ✓ Wage-earning opportunities
Cross-generational and cultural integration	• Sharing of knowledge and practices. • Increased access and equal opportunity to social opportunities/ city-life benefits. • Intergenerational social interaction increased • Intergenerational knowledge shared, and consequently social barriers where reduced.	From a participatory planning approach, spatial planning should consider opportunities to enhance multi- and transdisciplinary planning and explore possibilities of: ✓ Immigrant/refugee programmes ✓ Youth and elderly programmes ✓ Field trip programmes

	● Provide opportunities for elderly citizens to socialise within a safe environment. Increased well-being of elderly.	✓ Linking with academic bodies/universities
Economic benefits		
Job creation, training, business incubation and economic savings on food	● Community food projects provide employment (locality preference). ● Skills training, food justice programmes stimulate job creation and entrepreneurial ventures. ● Improved economic conditions for participants and financial gain either from direct economic benefits (capital for soul goods) or indirect financial gains/savings (proximity to markets). ● Small scale farmers experience more profit by directly selling produce instead of using wholesale strategies that require larger yields. ● Cost savings on groceries and access to foods otherwise unaffordable in supermarkets	As part of broader viability and sustainability objectives, the economic benefits relating to UA should be explored, including: ✓ Employment opportunities (farms) ✓ Niche-market businesses ✓ Community food projects ✓ Youth employment programmes ✓ Food justice programmes ✓ Processes services (value added products) ✓ Market expansions and establishment ✓ Financial support for micro-UA-businesses ✓ Farmer markets ✓ Vegetable box schemes
Savings for municipal agencies	● Vacant lots transformed into UA sites preventing vandalism and resulting in municipal savings. ● Ecosystem services (see table 6.x) include: Increased biodiversity, provision of habitat, reduced air pollution through filtration of particulates by vegetation, micro-climate regulation, increased rainwater drainage, natural disaster risk reduction, waste management, noise reduction, and restoration of natural landscapes. ● Climate change mitigation through greenhouse gas emission reduction. ● Improvement to build environment.	To sensitize authorities to plan for UA the possibilities and benefits of UA for municipal agencies should be highlighted, including: ✓ Waste management integration ✓ Revenue from farming sites ✓ Urban rejuvenation possibilities (vacant lots) ✓ Rooftop gardening possibilities ✓ Vertical gardening possibilities ✓ Taxation on farming land

Sources: Based on Golden (2013:1-22).

As seen from the table, the benefits of UA are numerous and grounded in economic, social, health and ecological considerations. These benefits should however be acknowledged, along with the advances in local and global UA theory, and included as part of mainstream spatial planning to align with broader sustainability thinking and planning of urban environments.

8.2 Recommendation 2: Policy and legislative frameworks that govern urban planning and food distribution globally, and in South Africa should acknowledge and enhance UA as crucial commodity

Based on the policies and legislations included in this research, it was evident that UA should be more integrated and enhanced as a valuable resource to ensure the successful planning and management thereof. Based on the analysis (**Table 4.16**) conducted in terms of sustainable urban development, community development, environmental focus or protection, economic development and food provision and food security, it was evident that international policies and legislation had a weak contribution to supporting UA as instrument of sustainable urban development. Most of the local policies and legislation had a similar finding, except for the White Paper on Agriculture (1995), IADFP (2015) and Integrated Urban Development Framework (2016+) which were concluded to have a strong impact and support in terms of UA.

Policy and legislation in broad promote sustainable development but is negligent of the possible impact of UA in achieving these goals. The research stressed the importance of international agreements in favour of UA and the respective impact on domestic law, as well as the importance of national legislation and policies to further guide the implementation of UA. The challenge of creating UA-specific urban policies in South African is not necessarily the lack of knowledge or research, but rather the discord between different policies currently in development related to this topic and as reviewed. The possibility of a singular policy for the planning and management of UA as part of broader spatial planning should be considered.

8.3 Recommendation 3: Consider additional requirements for UA in development of policy and legislation (in particular those concerned with cities and food) to enable municipalities to plan and integrate UA on a local scale

From the theoretical and empirical investigation (in particular section 6.3), it was evident that additional requirements are needed to effectively and sufficiently plan and manage UA as part of broader planning approaches. In essence, this refined approach would include: (1) separation of criteria into the smallest defining parts to emphasise details and (2) revise criteria which contain ambiguous words or phrases to be more precise and specific. **Table 8.2** illustrates a proposal as to how this could be approached and realised in practice.

Table 8.2: Proposed criteria changes and **additional requirements for UA in development of policy and legislation**

Old criteria	Most significant changes	Refined set of criteria
An UA food production service,		An UA food production service,
Social perspectives		Social perspectives
Should positively and actively contribute to community development.	Separate criterion into the dominant parts	Should positively contribute to community development.
		Should actively contribute to community development.
Must be empowering to a variety of stakeholders.		Must be empowering to a variety of stakeholders.
Should be multifunctional in services provided.		Should be multifunctional in services provided.
Should stimulate social activities and improve social inclusion.	Separate sentence into the dominant parts	Should stimulate social activities in the community.
		Should stimulate/ improve social inclusion in the community.
Managerial team should have agricultural and technical knowledge (prerequisite).	1. Separate criterion into the dominant parts 2. Differentiate between the different types of knowledge required	Managerial team should have agricultural knowledge (prerequisite).
		Managerial team should have technical knowledge (prerequisite).
		Managerial team should have business management knowledge (prerequisite).
Should enhance food security.		Should enhance food security.
Should contribute to poverty alleviation.		Should contribute to poverty alleviation.
Should present health and safety benefits to the community.	Separate criterion into the dominant parts	Should present health benefits to the community.
		Should present safety benefits to the community.
Economic perspectives		
Should give rise to financial gain for those involved.	Specify who the ambiguous “those involved” refer to.	Should give rise to financial gain for management and staff.

		Should give rise to financial advantage for customers or consumers.
Should be financially self-sustaining after a reasonable time period.		
Start-up cost should coincide with the type and size of practice.		
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.		
Should reduce the “food miles’ of produce, whilst also maintaining comparative advantage in terms of food prices.		
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.		
Ecological perspectives		
Should present multiple safety benefits (with regard to the ecosystem and crisis situations).	Change wording to formulate a more precise criterion.	Should present multiple safety benefits to the ecosystem which it forms part of, especially in regard to ecosystems in a crisis situation (such as declining bee numbers).
Should contribute to urban greening, environmental protection and land rejuvenation.	Separate criterion into the dominant parts.	Should contribute to urban greening.
		Should contribute to environmental protection.
		Should contribute to land rejuvenation (of the area in which the site is located).
In order to improve the viability, should make up part of some larger nature conservation scheme, recreational services and/or tourism services within the urban space.	Separate criterion into the dominant parts.	In order to have improved viability, should make up part of some larger nature conservation scheme within the urban space.
		In order to have improved viability, should make up part of some larger recreational services within the urban space.
		In order to have improved viability, should make up part of some larger tourism service within the urban space.
Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services.		

Should complete or make up part of the waste management system, be it centralised or decentralised.		
Should make use of a variety of agro-ecological production methods.		
Should create multi-habitat, heterogeneous environments through the use of variant production methods and typologies.	The inclusion of the word *inter alia* to broaden the ways in which this criterion could be satisfied.	Should create multi-habitat, heterogeneous environments through *inter alia* the use of variant production methods and typologies.
Should improve the environmental quality.		

8.4 Recommendation 4: Consider best practises to create a framework for UA that could be aligned with broader spatial planning objectives

International and local best practices should be considered to create a framework for UA that could be aligned with broader spatial planning objectives. From the cases included in this research, the following criteria was identified as 'best practices' relating to UA practices (**Table 8.3**). Only criteria that were ranked as 'highest priority' in each of the four cases were considered and their scores are indicated. The refined best practice qualities, as per **Table 8.2**, are presented below.

Table 8.3: Best-practice criteria for UA and ranking per case study analysis

Criteria An UA food production service	
Social perspectives	
Best practices	Score
Should positively contribute to community development.	4
Should actively contribute to community development.	4
Must be empowering to a variety of stakeholders	3
Should be multifunctional in services provided	3
Managerial team should have agricultural knowledge (prerequisite).	3
Managerial team should have technical knowledge (prerequisite).	3
Managerial team should have business management knowledge (prerequisite).	3
Should stimulate social activities in the community.	2
Should enhance food security.	2
Should contribute to poverty alleviation.	2
Should present health benefits to the community.	1
Should stimulate improve social inclusion in the community.	2

Should present safety benefits to the community.	1
Economic perspectives	
Should give rise to financial gain for management and staff.	3
Should be financially self-sustaining after a reasonable time period.	1
Start-up cost should coincide with the type and size of practice.	2
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.	1
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.	1
Ecological perspectives	
Should contribute to urban greening.	1
Should contribute to environmental protection.	1
Should contribute to land rejuvenation (of the area in which the site is located).	1
Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services.	2
Should complete or make up part of the waste management system, be it centralised or decentralised.	1
Should create multi-habitat, heterogeneous environments through *inter alia* the use of variant production methods and typologies.	1
Should improve the environmental quality.	1

When creating a framework for the implementation of UA as part of mainstream urban planning, these best practices should be considered as guidelines for implementation. Although theory identify more benefits relating to UA (refer to the comprehensive criteria employed in the case study analysis), it is recommended that these refined criteria should be included in spatial planning as point of departure and as minimal requisite.

UA should however, also contribute to **urban greening**, **environmental protection** and **land rejuvenation**. Other case studies might provide more examples and best practices of how identified criteria could be employed, and further research is required to refine the criteria in this sense. It is however, for purposes of this research, proposed that these best practices are utilised to create a framework for UA as explained accordingly.

8.5 Recommendation 5: Create a UA framework for the strategic and spatial planning of sustainable UA practices in South Africa

Based on the theoretical investigation and empirical investigation captured in this research, along with the respective conclusions drawn, this research ultimately proposes that a framework should be development to guide strategic and spatial planning of sustainable UA practices in South

Africa. The framework proposed by this research could be used as point of departure for including UA as part of spatial planning. The framework identifies high priorities, average priorities and low priorities based on the conclusions of this research (**Table 8.4**). Context-based application should be stressed, as each area and local authority would need to apply this framework in relation to specific needs (social, economic and ecological) and plan accordingly.

Table 8.4: UA framework for the strategic and spatial planning of sustainable UA practices in South Africa

Priority-level	Best quality to be implemented (as derived from the criteria)	Number of qualities from each perspective
Highest policy priority	● Should positively contribute to community development ● Should actively contribute to community development. ● Must be empowering to a variety of stakeholders ● Should be multifunctional in services provided ● Should stimulate social activities in the community. ● Managerial team should have agricultural knowledge (prerequisite). ● Managerial team should have technical knowledge (prerequisite). ● Managerial team should have business management knowledge (prerequisite).	Social: 8 Economic: 0 Ecological: 0 **Total: 8**
Average policy priority	● Should enhance food security. ● Should contribute to poverty alleviation. ● Should present safety benefits to the community. ● Should present health benefits to the community. ● Should give rise to financial gain for management and staff ● Should give rise to financial gain for customers or consumers. ● Should be financially self-sustaining after a reasonable time period. ● Start-up cost should coincide with the type and size of practice. ● Should attempt to reshape underutilised urban space in order to contribute to area-profitability. ● Should reduce the "food miles' of produce, while also maintaining comparative advantage in terms of food prices. ● Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts. ● Should present multiple safety benefits to the ecosystem which it forms part of, especially in regard to ecosystems in a crisis situation (such as declining bee numbers). ● Should contribute to urban greening. ● Should contribute to environmental protection. ● Should contribute to land rejuvenation (of the area in which the site is located). ● In order to have improved viability, should make up part of some larger recreational services within the urban space. ● Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services. ● Should make use of a variety of agro-ecological production methods. ● Should create multi-habitat, heterogeneous environments through *inter alia* the use of variant production methods and typologies ● Should improve the environmental quality.	Social: 4 Economic: 7 Ecological: 9 Total: 20

Lowest policy priority	• Should stimulate improve social inclusion in the community. • In order to have improved viability, should make up part of some larger nature conservation scheme within the urban space. • In order to have improved viability, should make up part of some larger tourism service within the urban space. • Should complete or make up part of the waste management system, be it centralised or decentralised.	Social: 1 Economic: 0 Ecological: 3 **Total: 4**

To further refine the UA criteria and make it context-based, it is proposed that the framework be send to various experts when authorities intend to explore the possibilities of including UA as part of spatial planning approaches for a specific area or municipality. To optimise the implementation of the framework, this research could be expanded to include more stakeholders across various disciplines. The aim of further research and refinement of the UA framework would be to consider and evaluate the quality, strengths, weaknesses and opportunities of the compiled sustainability criteria in order to complement the theory with in-field knowledge. The following table captures the proposed questionnaire that could be circulated to refine the framework based on the perceptions of purposefully selected stakeholders (**Table 8.5**).

In contrast to the list of criteria which (1) demanded a qualitative analysis, as per the aim of identification of best quality practices; and (2) was laden with restrictive conditions to achieve the aforementioned aim, this questionnaire could be mass used in a quantitative analysis. Although no restrictions are compiled for use with this questionnaire, it is recommended that the participants should have knowledge of or experience in UA to provide informative responses.

Table 8.5: Suggested questionnaire for further analysis

Sustainability Criteria			
Criteria In order to be sustainable (successful), a UA practice should...	Compulsory		Any remarks on the specific criterion. *Do you think the criterion is redundant? Would the criterion be insignificant towards sustainability? Is the criterion incomplete? Would you say the criterion is more significant than the others?*
	Relevant	Not relevant	
	Mark with x by ticking box		
Social criteria			
Should positively contribute to community development.	☐	☐	
Should actively contribute to community development.	☐	☐	
Must be empowering to a variety of stakeholders	☐	☐	
Should be multifunctional in services provided	☐	☐	

Should stimulate social activities in the community.	☐	☐	
Should stimulate improve social inclusion in the community	☐	☐	
Managerial team should have agricultural knowledge (prerequisite).	☐	☐	
Managerial team should have technical knowledge (prerequisite).	☐	☐	
Managerial team should have business management knowledge (prerequisite).	☐	☐	
Should enhance food security.	☐	☐	
Should contribute to poverty alleviation.	☐	☐	
Should present safety benefits to the community.	☐	☐	
Should present health benefits to the community.	☐	☐	
Economic criteria			
Should give rise to financial gain for management and staff.	☐	☐	
Should give rise to financial gain for customers or consumers.	☐	☐	
Should be financially self-sustaining after a reasonable time period.	☐	☐	
Start-up cost should coincide with the type and size of practice.	☐	☐	
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.	☐	☐	
Should reduce the “food miles” of produce, while also maintaining comparative advantage in terms of food prices.	☐	☐	
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.	☐	☐	
Ecological criteria			
Should present multiple safety benefits to the ecosystem which it forms part of, especially in regard to ecosystems in a crisis situation (such as declining bee numbers).	☐	☐	
Should contribute to urban greening.	☐	☐	
Should contribute to environmental protection.	☐	☐	

Should contribute to land rejuvenation (of the area in which the site is located).	☐	☐	
In order to have improved viability, should make up part of some larger nature conservation scheme within the urban space.	☐	☐	
In order to have improved viability, should make up part of some larger nature conservation scheme within the urban space.	☐	☐	
In order to have improved viability, should make up part of some larger tourism service within the urban space.	☐	☐	
Should be multi-functional in terms of ecosystem services provided.	☐	☐	
Should complete or make up part of the waste management system, be it centralised or decentralised.	☐	☐	
Should make use of a variety of agro-ecological production methods.	☐	☐	
Should create multi-habitat, heterogeneous environments through inter alia the use of variant production methods and typologies.	☐	☐	
Should improve the environmental quality.	☐	☐	

The questionnaire, as presented in **Table 8.5** is a proposal for use in the evaluation of other cases. This could be included as part of wider spatial planning approaches, as the questionnaire would present *inter alia* the strengths, weaknesses and opportunities of UA practices which are more specific, as the result is influenced by conditions of a specific location. Where the list of evaluation criteria manifested logical generalized qualities of good UA practices which are true across a wide range of conditions, the results from the questionnaire could provide specific representations and considerations which could be incorporated in the Spatial Development Frameworks and Land Use Management plans. It could also represent the perspectives from a wide UA stakeholder demography. If the result were to be statistically analysed, it would be possible to identify how perceptions differ between the disciplines and practices. Additionally, the needs and priorities of each group would be identified from within the different three overarching perspectives, namely social, economic and ecological. This could lead to UA and spatial planning recommendations which cuts across different disciplines.

In conclusion, this research illustrated the need to define UA within a spatial planning context, in order to enhance the success and implementation thereof. UA should ultimately form part of the economic, social and ecological considerations of spatial planning, as per the three-pillar approach. An UA framework (as proposed in this research) could guide strategic and spatial

planning and enhance sustainable UA practices in South Africa, which could be a solution to a myriad of complex urban problems.

BIBLIOGRAPHY

Acts ***see*** South Africa

AGNR, Agriculture and Natural Resources. 2005. Finfish aquaculture. http://www.mdsg.umd.edu/topics/finfish-aquaculture/finfish-aquaculture Date of access: 17 Nov. 2017

Agyeman, J., Bullard, R.D. & Evans, B. 2003. Just sustainabilities: development in an unequal world. Earthscan.

ALC, Provincial Agricultural Land Commission. 2014. Agricultural land. https://www.alc.gov.bc.ca/alc/content/alr-maps/agricultural-land Date of access: 10 Mar. 2018.

Alexander, S., Aronson, J., Whaley, O. & Lamb, D. 2016. The relationship between ecological restoration and the ecosystem services concept. *Ecology and Society*, 21(1): 34.

Bach, D. 2017. Preteen powerhouse: meet 12-year-old CEO and bee ambassador Mikaila Ulmer. https://news.microsoft.com/features/preteen-powerhouse-meet-12-year-old-ceo-bee-ambassador-mikaila-ulmer/ Date of access: 17 Nov. 2017.

Bagheri, A. & Hjorth, P. 2007. Planning for sustainable development: a paradigm shift towards a process-based approach. *Sustainable Development*, 15(2): 83-89.

Bailkey, M., Nasr, J. 1999. From brownfields to green fields: producing food in North American Cities; United Nations Development Programme. USA: New York.

Bhorat, H., van der Westhuizen, C., & Jacobs, E. 2011. The role of agriculture in poverty reduction: South Africa.

Bickerton, P. 2017. Aquaculture and tilapia: a fish that may tip the balance. http://www.earlham.ac.uk/articles/aquaculture-and-tilapia-fish-may-tip-balance Date of access: 17 Nov. 2017

Bobbins, K., Culwick, C., Harrison, P., Humby, T., La Mantia, C., Todes, A. & Weakley, D. 2014. Urban resilience thinking for municipalities. Johannesburg: University of the Witwatersrand & Gauteng City-Region Observatory.

Botha, C. 2013. Statutory Interpretation: An Introduction for Students. 5th ed. Cape Town: JUTA.

Brooklyn Grange. 2016. https://www.brooklyngrangefarm.com/ Date of access: 16 Sept. 2016

Brown, B.J., Hanson, M.E., Liverman, D.M. & Merideth, R.W. 1987. Global sustainability: Toward definition. *Environmental Management*, 11(5): 713-719).

Brundtland Commission. 1987. Our common future: report of the World Commission on Environment and Development http://www.un-documents Date of access: 29 Apr. 2016.

Buchanan, G., R. Herdt, & L. Tweeten. 2010. Agricultural Productivity Strategies for the Future - Addressing U.S. and Global Challenges. Issue Paper. Council for Agricultural Science and Technology.

Cabannes, Y. 2011. Financing urban agriculture: current challenges and innovations. *Urban Agriculture Magazine*. 25:32-35. Sep. 2011.

Camps-Calveta, M., Langemeyera, J., Calvet-Mira, L. & Gómez-Baggethund, E. 2016. Ecosystem services provided by urban gardens in Barcelona, Spain: Insights for policy and planning. *Environmental Science & Policy* 62 (2016) 14–23.

Chicago Department of Environment. 2016. A guide to rooftop gardening. http://naturcycle.com/wp-content/uploads/2016/12/GuidetoRooftopGardening_v2.pdf Date of access: 17 Nov. 2017.

Cilliers, L. 2014. Evaluating the spatial and environmental benefits of green space: An international and local comparison on rural areas. Potchefstroom: NWU. (Dissertation-Masters).

Cilliers, S., du Toit, M., Cilliers, J., Drewes, E. & Retief, F. 2014. Sustainable urban landscapes: South African perspectives on transdisciplinary possibilities*. Landscape and Urban planning*, 125(2014): 260-270.

Circular Ecology. 2015. Sustainability and sustainable development: What is sustainability and what is sustainable development? http://www.circularecology.com/sustainability-and-sustainable-development.html#.V_UaZPl97IW Date of access: 26 May 2016.

Citiscope. 2016. What is the New Urban Agenda? http://citiscope.org/habitatIII/explainer/2015/06/what-new-urban-agenda Date of access: 18 Oct. 2016.

City of Victoria. n.d. Building a rooftop greenhouse. http://www.victoria.ca/assets/Departments/Parks~Rec~Culture/Parks/Documents/Growing~in~the~City/Building%20Rooftop%20Greenhouse.pdf Date of access: 17 Nov. 2017

Classen, M. 2015. The nature of urban gardens: towards a political ecology of urban agriculture. *Agriculture and Human Values*. 32:229-239.

Clos, J. 22 Jan. 2016. Dr Joan Clos-Principles of planned urbanization. http://unhabitat.org/principles-of-planned-urbanization-dr-joan-clos-executive-director-un-habitat-2/ Date of Access: 25 Apr. 2016. [Podcast]

COGTA, (Cooperative Governance Traditional Affairs). 2016. What is the Integrated Urban development Framework (IUDF)? http://www.cogta.gov.za/?p=556 Date of access: 29 Sept. 2016.

Cohen, D. & Crabtree, B. 2006. Qualitative research guidelines project. http://www.qualres.org/HomeSamp-3702.html. Date of access: 10 Jun. 2017.

Collett, A. & Lindemann, H. 2008. http://www.ee.co.za/wp-content/uploads/legacy/6%20GIS%20and%20agricultural%20natural%20resources.pdf Date of access: 17 Sept. 2016.

Constitution ***see*** South Africa.

Cornell University. n.d. A primer on community food systems: Linking food, nutrition and agriculture. Ithaca, NY: Cornell University.

Curbed. 2015. Rooftop farm designer wants to cover New York City in green. https://www.curbed.com/2015/11/11/9901414/gwen-schantz-brooklyn-grange-rooftop-farm-young-guns Date of access: 7 Oct. 2016.

Currie, I. & de Waal, J. 2006. The Bill of rights Handbook. 5th ed. Lansdowne: JUTA.

DAFF, Department of Agriculture, Fisheries and Forestry ***see*** South Africa.

De Baat, F & Renting, H. 2014. Working towards robust urban agriculture initiatives in Cape Town and Utrecht. *Urban Agriculture Magazine*. 28:22-23, Dec. 2014.

De Wit, M.P., Blignaut, J.N., Knot, J., Midgley, S., Drimie, S., Crookes, D.J., and Nkambule N.P. 2015. Sustainable farming as a viable option for enhanced food and nutritional security and a sustainable productive resource base. Synthesis report. Green Economy Research Report, Green Fund, Development Bank of Southern Africa, Midrand.

Desai, V. 2014. Ageing and poverty. (*In* Desai, V. & Potter, R.B., eds. The companion to developmental studies. 3rd ed. New York: Routledge. p. 457-460).

Dimitri, C., Oberholtzer, L. & Pressman, A. 2016. Urban agriculture: connecting producers with consumers. *British Food Journal*, 118 (3): 603-617.

Dimitrov, D.K. 2010. The paradox of sustainability definitions. Apira Conference. Waikato: Department of accounting.

Drescher, A.W. 2001. Urban and peri-urban agriculture: report on the e-conference on the policy agenda. *Urban Agriculture Magazine*. 7-8. Jun. 2001.

Du Plessis, C. & Landman, K. 2002. An analysis of the sustainability of human settlements in South Africa. CSIR Building and Construction Technology.

Dubbeling, M. & Santandreu, A. 2003. Guidelines for municipal policy making on urban agriculture. Policy Brief 1: Urban agriculture: a tool for sustainable municipal development. IPES/UMPLAC: Quito-Ecuador.

Dugard, J., Du Plessis, M., Katz, A. & Pronto, A. 2011. International Law: A South African Perspective. 4th ed. Cape Town: JUTA.

EcoFarm, Ecological Farming Association. 2016. Honoured with awards at the 35th annual EcoFarm conference. https://eco-farm.org/news/february-e-news-chock-full-2016-ecofarm-conference-goodies-and-exciting-announcements Date of access: 12 Nov. 2017.

EDRS, EcoDesign Resource Society. 2013. The urban farming guidebook. Planning for the business of growing food in bc's towns & cities. http://www.refbc.com/sites/default/files/Urban-Farming-Guidebook-2013.pdf Date of access: 17 Nov. 2017.

Egal, F., Valstar, A. & Meershoek, S. 2003. Urban Agriculture, Household Food Security and Nutrition in Southern Africa. Rome: Food and Agriculture Organization of the United Nations.

Eisenhardt, K. 1989. Building theories from case study research. *The Academy of Management Review*, 14(4):532-550.

Elder, L. E. 2012. Green thumbs up. *UNCENSORED*. 3.2: 18-22. Summer 2012.

Eliades, A. 2016. Understanding Urban Agriculture part 3, calculating the food production potential of a city. https://permaculturenews.org/2016/10/25/understanding-urban-agriculture-part-3-calculating-food-production-potential-city/ Date of access: 28 Oct. 2017.

eNCA. 20 Sep. 2013. Taking fish farming to new heights. https://www.enca.com/south-africa/cape-town-innovator-creates-fish-farm-box Date of access: 23 Jul. 2016. [Podcast]

ETU, Education and Traing Unit. 2017. The policy and law-making process. http://www.etu.org.za/toolbox/docs/govern/policy.html Date of access: 13 Nov. 2017.

European Union. 2013. European commission: building a Green Infrastructure for Europe. Publications Office of the European Union. Luxembourg: European Union.

Falchikov, N. & Boud, D. 1989. Student self-assessment in higher education: a meta-analysis. *Review of educational research*, 59(4):395-430.

Faling, W. 2012. A spatial planning perspective on climate change, asset adaptation and food security: The case of two cities. (*In* Frayne, B., ed. Climate change, assets and food security in Southern African cities. Abingdon: Earthscan. p. 163-185).

FAO, Food and Agriculture Organization. 2002. The State of Food Insecurity in the World 2001. Rome.

FAO, Food and Agriculture Organization & World Bank. 2008. Urban agriculture for sustainable poverty alleviation and food security. http://www.fao.org/fileadmin/templates/FCIT/PDF/UPA_-WBpaper-Final_October_2008.pdf Date of access: 30 Jan. 2016.

FAO, Food and Agriculture Organization. 2011. Beekeeping and sustainable livelihoods. http://www.fao.org/3/a-i2462e.pdf Date of access: 17 Nov. 2017

FAO, Food and Agriculture Organization. 2015. FAO statistical pocketbook: World food and agriculture. Rome.

FAO, Food and Agriculture Organization. 2017. Urban agriculture. http://www.fao.org/urban-agriculture/en/ Date of access: 17 Nov. 2017

FAO, Food and Agriculture Organization. n.d. Urban and peri-urban agriculture. http://www.fao.org/unfao/bodies/coag/coag15/x0076e.htm Date of access: 17 Nov. 2017

Fistola, R. 2012. Urban entropy vs sustainability: a new town planning perspective. (*In* Pacetti, M., Brebbia, G., Latini, G. & Passerini, G. Eds. The sustainable city VII. South Hampton: WIT Press. p. 195-204).

Florin, M. & Renting, H. 2015. Building sustainable food systems: beyond the rural-urban divide. *Urban Agriculture Magazine*. 30:6-8, Jun.

Fraser, G., Monde, N. & Averbeke, W. 2003. Food security in South Africa: A case study of rural livelihoods in the Eastern Cape. (In Nieuwoudt, L. & Groenewald, J., *eds*. The Challenge of change: agriculture, land and the South African economy. Scotsville: University of Natal Press. p. 171-183).

Game, I. & Primus, R. 2015. GSDR 2015: urban agriculture. State University of Ney York College of forestry and environmental sciences.

GCIS, Government Communication and Information System. 2015. *South Africa yearbook* 2014/15. *Eds*. Elias Tibane. Pretoria.

Ghosh, S. N., Desai, V. R. 2006. Environmental hydrology and hydraulics: eco-technological practices for sustainable development. Boca Ranton: Taylor & Francis Group.

Going to Seed. 2015. Identifying diseases and pests. https://goingtoseed.wordpress.com/tag/organic-farming/ Date of access: 17 Nov. 2017.

Golden, S. 2013. Urban agriculture impacts: social, health, and economic: An annotated bibliography. UC Sustainability Institute. http://asi.ucdavis.edu/programs/sarep/publications/food-and-society/uaannotatedbiblio-2013.pdf Date of access: 7 Mar. 2017.

Goldstein, B.P., Birkved, M., Fernandez, J. & Hauschild, M.Z. 2014. Urban agriculture typologies and the need to quantify their potential to reduce a city's environmental 'foodprint'. (*In* Proceedings of World SB Conference. p21-31. 2014).

Goldstein, M. 2011. Urban agriculture: A sixteen city survey of urban agriculture practices across the country http://www.georgiaorganics.org/Advocacy/urbanagreport.pdf Date of Access: 15 Mar. 2016.

Gorjian, S., Hashjin, T. T. & Ghobodian, B. 2011. Solar powered greenhouses. https://www.researchgate.net/publication/233808000_Solar_Powered_Greenhouses Date of access: 17 Nov. 2017

GRHC, Green Roofs for Healthy Cities. 2008. Introduction to green walls. https://greenscreen.com/docs/Education/greenscreen_Introduction%20to%20Green%20Walls.pdf Date of access: 17 Nov. 2017.

Growth Technology. n.d. What is hydroponics? http://www.growthtechnology.com/wp-content/uploads/2013/07/What-is-hydroponics.pdf Date of access: 17 Nov. 2017.

Grusauskas, M. 2012. Children volunteer at the Homeless Garden Project-More than 60 people helped garden on Martin Luther King Jr. day. https://patch.com/california/santacruz/children-volunteer-at-the-homeless-garden-project Date of access: 12 Nov. 2017.

Hagey, A., Flournoy, R. & Rice, S. 2012. Growing Urban Agriculture that works: Equitable strategies and policies improving access to healthy food and revitalizing communities. http://www.policylink.org/sites/default/files/URBAN_AG_FULLREPORT.PDF Date of Access: 10 Oct. 2016.

Hamilton, M. 2014. Urban farming yields fresh foods, land reuse: in backyards and on once-barren city lots, local growers produce crops and livestock. http://news.nationalgeographic.com/news/2014/05/140518-urban-farming-produce-chickens-community-agriculture-food/ Date of Access: 20 Apr. 2016.

Hansmann, R., Frischknecht, P. & Mieg, H.A. 2012. Principal sustainability components: Empirical analysis of synergies between the three pillars of sustainability. *International Journal of Sustainable Development and World Ecology*, 19(5): 451-459.

Harrison J.M. 2003. Sustainability and sustainable development. (*In* Internet encyclopaedia of ecological economic, http://isecoeco.org/pdf/susdev.pdf Date of access: 26 May 2016).

Harrison, P., Todes, A. and Watson, V. .2008. Planning and transformation: learning from the Post-Apartheid experience, Abingdon: Routledge.

Harvest of Hope. 2016. file:///E:/Case%20studies/Harvest%20for%20hope/Harvest%20for%20hope%20website.htm Date of access: 5 Oct. 2016.

Haysom, G. 2009. Urban agriculture and food security. http://www.sustainabledevelopmentnetwork.com/manual1/Chapter%208.pdf Date of access: 30 Jan. 2016.

Hendrickson M. K., & Porth M. 2012. Urban Agriculture: best practices and possibilities. http://extension.missouri.edu/foodsystems/urbanagriculture.aspx Date of Access: 15 Mar. 2016.

Hertel, T. W. 2012. The global supply and demand for agricultural land in 2050: a perfect storm in the making? http://www.agecon.purdue.edu/files/Hertel_AAEA_Presidential_Addresss-Short%20Version.pdf Date of access: 3 May 2016.

HLPE, The High-Level Panel of Experts. 2014. Food losses and waste in the context of sustainable food systems. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2014.

HLPE, The High-Level Panel of Experts. 2017. Nutrition and food systems. A report by the High-Level Panel of Experts on food security and nutrition of the committee on world food security, Rome.

HGP, Homeless Garden Project. 2017. http://www.homelessgardenproject.org/index.php Date of access: 7 Mar. 2017

IBA, International Bar Association. 2012. Anti-corruption strategy for the legal profession-Country Brief. file:///C:/Users/Karla%20Stander/Downloads/SA%20Anti-Coruption%20Briefing%20Final.pdf Date of access: 23 October 2017.

ICPH, Institute for Children, Poverty and Homelessness. 2017. http://www.icphusa.org/ Date of access: 12 Nov. 2017.

IRDP & UNDP-India, International Recovery Platform & United Nations Development Programme India. 2010. Guidance note on recovery livelihood. Kobe.

Jacobs, P., Baipheti, M., Hart, T. & Ngcobo, N. 2010. Developmental social policies for the poor in South Africa: Exploring options to enhance impacts? Conference paper of Overcoming inequality and structural poverty in South Africa: Towards inclusive growth and development. Johannesburg.

Jarlov, L. 2001. Why we need new urban planning concepts: insight from South Africa. *Urban Agriculture Magazine*. 4 :(9-11), Jul.

Jouan, J. 2014. Brooklyn Grange farm: New York City, USA. http://www.iufn.org/wp-content/uploads/2014/01/IUFN-2014-Initiative-N%C2%B02-Brooklyn-Grange-Farm-NY-USA.pdf Date of access: 22 Feb. 2018.

Kidd, M. 2011. Environmental Law. 2th ed. Cape Town: JUTA.

Kleyn, D.G. & Viljoen, F. 1998. Beginner's guide for law students. Kenwyn: Juta.
.
Larsson, R. 1993. Case survey methodology: Quantitative analysis of patterns across case studies. *Academy of Management Journal*, 36:1515-1546.

Law reports ***see*** South Africa.

Loux, J. 2006. The characteristics & benefits of green roofs in urban environments. https://extension.ucdavis.edu/sites/default/files/green_roof_02.pdf Date of access: 17 Nov. 2017

Lovett, G. 2016. Is urban farming only for rich hipsters? *The Guardian,* 15 Feb. http://www.theguardian.com/sustainable-business/2016/feb/15/urban-farming-rich-hipsters-food-affordability-inequality Date of Access: 25 Apr. 2016.

Mabin, A. & Smit, D. 1997. Reconstructing South Africa's cities? The making of urban planning 1900–2000. *Planning Perspectives*, 12: 193–223.

Malan, N. 2015. Urban farmers and urban agriculture in Johannesburg: responding to the food resilience strategy. *Agrekon*, 54(2):51-75.

Mattheisen, E. 2015. Creating city region food systems. *Farming Matters*. 43-45. Jun.

Maughan, T. 2015. Is farming the future of cities? http://eandt.theiet.org/magazine/2015/12/farming-in-cities.cfm Date of access: 1 Feb. 2016.

McClintock, N. 2014. Radical, reformist, and garden-variety neoliberal: coming to terms with urban agriculture's contradictions. *Local Environment*. 19(2): 147-171.

McKenzie, K. 2015. Edible notables- Homeless Garden Project. *Edible Monterey Bay*. Summer issue:13-14. 2015.

Miccoli, S., Fabrizio, F., Murro, R. 2015. Feeding the cities through urban agriculture: the community esteem value. Agriculture and agriculture science, *Procedia*, 8(2016):128-134.

Modern Garden. 2017. Gardening ideas on a budget. http://uclachoralmusic.com/gardening-ideas-on-a-budget-unsubscribe-yard-landscaping-designs-for-small-gardens-simple-garden-and-design-pictures-of-front-back-the-kids-home-made/gardening-ideas-on-a-budget-

unsubscribe-yard-landscaping-designs-for-small-gardens-simple-garden-and-design-pictures-of-front-back-the-kids-home-made-2/ Date of access: 17 Nov. 2017

Mougeot, L.J.A. 1996. Introduction: an improving domestic and international environment for African urban agriculture. *African urban quarterly*, 11(2):137-152.

News24. 2013. Buthelezi: ANC and people divided. http://www.news24.com/SouthAfrica/Politics/Buthelezi-ANC-and-people-divided-20130219 Date of access: 17 Oct. 2017.

Noble Rot. 2017. Our rooftop garden. http://www.noblerotpdx.com/web/garden/ Date of access: 17 Nov. 2017

Oh, J. & Kim S. 2017. Enhancing urban agriculture through participants' satisfaction: The case of Seoul, Korea. *Land Use Policy*, 29:123-133.

Optigrün. 2018. Brooklyn Grange- New York City. http://www.optigreen.com/fileadmin/contents/sprache_englisch/objektsteckbriefe/GardenRoof_Reference_UF_2.pdf Date of access: 22 Feb. 2018.

Orsini, F., Kahane, R., Nono-Womdim, R., Gianquinto, G. 2013. Urban agriculture in the developing world: a review. *Agronomy for sustainable development*, 33:695-720.

Oxford Dictionary of English. 2010a. Bearable. http://www.oxfordreference.com.nwulib.nwu.ac.za/view/10.1093/acref/9780199571123.001.0001/m_en_gb0067030?rskey=WWfbpw&result=7271 Date of access: 3 Oct. 2016.

Oxford Dictionary of English. 2010b. Equitable. http://www.oxfordreference.com.nwulib.nwu.ac.za/view/10.1093/acref/9780199571123.001.0001/m_en_gb0271360?rskey=8zZneF&result=29211 Date of access: 3 Oct. 2016.

Oxford Dictionary of English. 2010c. Viable. http://www.oxfordreference.com.nwulib.nwu.ac.za/view/10.1093/acref/9780199571123.001.0001/m_en_gb0926460?rskey=lwdly0&result=99631 Date of access: 3 Oct. 2016.

Parnell, S. 2016. Defining the Global Urban Development Agenda. *World Development.* 78:529-540.

Patton, MQ. 2001. Qualitative Research and Evaluation Methods. *2nd ed.* Thousand oaks, CA: Sage Publications.

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmnetal Change*, 19:354-365.

Peeters, M. 2015. 10,000 square meter rooftop farm in Chongqing. http://myvegua.com/10000-square-meter-rooftop-farm-in-chongqing/ Date of access: 17 Nov. 2017

Piel, G. 1997. The urbanization of poverty worldwide. *Challenge*, 58-68.

Planet Natural Research Centre. n.d. Hydroponics. https://www.planetnatural.com/hydroponics-gardening-101/ Date of access: 17 Nov. 2017

Plaskoff Horton, R. 2011. New York city public school's rooftop hydroponic garden and urban farm classroom. http://www.urbangardensweb.com/2011/11/16/nyc-classroom-in-an-urban-rooftop-farm/ Date of access: 17 Nov. 2017

Pleasanton Patch. 2017. Aquaculture/gardening special interest group. https://patch.com/california/pleasanton/calendar/event/20161001/34263/aquaculture-gardening-special-interest-group Date of access: 17 Nov. 2017

Pool, K. & Stone, A. 2014. Introduction to High Tunnels. http://articles.extension.org/pages/18358/introduction-to-high-tunnels Date of access: 17 Nov. 2017

Poulsen, M.N., Spiker, M.L., Spiker M.P.H., MSPH & RD. 2014. Integrating urban farms into the social landscape of cities recommendations for strengthening the relationship between urban farms and local communities. Johns Hopkins Bloomberg School of Public Health.

Pretty, J., Sutherland, W.J., Ashby, J., Auburn, J., Baulcombe, D., Bell, M., Bentley, J., Bickersteth, S., Brown, K., Burke, J., Campbell, H., Chen, K., Crowley, E., Crute, I., Dobbelaere, D., Edwards-Jones, G., Funes-Monzote, F., Godfray, H.C.J., Griffon, M., Gypmantisiri, P., Haddad, L., Halavatau, S., Herren, H., Holderness, M., Izac, A., Jones, M., Koohafkan, P., Lal, R., Lang, T., McNeely, J., Mueller, A., Nisbett, N., Noble, A., Pingali, P., Pinto, Y., Rabbinge, R., Ravindranat , N.H., Rola, A., Roling, N., Sage, C., Settle, W., Sha, J.M., Shiming, l., Simons, T., Smith, P., Strzepeck, K., Swaine, H., Terry, E., Tomich, T.P., Toulmin, C., Trigo, E., Twomlow, S., Vis, J.K., Wilson, J., & Pilgrim, S. 2010. The top 100 questions of importance to the future of global agriculture. *International Journal of Agricultural Sustainability*, 8(4): 219-236.

Pretty, J. 2012. Agriculture and food systems: our current challenge. (I*n* Rosin, C., Campbell, H. & Stock, P. eds. Food systems failure: the global food crisis and the future of agriculture. p.17-29).

Pretty, J. & Bharucha, P. 2014. Sustainable intensification in agricultural systems. Annals of Botany. Colchester: University of Essex.

R2G, Rust to Green. 2016. Food systems: Toward resilient food systems. http://www.rust2green.org/food_systems.php Date of access: 16 Oct. 2016.

Rautenbach, I. M. 2012. Constitutional Law. 6th ed. Durban: LexisNexis.

Redclift, M. 2014. Sustainable development. (In Desai, V. & Potter, R.B., eds. The companion to developmental studies. 3rd ed. New York: Routledge. p. 333-336).

Reinhardt, S. 2005. Home gardens- treasure trove of diversity. https://conservation-development.net/Projekte/Nachhaltigkeit/DVD_11_China/Material/pdf/en-issue-paper-home_gardens-2005.pdf Date of access: 17 Nov. 2017

Rogers, C. 2013. 10 Things I've learned from lambs. https://modernfarmer.com/2013/12/10-things-learned-lambs/ Date of access: 17 Nov. 2017

Ronquest-Ross, L., Sigge, G. & Vink, N. 2015. Food consumption changes in South Africa since 1994: research article. *South African Journal of Science*, 111(9 & 10): 64-75.

RUAF, Resource centres on Urban Agriculture and Food security. 2009. Urban agriculture: what and why? http://www.ruaf.org/urban-agriculture-what-and-why Date of access: 17 Feb. 2016.

Ruel, M.T. 2003. Operationalizing dietary diversity: A review of measurement issues and research priorities. *The Journal of Nutrition*, 133(11):3911S-3926S.

Ryerson Urban Farm. n.d. The green roof & green wall projects database. http://www.greenroofs.com/projects/pview.php?id=1758 Date of access: 17 Nov. 2017

SA Info. 2013. Fish Farming in a shipping container. *SA Info*. Fish farming in a shipping container.

SACN, (South African Cities Network). 2015. SPLUMA as a tool for spatial transformation. http://sacitiesnetwork.co.za/wp-content/uploads/2015/04/spluma-_as_a_tool_for_spatial_transformation_final.pdf Date of access: 18 Oct. 2016.

SACN, South African Cities Network. 2016. State of South African Cities Report 2016. Johannesburg: SACN

San-Francisco Public Press. 2010. A farm blossoms in Hayes Valley where a freeway once cast a dominating shadow. http://sfpublicpress.org/news/2010-11/a-farm-blossoms-in-hayes-valley-where-a-freeway-once-cast-a-dominating-shadow Date of access: 17 Nov. 2017

SAP. n.d. Living walls. https://sapgroup.com/living-wall/ Date of access; 17 Nov. 2017

Schoonraad, M. 2000. Some reasons why we build unsustainable cities in South Africa. Paper presented at the Conference, Strategies for Sustainable Development, Pretoria, 23 -25 August 2000.

ScienceDaily. 2007. Mayday 23: world population becomes more urban than rural. https://www.sciencedaily.com/releases/2007/05/070525000642.htm Date of Access: 26 Mar. 2016.

Sherman, S. 2010. Promoting lifelong healthy eating habits. A new deal for school gardens. http://www.fao.org/docrep/013/i1689e/i1689e00.pdf Date of access: 17 Nov. 2017

Small, R. & Hoekstra, F. 2010. Vegetable box scheme in Cape Town, South Africa. *Urban Agriculture Magazine*. 24:17-20, Sept. 2010.

Small, R. & Hoekstra, F. 2015. Growing as sense of place and community in Cape Town. *Urban Agriculture Magazine*. 30:14 -17. Jun. 2015.

Smit, J., Ratta, A. and Nasr, J. 1996. Urban agriculture: food, jobs and sustainable cities. United Nations Development Programme, New York, USA.

Smit, J. 1998. Urbaculture. http://www.cityfarmer.org/jac.html Date of access: 6 Mar. 2017.

Sniderman, Z. 2012. The future of food: 11 unique urban projects. http://mashable.com/2012/02/01/urban-farming-technology/#OTWqVRkC_EqI Date of Access: 1 May 2016.

South Africa, South African Government. 2016. Agriculture. http://www.gov.za/about-sa/agriculture Date of access: 5 Jun. 2016.

South Africa. 1995. S v Makwanyane 1995 (3) SA 391 (CC).

South Africa. 1996. Constitution of the republic of South Africa 1996.

South Africa. 1998. National Environmental Management Act, 1998. (Notice 19519). *Government Gazette*, 107:1, 27 Nov.

South Africa. 1999. Fedsure Life Assurance LTD and others v Greater Johannesburg Transitional Metropolitan Council and others 1999 (1) SA 374 (CC).

South Africa. 2000. Pharmaceutical Manufacturers Association of SA and Another: in re Ex Parte President of the Republic of South Africa and Others 2000 (2) SA 674 (CC).

South Africa. 2001. Government of the Republic of South Africa and others v Grootboom and others 2001 (1) SA 46 (CC).

South Africa. 2003. Eisenberg & Associates v Minister of Home Affairs and Others 2003 (5) SA 281 (CC).

South Africa. 2004. Bato Star Fishing (Pty) Ltd v Minister of Environmental Affairs 2004 (4) SA 490 (CC).

South Africa. 2011. Glenister v President of the Republic of South Africa 2011 3 SA 347 (CC).

South Africa. 2013. Spatial Land Use Management Act, 2013. (Notice 559). *Government gazette,* 36730:2, 5 Aug.

South Africa. 2016. Minister of Justice and Constitutional Development and Others v Southern African Litigation Centre and Others 2016 ZASCA 17(CC).

South Africa. Department of Agriculture, Forestry and Fisheries. n.d. Policy on agriculture in sustainable development (working paper). Pretoria.

South Africa. Department of Agriculture, Forestry and Fisheries. 2013. National policy on food and nutrition security. Pretoria.

South Africa. Department of Agriculture, Forestry and Fisheries. 2015. Pocket guide to South Africa 2014/2015.

South Africa. Department of Rural Development. 2012. Twenty-year review: South Africa 1994-2014. Pretoria.

Spire Research. 2015. Indoor agriculture. Feeding the future. https://www.spireresearch.com/wp-content/uploads/2015/10/SpirE-Journal-Q3-2015_Indoor-Agriculture_Feeding-the-future.pdf Date of access: 17 Nov. 2017

Stander, K. 2016. Enhancing sustainable development by incorporating urban agriculture into spatial planning processes and policies. Potchefstroom: NWU. (Mini-dissertation-Honours).

Stats Sa, Statistics South Africa. 2017a. Poverty on the rise in South Africa. http://www.statssa.gov.za/?p=10334 Date of access: 23 Aug. 2017

Stats SA, Statistics South Africa. 2017b. Poverty trends in South Africa: An examination of absolute poverty between 2006 and 2015. Statistics South Africa: Pretoria

Sweet, R. & Mitchell, A. 2017. creative ways to plant a vertical garden. http://www.countryliving.com/gardening/garden-ideas/how-to/g1274/how-to-plant-a-vertical-garden/ Date of access: 17 Nov. 2017.

TEEB: The Economics of Ecosystems and Biodiversity for local and regional policy makers. 2010. TEEB Manual for Cities: Ecosystem Services in Urban Management. http://doc.teebweb.org/wp-content/uploads/Study%20and%20Reports/Additional%20Reports/Manual%20for%20Cities/TEEB%20Manual%20for%20Cities_English.pdf Date of access: 5 Apr. 2016.

The Fish Farm. 2016. http://www.thefishfarm.net/why-fish-farming.htm Date of access: 23 Jul. 2016.

The Mail and Guardian. 2011. Scorpions disbanding unconstitutional. https://mg.co.za/article/2011-03-18-scorpions-disbanding-unconstitutional Date of access: 17 Oct 2017.

Thiaw, Ibrahim. 2016. A policy agenda for sustainable development goals. Aljazeera, 26 March. http://www.aljazeera.com/indepth/opinion/2016/03/policy-agenda-sustainable-development-goals-160321100549287.html Date of access: 10 Oct. 2016.

Thornton, A. 2012. Food for thought? Linking urban agriculture and local food production for food security and development in the South Pacific. (*In* Rosin, C., Campbell, H. & Stock, P. eds.)

Turok, I. 2011. Deconstructing density: strategic dilemmas confronting the post-apartheid city. *Cities*, 28:470-477.

Turok, I. 2015. South Africa's New Urban Agenda: Transformation or compensation? http://www.erln.co.za/images/jevents/5624bfa28bcf33.24776321.pdf Date of access: 29 Sept. 2016.

UAWG, Urban Agriculture Working Group. 2013. Urban agriculture policy, planning and practice: A report for the City of Hamilton, Ontario. https://www.hamilton.ca/sites/default/files/media/browser/2015-03-06/urbanagriculturepolicyplanningandpractice.pdf Date of access: 10 Oct. 2016.

UN-DESA, United Nations Department of Sustainable Development. 1992. Agenda 21. https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf Date of access: 10 Oct. 2016.

UN-DESA. United Nations Department of Economic and Social Affairs. 2015. World population prospects: the 2015 revision, key findings and advance tables. New York: UN-DESA, Population Division.

UN-HABITAT, United Nations Human Settlements Department. 2003. The Habitat Agenda goals and principles, commitments and the global plan of action.

UN-HABITAT, United Nations Human Settlements Department. 2016a. Draft outcome document for adoption in Quito, October 2016. Paper presented at the United Nations Conference on Housing and Sustainable Urban Development, 17-20 October, Quito, Ecuador.

UN-HABITAT, United Nations Human Settlements Department. 2016b. Habitat III, New Urban Agenda: http://www.un.org/en/events/pastevents/pdfs/habitat_agenda.pdf Date of access: 18 Oct. 2016.

UN, United Nations. 2016. Transforming our world: The 2030 agenda for sustainable development. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf Date of access: 24 Sept. 2016.

UNCDP, United Nations Committee for Development Policy. 2016. List of least developed countries (as of May 2016). http://www.un.org/en/development/desa/policy/cdp/ldc/ldc_list.pdf Date of access: 29 Sept. 2016.

Urban Seedling. 2017. School garden. https://www.urbanseedling.com/school-garden/ Date of access: 17 Nov. 2017.

USDA, United States Department of Agriculture. Local food systems. 2015. https://www.nal.usda.gov/afsic/local-food-systems Date of access: 6 Aug. 2016.

Ventura, P. n.d. Assessment of the landscape quality including the historical heritage in Italy. http://cost356.inrets.fr/pub/conferences/Ventura_landscape_Oslo%2008.pdf Date of access; 17 Nov. 2017

Vilar-Compte, M. Sandoval-Olascoaga, S. Bernal-Stuart, A. Shimoga, A. Vargas-Bustamante, A. 2015. The impact of the 2008 financial crisis on food security and food expenditures in Mexico: A disproportionate effect on the vulnerable. *Public Health Nutr*, 18(16):2934-2942.

Vitalis, V. 2003. Round table on sustainable development: Science, the environment, economics and sustainable development.

Walker, B. and Salt, D. 2006. Resilience thinking: Sustaining ecosystems and people in a changing world. Island Press: London

Warnes, K. 2015. Urban agriculture: research starter. (*In* Salem Press Encyclopaedia, http://eds.a.ebscohost.com.nwulib.nwu.ac.za/eds/detail/detail?sid=e4ff7898-c403-4ca4-b62e-331098ed245f%40sessionmgr4001&vid=1&hid=4102&bdata=JnNpdGU9ZWRzLWxpdmU%3d#db=ers&AN=89677655 Date of access: 7 Mar. 2016.

Warren Flint, R. & Houser, W.L. 2001. Living a sustainable lifestyle for our children's children. New York: Authors Choice Press.

Warren, E., Hawkesworth, S. & Knai, C. 2015. Investigating the association between urban agriculture and food security, dietary diversity, and nutritional status: A Systematic literature review. *Food Policy.* 53:54-68.

WB, World Bank. 2013. Defining civil society. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/CSO/0,,print:Y~isCURL:Y~contentMDK:20101499~menuPK:244752~pagePK:220503~piPK:220476~theSitePK:228717,00.html Date of access: 10 Mar. 2018.

WB, World Bank. 2016. World development indicators. http://databank.worldbank.org/data/reports.aspx?source=2&series=SP.URB.TOTL.IN.ZS&country= Date of access: 3 Sept. 2017.

White, L. 2015. The best urban farming in Chicago. http://chicagoist.com/2015/05/20/the_best_urban_farming_in_chicago.php Date of Access: 1 May 2016.

White, S. & Hamm, M.W. 2014. Urban agriculture and a planning approach to urban food systems. Center Report Series, No. 4. Global systems Center for food systems innovations. Michigan: US Global Development Lab.

Womach, J. 2005. Agriculture: A glossary of terms. programs, and laws. https://web.archive.org/web/20110212033139/http://ncseonline.org/nle/crsreports/05jun/97-905.pdf Date of access: 17 Nov. 2017

WRI, World Resource Institute. 2015. Why Africa needs to look to its cities to end hunger. http://www.wri.org/blog/2015/07/why-africa-needs-look-its-cities-end-hunger Date of access: 4 July 2017.

Wu, J. 2010. Urban sustainability: an inevitable goal of landscape research. *Landscape Ecology*, 25:1-4.

WWF, World Wildlife Fund. 2010. Agriculture: facts and trends, South Africa. http://awsassets.wwf.org.za/downloads/facts_brochure_mockup_04_b.pdf Date of access: 17 Jul. 2016.

Zezza, A., and Tasciotti, L. 2010. Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. *Food policy*, 35(4):265-273.

Zigas, E. 2015. Guide to implementing the Urban Agriculuture Incentives Zones Act, University of California Cooperative Extension. http://ucanr.edu/sites/UrbanAg/files/190763.pdf Date of access: 10 Oct. 2016.

Zimmern, A. 26 Sept. 2013. 5 Questions: Darrie Ganzhorn. http://andrewzimmern.com/2013/09/26/5-questions-darrie-ganzhorn/ Date of access: 12 Nov. 2017.

Zink, K. J. 2014. Designing sustainable work systems: The need for a systems approach. *Applied Ergonomics*, 45:126-132.

ANNEXURES

Annexure A: Urban agriculture: What and why?

1. What is urban agriculture?

Urban agriculture can be defined shortly as the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in -and interacting with- the urban ecosystem. Such linkages include the use of urban residents as labourers, use of typical urban resources (like organic waste as compost and urban wastewater for irrigation), direct links with urban consumers, direct impacts on urban ecology (positive and negative), being part of the urban food system, competing for land with other urban functions, being influenced by urban policies and plans, etc. Urban agriculture is not a relict of the past that will fade away (urban agriculture increases when the city grows) nor brought to the city by rural immigrants that will lose their rural habits over time. It is an integral part of the urban system.

In each city a further specification of urban agriculture is possible by looking at the following dimensions: Types of actors involved Large part of the people involved in urban agriculture is the urban poor. Contrary to general belief they are often not recent immigrants from rural areas (since the urban farmer needs time to get access to urban land, water and other productive resources). In many cities, one will often also find lower and mid-level government officials, school teachers and the like involved in agriculture, as well as richer people who are seeking a good investment for their capital. Women constitute an important part of urban farmers, since agriculture and related processing and selling activities, among others, can often be more easily combined with their other tasks in the household. It is however more difficult to combine it with urban jobs that require travelling to the town centre, industrial areas or to the houses of the rich.

Types of location

Urban agriculture may take place in locations inside the cities (intra-urban) or in the peri-urban areas. The activities may take place on the homestead (on-plot) or on land away from the residence (off-plot), on private land (owned, leased) or on public land (parks, conservation areas, along roads, streams and railways), or semi-public land (schoolyards, grounds of schools and hospitals).

Types of products grown

Urban agriculture includes food products, from different types of crops (grains, root crops, vegetables, mushrooms, fruits) and animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (like aromatic and medicinal herbs, ornamental plants, tree products, etc.) or combinations of these. Often the more perishable and relatively high-valued vegetables and animal products and by-products are favoured.

Production units in urban agriculture in general tend to be more specialized than rural enterprises, and exchanges are taking place across production units.

Types of economic activities

Urban agriculture includes agricultural production activities as well as related processing and marketing activities as well as inputs (e.g. compost) and services delivery (e.g. animal health services) by specialized micro-enterprises or NGOs, etc. In urban agriculture, production and marketing tend to be more closely interrelated in terms of time and space than for rural agriculture, thanks to greater geographic proximity and quicker resource flow.

Product destination / degree of market orientation

In most cities in developing countries, an important part of urban agricultural production is for self-consumption, with surpluses being traded. However, the importance of the market-oriented urban agriculture, both in volume and economic value, should not be underestimated (as will be shown later). Products are sold at the farm gate, by cart in the same or other neighbourhoods, in local shops, on local (farmers) markets or to intermediaries and supermarkets. Mainly fresh products are sold, but part of it is processed for own use, cooked and sold on the streets, or processed and packaged for sale to one of the outlets mentioned above.

Scales of production and technology used

In the city, we may encounter individual or family farms, group or cooperative farms and commercial enterprises at various scales ranging from micro- and small farms (the majority) to medium-sized and some large-scale enterprises. The technological level of the majority of urban agriculture enterprises in developing countries is still rather low. However, the tendency is towards more technically advanced and intensive agriculture and various examples of such can be found in all cities.

2. Why urban agriculture?

The rapid urbanization that is taking place goes together with a rapid increase in urban poverty and urban food insecurity. By 2020 the developing countries of Africa, Asia, and Latin America will be home to some 75% of all urban dwellers, and to eight of the

anticipated nine mega-cities with populations in excess of 20 million. It is expected that by 2020, 85% of the poor in Latin America, and about 40-45% of the poor in Africa and Asia will be concentrated in towns and cities. Most cities in developing countries have great difficulties to cope with this development and are unable to create sufficient formal employment opportunities for the poor. They also have increasing problems with the disposal of urban wastes and waste water and maintaining air and river water quality. Urban agriculture provides a complementary strategy to reduce urban poverty and food insecurity and enhance urban environmental management. Urban agriculture plays an important role in enhancing urban food security since the costs of supplying and distributing food to urban areas based on rural production and imports continue to increase, and do not satisfy the demand, especially of the poorer sectors of the population. Next to food security, urban agriculture contributes to local economic development, poverty alleviation and social inclusion of the urban poor and women in particular, as well as to the greening of the city and the productive reuse of urban wastes (see below for further explanations and examples). The importance of urban agriculture is increasingly being recognized by international organizations like UN-Habitat and FAO (World Food and Agriculture Organization). The main reasons why Municipalities and international organizations are supporting urban agriculture are related to the following benefits of (intra- and peri-) urban agriculture:

Contributions to urban food security and nutrition:

The contribution of urban agriculture to food security and healthy nutrition is probably its most important asset. Food production in the city is in many cases a response of the urban poor to inadequate, unreliable and irregular access to food, and the lack of purchasing power. Most cities in developing countries are not able to generate sufficient (formal or informal) income opportunities for the rapidly growing population. The World Bank (2000) estimates that approximately 50% of the poor live in urban areas (25% in 1988). In urban settings, lack of income translates more directly into lack of food than in a rural setting (cash is needed). The costs of supplying and distributing food from rural areas to the urban areas or to import food for the cities are rising continuously, and it is expected that urban food insecurity will increase (Argenti, 2000). Food prices in Harare, for example, rose 534 percent between 1991 and 1992 due to the removal of subsidies and price controls, spurring poor urban consumers to get access to food outside of market channels through home production or bartering (Tevera 1996). Urban agriculture may improve both food intake (improved access to a cheap source of proteins) and the quality of the food may improve (poor urban families involved in farming eat more fresh vegetables than other families in the same income category). In Harare, sixty percent of food consumed by low-income groups was self-produced (Bowyer-Bower and Drakakis-Smith, 1996). In Kampala, children aged five years or less in low-income farming households were found to be significantly better-off nutritionally (less stunted) than counterparts in non-farming households (Maxwell, Levin and Csete 1998). Urban producers obtained 40 to 60 percent or more of their household food needs from their own urban garden (Maxwell and Zziwa 1992). In Cagayan de Oro, urban farmers generally eat more vegetables than non-urban farmers of the same wealth class, and also more than consumers from a higher wealth class (who consume more meat) (Potutan *et al*.1999). In addition to production for their own consumption needs, large amounts of food are produced for other categories of the population. It is estimated (UNDP 1996; FAO 1999) that 200 million urban residents provide food for the market and 800 million urban dwellers are actively engaged in urban agriculture in one way or another. These urban farmers produce substantial amounts of food for urban consumers. A global estimate (data 1993) is that 15-20% of the world's food is produced in urban areas (Margaret Armar-Klemesu 2000). Research on specific cities and products yield data like the following: in Hanoi, 80% of fresh vegetables, 50% of pork, poultry and fresh water fish, as well as 40% of eggs, originate from urban and peri-urban areas (Nguyen Tien Dinh, 2000); in the urban and peri-urban area of Shanghai, 60% of the city's vegetables, 100% of the milk, 90% of the eggs, and 50% of the pork and poultry meat is produced (Cai Yi-Zhang and Zhang Zhangen in Bakker et al. 2000); in Java, home gardens provide for 18% of caloric consumption and 14% of proteins of the urban population (Ning Purnomohadi 2000);Dakar produces 60% of the national vegetable consumption whilst urban poultry production amounts to 65% of the national demand (Mbaye and Moustier 1999). Sixty percent of the milk consumed in Dakar is produced in/around the city; and in Accra, 90% of the city's fresh vegetable consumption is from production within the city (Cencosad 1994). Over 26000 popular gardens cover 2438,7 hectares in Havana and produce 25000 tons of food each year; a total of 299 square kilometres of urban agriculture produces 113525 tons/year (Mario Gonzalvez Novo and Catherine Murphy in Bakker et al. 2000); Urban agriculture to a large extent complements rural agriculture and increases the efficiency of the national food system in that it (IDRC 1998) provides products that rural agriculture cannot supply easily (e.g. perishable products, products that require rapid delivery upon harvest), that can substitute for food imports and can release rural lands for export production of commodities.

Economic impacts.

Growing your own food saves household expenditures on food; poor people in poor countries generally spend a substantial part of their income (50 – 70%) on food. Growing the relatively expensive vegetables therefore saves money as well as on bartering of produce. Selling produce (fresh or processed) brings in cash.

In Dar es Salaam, urban agriculture forms at least 60% of the informal sector (personal communication Mr. Majani UCLAS, Dar es Salaam, 2001) and urban agriculture is the second largest urban employer (20 percent of those employed). In 1993, urban fresh milk production was worth an estimated USD 7 million in 1993 (Mougeot 1994). The annual gross output of over ten thousand UA enterprises in the city of Dar es Salaam totalled 27.4 million USD, with an annual value added amounting to 11.1 million USD. In 1991, the individual urban farmer's annual average profit was estimated at 1.6 times the annual minimum salary (Sawio 1998). In Addis Abeba, above-normal profits are earned by even the smallest-scale backyard producers with very low capital (Staal 1997). In Harare, savings accruing to small-scale urban farmers are equivalent to more than half a month's salary (Sanyal, 1996). In Nairobi in the early 1990s, agriculture provided the highest self-employment earnings among small-scale enterprises and the third highest earnings in all of urban Kenya (House et al. 1993). In Mexico City production of swine brings in 10-40% of household earnings, urban cowshed-based milk can supply up to 100% of household income and in sub and peri-urban areas maize production provides 10-30%, vegetable and legume production even up to 80% of the household income (Pablo Torres Lima, L.M.R. Sanchez, B.I.G. Uriza in Bakker et al. 2000)
Besides the economic benefits for the urban agricultural producers, urban agriculture stimulates the development of related micro-enterprises: the production of necessary agricultural inputs and the processing, packaging and marketing of outputs. The activities or services rendered by these enterprises may owe their existence in part or wholly to urban agriculture. Other services may also be rendered by independent families and groups (e.g. animal health services, bookkeeping, and transportation). Input production and delivery may include activities like the collection and composting of urban wastes, production of organic pesticides, fabrication of tools,

delivery of water, buying and bringing of chemical fertilisers, etc.) Transformation of foodstuffs may include the making of yoghurt from milk, or the frying of plantains or yams, chicken or eggs, etc. This might be done at the household level, to sell at the farm gate or in a local shop or market, and larger units to sell in supermarkets or even for export. Special attention is needed for the strengthening of the linkages between the various types of enterprises in clusters or chains. The municipality and sectoral organisations can play a crucial role in stimulating micro-enterprise development related to urban agriculture. In Ecuador the municipality of Quito has provided marketplaces for urban farmers. The organic refuse left after a market day is collected by a women's group who compost the refuse to use in their own farms. A true win-win situation.

Social impacts

Urban agriculture may function as an important strategy for poverty alleviation and social integration. We mentioned earlier the positive stimulus it may give to women. Several examples exist of municipalities or NGOs that have initiated urban agriculture projects that involve disadvantaged groups such as orphans, disabled people, women, recent immigrants without jobs, or elderly people, urban agriculture may function as an important strategy for poverty alleviation and social integration. With the aim to integrate them more strongly into the urban network and to provide them with a decent livelihood. The participants in the project may feel enriched by the possibility of working constructively, building their community, working together and in addition producing food and other products for consumption and for sale.

In more developed cities, urban agriculture may be undertaken for the physical and/or psychological relaxation it provides, rather than for food production per se. Also, urban and peri-urban farms may take on an important role in providing recreational opportunities for citizens (recreational routes, food buying and meals on the farm, visiting facilities) or having educational functions (bringing youth in contact with animals, teaching about ecology, etc.).

Contributions to urban ecology.

Urban agriculture is part of the urban ecological system and can play an important role in the urban environmental management system. Firstly, a growing city will produce more and more wastewater and organic wastes. For most cities the disposal of wastes has become a serious problem. Urban agriculture can help to solve such problems by turning urban wastes into a productive resource. In many cities, local or municipal initiatives exist to collect household waste and organic refuse from vegetable markets and agro-industries in order to produce compost or animal feed, but one can also find urban farmers who use fresh organic waste (which may cause environmental and health problems). Quality compost is an important input that can fetch a good price, as the example from Tanzania shows. Compost allows an urban farmer to use less chemical fertilisers and by doing so preventing problems related to the contamination of groundwater. In addition, compost-making initiatives create employment and provide income for the urban poor. Farmers may use wastewater for irrigating their farms when they lack access to other sources of water or because of its high price. The use of fresh (untreated) wastewater has the additional advantage for poor urban farmers that it contains a lot of nutrients (although often not in the proportions required by their soils and crops). However, without proper guidance, the use of wastewater may lead to health and environmental problems. Farmers need to be trained in self- protection during handling of the wastewater, proper crop selection and adequate irrigation methods, among other things. Technologies such as hydroponics or organoponics, drip irrigation, zero tillage etc. substantially reduce water needs and health risks and are very interesting for the urban environment and can indeed be found in many cities.
The treatment and reuse of more urban wastewater in agriculture also needs to be ensured. This necessitates special decentralised treatment facilities and low cost (preferably bio-) technologies. In many cases, partial treatment will be optimal for agricultural reuse. More and more experience is being gained in public-private initiatives involving private enterprises and/or civic organisations in the development and management of municipal wastewater treatment plants. However, in most municipalities, the treatment capacity will be far lower than what is needed for many years to come, and farmers will continue to use raw wastewater - a fact that should urge municipalities and other actors to take proper accompanying measures. Without a doubt, each situation will require a tailor-made solution, preferably to be found by involving the stakeholders in a process of participatory problem analysis, planning and implementation.

Secondly,. Degraded open spaces and vacant land urban agriculture may also positively impact upon the greening and cleaning of the city by turning derelict open spaces into green zones and maintaining buffer and reserve zones free of housing, with positive impacts on the micro-climate (shade, temperature, sequestration of CO_2)are often used as informal waste dumpsites and are a source of crime and health problems. When such zones are turned into productive green spaces, not only an unhealthy situation is cleared, but also the neighbours will passively or actively enjoy the green area. Such activities may also enhance community self-esteem in the neighbourhood and stimulate other actions for improving the community's livelihood.

Thirdly, urban agriculture and urban forestry contribute to disaster risk reduction and adaptation to climate change by reducing runoff, keeping flood plains free from construction, reducing urban temperatures, capturing dust and CO_2, while growing fresh food close to consumers reduces energy spent in transport, cooling, processing and packaging, whilst productive reuse of urban organic wastes and wastewater (and the nutrients these contain) reduces methane emissions from landfills and energy use in fertilizer production.

3. Three policy perspectives on urban agriculture

It is useful to distinguish three main policy perspectives on urban agriculture each associated with different types of urban agriculture. These three perspectives are helpful in designing alternative policy scenarios for the development of intra- and peri-urban agriculture.

The **social perspective** is mainly (but not exclusively) associated with subsistence oriented types of urban agriculture that form part of the livelihood strategies of urban low income households with a focus on producing food and medicinal plants for home consumption. In addition, the family expenses on food and medicines are reduced and some cash is generated from sales of surpluses. These households seek out multiple additional income sources for their survival. Examples include home gardening, community gardening, institutional gardens at schools and hospitals, and open field farming at micro scale with low levels of

investment. These systems show little direct profitability but have important social impacts such as enhanced food security, social inclusion, poverty alleviation, community development, HIV-AIDS mitigation etc.

The **economic perspective** is particularly related to market oriented types of urban agriculture. Activities usually involve small-scale family-based enterprises and sometimes larger scale entrepreneurial farms run by private investors or producer associations. The activities not only include food production (e.g. irrigated vegetable production, stall-fed dairy production) but also non-food products (e.g. medicinal and aromatic herbs, flowers, ornamental plants). These commercial farms are associated with small-scale and larger enterprises involved in delivery of inputs (such as seed, compost, fodder, agro-chemicals) and the processing and marketing of agricultural products. These types of urban agriculture have a more pronounced economic impact and higher profitability, but their externalities for the city and urban populations, especially those of the intensive larger scale enterprises, tend to be higher especially through risk of water and soil contamination due to intensive use of agro chemicals, health risks from use of contaminated water for irrigation and risks of animal-human disease transfers (zoonosis).

The **ecological perspective** refers mainly to types of urban agriculture that have a multi- functional character: Besides provision of food and generating income they can play a role in environmental management for example, through nutrient recycling via decentralised composting and reuse of organic wastes and wastewater. They can also provide other services demanded by urban citizens: urban greening, improvement of the urban climate, keeping buffer zones and flood plains free from construction, provision of opportunities for leisure and recreational activities, storm water storage and flood prevention, etcetera. In order to enable such a combination of functions, urban and peri-urban agriculture will have to adopt agro-ecological production methods, link up with eco-sanitation and decentralised sustainable waste management systems, as well as becoming part of the planning and management of parks, nature reserves and recreational services.

The three policy perspectives on urban agriculture suggest different scenarios for the development of urban agriculture and enable to consider alternative policy measures, in relation to the actual situation in the city and the existing policy priorities. It should be stressed that the three perspectives certainly are not mutually exclusive and in practice, most policies on urban agriculture will be based on a specific mix of the three perspectives, giving different emphasis to a certain perspective in certain locations and with certain categories of the population and another perspective in other parts of the city territory and with other actors.

4. Multi-stakeholders Policy Development and Action Planning

Due to the cross cutting and multi-dimensional nature of urban agriculture, policy development and action planning on urban agriculture should involve various sectors and disciplines: agriculture, health, waste management, community development, parks and nature management, among others. Moreover, urban farmers, and the CBOs and NGOs supporting them, have to be involved in the planning process. An important aspect of strategic urban planning is related to the participation of the urban poor themselves in the analysis of the situation, in the definition of priorities and in action planning and implementation. Such consultative processes will make the outcomes of policy development and action planning not only robust and comprehensive, but also accepted and sustainable. Increasingly this is recognised and incorporated in urban planning approaches such as the multi-actor planning methodologies adopted by Local Agenda 21 and the Sustainable Cities Programme. The RUAF Foundation, through its "Cities Farming for the Future" programme, introduced the “Multi- stakeholder Policy making and Action Planning (MPAP) approach in twenty cities around the world. In those cities, a Multi-stakeholder Forum on Urban Agriculture and/or Food Security has been established, involving all direct and indirect stakeholders in urban food production and consumption, assisted by one or more multi-disciplinary working groups. This multi-stakeholder forum functions as a platform for dialogue and consensus building among the various stakeholders regarding the following: problem definition, agenda setting and identification of priorities; making choices among alternative strategies and policy instruments available; coordination of the drafting of action plans and participatory budgeting. The results are integrated in a City Strategic Action Plan on Urban Agriculture that will be formally presented for approval to the City Council (or one of its commissions). Subsequently, the Forum will coordinate the implementation of the actions plans, monitor the results obtained, draw lessons and adjust the strategies of the City Strategic Action Plan, if needed.

5. Municipal strategies for the Development of Safe and Sustainable Urban Agriculture

Urban policy makers can substantially contribute to the development of safe and sustainable urban agriculture by:

- Creating a conducive policy environment and formal acceptance of urban agriculture as an urban land use;
- Enhancing access to vacant open urban spaces and the security of agricultural land use;
- Enhancing the productivity and economic viability of urban agriculture by improving access of urban farmers to training, technical advice, and credit and supporting the establishment and strengthening of urban farmer organisations;
- Taking measures that prevent/reduce health and environmental risks associated with urban agriculture.

We will discuss below for each of these four areas mentioned above a number of key issues that require for policy attention and policy measures that might be adopted.

5.1 Creation of an enabling policy environment.

Formal acceptance of urban agriculture as an urban land use and its integration into urban development and land use plans is a crucial step towards effective regulation and facilitation of the development of urban agriculture. Existing policies and by-laws regarding urban agriculture will have to be reviewed in order to identify and remove unsubstantiated legal restrictions and to integrate more adequate measures to effectively stimulate and regulate the development of sustainable urban agriculture.

A second important step is the creation of an institutional home for urban agriculture. Conventionally, sector policies have been defined under the assumption that agriculture refers to the rural sphere and will be attended to by institutions other than the urban ones, whilst most agricultural organisations don’t operate in the urban sphere. As a consequence, urban agriculture often does not have an institutional home.
Municipal authorities can play a key role in filling this gap by selecting a leading institute in this field, creating an urban agriculture

office or department in this lead agency with proper staffing, and establishing an interdepartmental committee on urban food production and consumption. Nairobi and Accra have created a municipal agricultural department. In Villa Maria del Triunfo (Lima, Peru) an urban agriculture sub-department was created under the Department of Economic Development. The city of Rosario (Argentina) made in 2001 its Secretariat of Social Promotion responsible for the coordination of the new Urban Agriculture Programme. In Cape Town, South Africa, an inter-departmental working group has been established in 2002 to coordinate the activities in the field of urban agriculture of various Municipal and Provincial departments and facilitate integrated policy development. In Bulawayo, Zimbabwe, an Interdepartmental Committee on Urban Agriculture was created to coordinate the activities of the various Municipal departments active in this field including the Departments of Town planning, Health, Finance, and others.

Also important is stimulating the dialogue and co-operation among the direct and indirect stakeholders in urban agriculture. This can be done by setting up a multi-actor platform and working group on urban agriculture that organises the joint analysis of the presence, role, problems and development perspectives of urban agriculture in the city and coordinates the process of interactive formulation of a policy and the planning and implementation of action programmes by the various actors.

5.2 Enhancing access to vacant land and security of land use

Naturally, land is a critical asset for urban agriculture, and its availability, accessibility and suitability are of particular concern to urban farmers. City governments may facilitate access of urban producers to available urban open spaces in various ways. Below we present a number of measures taken by various cities in the South to enhance access of (especially poor) urban producers to land and improve their security of land use.

***Integration of urban agriculture in urban land use planning and zonification*.** Dar es Salaam (Tanzania), Dakar (Senegal), Maputo (Mozambique); Pretoria (South Africa), Kathmandu (Nepal), Accra (Ghana), Kathmandu (Nepal) and Beijing (China) are examples of the many cities that have demarcated zones for urban agriculture areas as a form of permanent land use in the perspective to support agriculture in combination, to protect open green areas, flood plains and areas under power lines to be built upon, to create buffer zones between conflicting land uses. Demarcation of such zones alone is not enough Zoning in itself is not sufficient to maintain these green open spaces. To realise that, the political will of the local authorities and the practical, technical and financial support provided to the urban producers to stimulate the development of sustainable and multi-functional agriculture in these zones, is very important.

Making an inventory of the available *vacant open land within the city.* Contrary to the common belief, even in highly urbanised areas surprisingly high amounts of vacant land can be found that could be used for agriculture on a temporary or permanent basis. In the city of Chicago, researchers identified 70,000 vacant lots. Various cities, like Cienfuegos (Cuba), Piura (Peru) and Dar es Salaam (Tanzania) have made an inventory of the available vacant open land within the city (using methods like community mapping and/or GIS) and analysed its suitability for use in agriculture, which creates a good starting point for enhancing access, especially of the urban poor, to land for urban farming.

Temporal lease of vacant municipal land. **Various cities**, like Havana (Cuba), Cagayan de Oro (the Philippines), Cape Town (South Africa), Lima (Peru), Bulawayo (Zimbabwe) and Governador Valadares (Brazil) have formulated a City Ordinance that regulates the (temporal) use of vacant municipal land by organised groups of urban producers. The vacant land (that might be land that is earmarked for other uses but not yet in use as such or land that is not fit for construction e.g. flood zones, land under power lines, etcetera, or buffer zones and land reserves for future use) is given in short or medium term lease to organized groups of urban poor for gardening purposes (multi annual purposive specific leaseholds or occupancy licenses). Often the contract with the farmers includes conditions and regarding the required land, crop and waste management practices and eventually some restrictions

Stimulating landowners to give vacant land in longer term leases for agriculture. The City of Rosario (Argentina) is providing a tax reduction to land owners that do lease out their land to urban producers (levying municipal taxes on land laying idle might be a complementary measure) and created a Land Bank which brings those in need of agricultural land in contact with landowners in need of temporary or permanent users. Also the city of Cagayan d'Oro, the Philippines, assists associations of the urban poor in the establishment of allotment gardens on privately owned land, which proves to be a successful strategy. Other examples of tenure agreements between urban producers and owners of private or semi-public estates with idle areas can be found in Accra (hospital grounds), Harare (golf club), Santiago de Chile (school yards), Dar es Salaam (university campus) and Port-au-Prince (church grounds).

Taking measures to improve the suitability of available tracts of land.

The City of Cape Town (South Africa) not only provides access to vacant land but also is assisting urban gardening groups in removing debris from that land, ploughing it, delivery of compost, etcetera. In New York community groups and volunteers, with the help of the Department of Sanitation, cleaned out derelict open spaces in their neighbourhoods and started there a community supported garden, leading amongst others to an increase of the prices of residential properties within 1000 feet of the garden.

Providing assistance to reallocation of those urban producers that are poorly located (and therefore may cause serious health and/or environmental risks due to these locations). For example, in Jakarta, Indonesia, 275 dairy cattle farmers with over 5,500 cows have been reallocated from the inner city (where they caused disease and waste problems) to a peri-urban area. Cape Town (South Africa) is planning a similar action creating new livestock kraals in the peri-urban area for the intra-urban herd owners.

***Including space for individual or community gardens in new public housing projects and slum upgrading schemes*.** Cities like Vancouver (Canada), Colombo (Sri Lanka), Kampala (Uganda), Rosario (Argentina), Dar es Salaam (Tanzania), Chicago (USA) are experimenting with the inclusion of space for home and/or community gardening in new public housing projects and slum

upgrading schemes.

Promotion of multifunctional land use. Under certain conditions urban farming can be combined with other compatible land uses. Farmers may provide recreational services to urban citizens, receive youth groups to provide ecological education, act as co-managers of parks, and their land may also be used as water storage areas, fire break zones, flood zones, etc. By doing so the management costs of such areas may be reduced, and protection against unofficial uses and informal re-zoning may be enhanced. In Bangkok (Thailand) aquaculture in urban or peri-urban lakes or ponds is combined with recreational activities like angling, boating, or a fish restaurant. In Calcutta the maintenance of the wetlands, agriculture and aquaculture are combined with wastewater treatment and reuse.

The Municipality of Beijing is promoting the development of peri-urban agro-tourism both in the form of larger agro-recreational parks as well as family-based agro-tourism: farmers diversifying their activities by offering services to urban tourists (food, accommodation, sales of fresh and processed products, functioning as tourist guide, horse riding, etc.). The local government made agro-tourism part of municipal and district level planning; established an agro-tourism association and information dissemination service; assists interested farmers with business planning, tax exemptions and funding of infrastructure development, and provides subsidized water and electricity. Some municipalities (e.g. Pretoria, South Africa; Vancouver, Canada; Rosario, Argentina)) entered into a partnership with producers to manage municipal open green spaces (and saving in this way the municipality considerable maintenance costs) by combining community gardening with other functions (e.g. park maintenance, recreational services).

5.3 Enhancing the productivity and economic viability of urban agriculture

The potential for improvement of the efficiency in urban farming systems is high. The urban farming sector tends to be highly dynamic, amongst others due to the closeness to the consumers, but its development is restrained amongst others due to urban farmers' limited access to training and extension services. Agricultural research and extension organisations and other support organisations (i.e. credit institutions) have - until recently - given relatively little attention to agriculture in the urban environment. And where it has happened, most attention was given to the larger scale, capital intensive and fully commercial farmers, especially peri-urban irrigated vegetable production, poultry and dairy production.

Important measures that can be taken by Municipal Governments to enhance the productivity and economic viability of urban agriculture include the following:

Provision of training and extension services to urban producers. Governmental organisations, educational institutes, NGO's and the private sector can be stimulated by the Municipal Government to provide training, technical advice and extension services to urban producers, with a strong emphasis on ecological farming practices, proper management of health risks, farm development (e.g. intensification and diversification), enterprise management and marketing. Cost-sharing systems (farmers, municipality, governmental organisations, and private enterprises) will be needed to ensure sustainability of such activities. For example, the Cape Town policy on urban agriculture (South Africa) calls upon the services of the research, training and support organisations in and around the city to provide the urban farmers with training on business administration, technical skills, marketing, etc. The Botswana policy paper on urban agriculture assigns a critical role to farmer education through the production of books, brochures, posters, and community level demonstration projects and advocates for the integration of urban agriculture into the formal training and education system (e.g. agricultural colleges, technical schools). In Chicago, the Food Policy Council is the platform where the Municipality and NGO's, like Heifer and Growing Power, coordinate their activities regarding capacity building and training activities for community gardeners.

Strengthening farmer organisations. Most urban farmers are poorly organized, and if so mostly in an informal way, and thus lack channels and power to voice their needs. This limits the representation of their interests in urban policymaking and planning at the various levels and hampers their participation in development programmes. Well-functioning farmer organisations can negotiate access to land, adequate tenure arrangements and access to credit. Such organisations may also take up roles in farmer training and extension, infrastructure development, processing and marketing; and control / certification of the quality of the products marketed. More efforts are needed to identify existing farmer organisations and informal networks of (various types of) urban farmers, and to analyse their problems and needs and effective ways to further develop these organisations. Municipalities may stimulate their departments as well as Universities, NGOs and CBO's present in the City to actively support farmer organisation and capacity development and to strengthen the linkages between farmer organisations and private enterprises, consumer organisations and support organisations.

The PROVE programme of Brasilia FD stimulated the urban producers to establish producer associations and their capacities were enhanced to gradually replace the government officers in their supporting role. In Rosario, Argentina, the Municipal Urban Agriculture Programme supported the establishment of the Urban Producers Network and helped them to establish working relations with various governmental and non-governmental organisations. In Beijing, agricultural cooperatives, often closely linked to village-level management, are created that facilitate capacity building and joint marketing.

Development of adequate technologies for urban agriculture. Urban agriculture is performed under specific conditions that require technologies different to those used in the rural context. Such specific conditions include among others: limited availability of space and the high price of urban land, proximity to large numbers of people (and thus a need for safe production methods), use of urban resources (organic waste and wastewater), and possibilities for direct producer-consumer contacts. Most available agricultural technologies need adaptation for use in these conditions whilst new technologies have to be developed to respond to specific urban needs (e.g. non-soil production technologies for use on roofs and in cellars; development of safe and economic practices for reuse of wastewater).

Municipalities can provide budget and expertise for local technology development, and/or to stimulate research organisations and universities to put urban agriculture issues on their research agenda and to undertake participatory action-research with urban producers. Also more coordination between research institutes, agricultural extension organisations, NGOs and groups of urban farmers could be promoted. Special attention is to be given to introduction of ecological farming practices (like integrated pest and disease management, ecological soil fertility management, soil and water conservation, etc.), space intensive and water saving technologies, health risk reducing practices and the creation of farmer study clubs and field schools that actively engage in the technology development and assessment process. The national urban agriculture programme in Cuba undertakes ample practical research to develop technology appropriate for the urban conditions e.g. agro-ecological production methods that do not harm the environment. The Botswana policy paper on urban agriculture urges research and extension institutions to develop and disseminate technologies with and to small-scale urban farmers. The following technologies are mentioned: (a) adaptable cultivars (e.g. cabbage, tomato, union, etc.), (b) water saving techniques (e.g. drip irrigation system or micro-irrigation system), (c) appropriate production practices (e.g. hydroponics, concrete benches, protected agriculture).

Enhancing access to water, inputs and basic infrastructure. Also access to year round supply of low cost water is of crucial importance in urban agriculture as well access to (composted or fresh) organic materials and other sources of nutrients (like wastewater). Municipalities can play an important role in enhancing access of urban farmers to water and production inputs. The city of Bulawayo (Zimbabwe) provides treated wastewater to poor urban farmers in community gardens, while the city of Tacna (Peru) agreed to provide urban farmers its treated wastewater in return for their assistance to maintain public green areas. The City of Gaza (Palestinian Authority) promotes the reuse of grey household water in home and community gardens. Mexico City (Mexico) promotes systems for rainwater collection and storage, construction of wells and the establishment of localised water efficient irrigation systems (e.g. drip irrigation) in urban agriculture to stimulate production and to reduce the demand for potable water. The municipality of Cape Town assist community garden groups with basic infrastructure (a fence, a tool shed, a tank and hoses for irrigation) and allows them to use up to a certain amount of piped water daily free of charge. The city of Havana facilitates adequate supply of quality seeds, natural fertilizers and bio-pesticides in small quantities to urban farmers through a network of local stores and is supporting the establishment of decentralised low-cost facilities for compost production and the installation of composting toilets.

*E**nhancing access of urban farmers to credit and finance.*** Improvement of the access of urban farmers to credit and finance (with an emphasis on women-producers and the resource poor farmers) is very much needed. Municipalities can stimulate (e.g. by creating a guarantee fund) existing credit institutions to establish special credit schemes for urban producers or to allow the participation of urban producers in existing credit schemes for the informal sector. In Brasilia FD (Brazil), the PROVE programme provided the urban producer associations with a non-monetary guarantee in the form of "Mobile Agro-industries" (metal frames that can be transported on a truck). Since these frames are mobile and durable, they can be used as collateral for a commercial loan. The inclusion of urban agriculture in the municipal budget is also an essential component in the promotion of urban agriculture activities. In many cities, the City Council allocates resources to support its policy and programme on urban agriculture (infrastructure development, training, marketing support, start-up kits, etcetera.

Facilitate (direct-)marketing. Due to the low status of urban agriculture and the usual exclusive focus on food imported from rural areas and the exterior, the creation of infrastructure for direct local marketing of fresh urban produced food and local small processing of locally produced food has received little attention in most cities. Municipalities may facilitate marketing by poor urban farmers by providing them access to existing city markets or to assist them in the creation of farmers' markets (infrastructure development, licenses, control of product quality), authorize food box schemes and/or support the establishment of "green labels" for ecological grown and safe urban food. An example is Brasilia D.F. that is furthering the integration of small food production with local food processing and marketing.
The Budapest municipality assisted Biokultura, the local organisation of urban and peri urban farmers, to establish a weekly organic farmers' market for organically grown food products. The municipality of Governador Valadares has prioritised the marketing of urban agricultural products in different ways: (a) by providing incentives for the formation of cooperatives for the production and commercialization of products, (b) by the creation of sales and distribution centres as well as farmers markets in the city and c) by buying agricultural products from the urban farmer groups to supply to schools, community kitchens, hospitals and other service organizations.

Supporting micro-enterprise development

Various Municipalities are promoting the development of small scale enterprises: suppliers of (often ecological) farm inputs (compost, earthworms, open pollinated seeds and plant materials, bio-pesticides) and processing enterprises (food preservation, packaging, street vending, transport) by provision of start-up licenses and subsidies or tax reductions to micro- and small entrepreneurs, provision of technical and management assistance to micro- and small enterprises or provision of subsidies and technical assistance for local infrastructure and equipment for small scale food preservation and storage facilities. In Ghana, the Tema Municipality cooperated with the Ministry of Food and Agriculture in the establishment of a milk collection system in order to encourage dairying in the peri-urban areas of Tema. In Brasilia, the Municipality facilitates the development of small agro- processing and/or packaging units managed by urban farmer groups and assisted them in setting up quality labels and other marketing strategies.

5.4 Measures to reduce the health and environmental risks associated with urban agriculture
Rather than restricting urban agriculture out of fear - often unspecified – of health and environmental risks associated with urban agriculture, cities –instead- better design a series of accompanying measures to reduce these risks. The following measures are regularly recommended to prevent eventual risks associated with urban agriculture:

Improved coordination between health, agriculture and environmental departments. The first measure to be taken is to create mechanisms of cooperation between agriculture, health and environment/waste management departments to assess actual health and environmental risks associated with urban agriculture and to design effective preventive and mitigating strategies for which the participation of all these sectors is required. In Kampala, Uganda, health, agricultural and town planning specialists closely cooperated in the development of the new ordinances on urban agriculture livestock and fisheries. In Phnom Penh (Cambodia) steps are being taken to improve the coordination between municipal departments, universities and private organisations for controlling and monitoring the microbiological and chemical quality of the wastewater-fed fish and plants in order to reduce a number of health problems (especially skin infections) related to wastewater fed aquaculture. In Kumasi, Ghana, small kits have been made available to various local organisations to periodically test the quality of the irrigation water. The Accra working group on urban agriculture, with the Accra Metropolitan Assembly as a member, has drafted revised by laws on the use of waste water and support an awareness campaign on health risk minimisation strategies in production and marketing (Farm to Fork) of urban vegetables. The Ministry of Housing, Construction and Sanitation of Peru (MVCS) is formulation of policy guidelines for the promotion of productive use of treated wastewater in intra- and peri-urban agriculture) and recreational use of wastewater (irrigation of parks and other public green areas).

Health considerations when zoning urban agriculture. Many cities identify zones where certain types of urban agriculture are allowed (often defining required management practices) and other types are excluded (due to expected negative effects in the given local circumstances) in order to reduce health and environmental risks. When preparing such a zoning and related regulations, factors like population density, the ecological sensitivity of the area concerned, closeness to polluting industry, closeness to sources of drinking water, etc. should be taken into account as well as the potential risks related to certain types of urban agriculture. Furthermore, the available means to enforce the zonification and related regulations should be taken into account. A city may want to avoid free roaming cattle and major concentrations of stall-fed dairy cattle or piggeries in central districts (traffic, bad smells, flies, waste management problems). Also intensive horticulture and poultry keeping in areas that are sources of drinking water (risk of water contamination) or mono-cropping in river stream beds (erosion problems/siltation of dams) might need to be avoided. Also proper location of crop fields in relation to sources of contamination is important in order to reduce the effects of air pollution. Within 50-75 meters of a main road, leafy vegetables could better be avoided; production of food crops close to industries that emit certain toxic elements should be discouraged.

Farmers education on the management of health and environmental risks Health risks associated with urban farming can be reduced substantially if farmers are made well aware of these risks and know how to prevent them. Examples of preventive measures that can be implemented by farmers themselves are the following: Application of ecological farming methods to reduce risks related to intensive use of agrochemicals; Adoption of adequate animal wastes management, regular cleaning and disinfection of the stables, proper handling of animal feed, etc. in order to prevent health risks related with raising animals in proximity of homes; and Use of adequate irrigation practices and proper crop choice to reduce health risks related to the use of wastewater in agriculture. Untreated wastewater preferably should not be used for food crops (especially not fresh leafy vegetables), but may be used for growing trees or shrubs, crops for industrial use and other non-edible plants (ornamentals, flowers). In Xochimilco, Mexico, urban producers have shifted from vegetable growing to a lucrative floriculture when untreated canal waters became unfit for food growing. In Hyderabad, India, farmers shifted from production of paddy to fodder grass production, when river water that is used for irrigation, gradually became more polluted. Food fish farmers in Bangkok, facing increasing pollution and food safety problems, were stimulated to switch to ornamental fish production. Vegetable producers in Ho Chi Minh City have begun cultivating ornamental plants for the urban middle class to reduce the risks of growing vegetables with wastewater. Municipalities in Ghana, Jordan and Senegal are field testing the various methods and procedures proposed by WHO to reduce risk of use of wastewater in urban agriculture in situations where comprehensive wastewater treatment is too expensive and not feasible in the near term (as common in many cities in the South).

Training of food vendors and consumers. During production, processing and marketing crops can get contaminated. Access to clean water and sanitation facilities in markets should be provided and food-hygiene training is to be provided to small food processors and vendors. Consumers need to be educated regarding washing or scraping of crops, heating of milk and meat products and securing hygienic conditions during food handling. They also need education regarding the importance of fresh nutritious foods and medicinal herbs and their preparation (also in relation to HIV-AIDS). A FAO project on making street foods safer, among others in Dakar Senegal, is training food vendors, food inspectors and consumers in food hygiene issues. In Accra, Ghana, a multi-partner project resulted in the training of more than 3,000 street food vendors on improved hygiene practices as well as increased consumer awareness.

Prevention of industrial pollution of soils and water by industry. Contamination of soils, rivers and streams by industry is a growing obstacle to safe urban food production. Separation of city waste (residential and office areas) and industrial waste streams and treatment of industrial wastes at the source should be promoted. In areas where contamination might occur (e.g. down streams of industrial areas: both wind and water) periodic testing of soils and water quality in agricultural plots might be needed. Increasing pollution and contamination of the city's domestic wastewater with industrial wastewater effluents is a major constraint to the continued viability of irrigated urban agriculture as well as to aquaculture. In many South-East Asian cities, the continuity of the existing potential for growing aquatic vegetables and fish using urban wastewater will depend on the city planners' ability to coordinate and develop strategies for effective separation of toxic industrial waste from domestic sewage. There are already encouraging examples in Hanoi and Ho Chi Minh City (Vietnam) of relocation and zoning of urban industries to industrial parks which allow for more effective treatment and monitoring of effluents. In the medium term, enforcing existing pollution control legislation to control contaminants at their source and monitoring and regulation of industrial wastewater discharge in public water sources can be effective in reducing health risks.

6. Final remarks

A growing number of cities are designing policies and programmes on urban agriculture, applying multi-stakeholder planning approaches to identify effective ways to integrate urban agriculture into urban sector policies and urban land use planning and to facilitate the development of safe and sustainable and multi-functional urban agriculture. Urban agriculture has the potential to become a dynamic economic sector that quickly adapts to changing urban conditions and demands, intensifying its productivity and diversifying its functions for the city. Governmental policy should create the proper framework conditions for optimal development of the social, economic and ecological benefits of urban agriculture, whilst reducing negative effects on public health and environment that some types of urban agriculture can have if improperly managed or not well located.

The sustainability of urban agriculture is closely related to its contributions to the development of a sustainable and resilient city that is socially inclusive, food-secure, productive and environmentally-healthy.

Annexure B: The Criteria as evaluated by a 3-level ranking system

Table 6.7 Evaluation results of all case studies

Criteria	Degree of criteria fulfilment: (ways in which the case study meets the requirements of the criteria)		
	To a minimal degree	To a moderate degree	To an important degree
	Lower priority for UA policy implementation		High level priority for UA policy implementation
Social perspectives			
Should positively and actively contribute to community development			x x x
Must be empowering to a variety of stakeholders			x x x
Should be multifunctional in services provided			x x x
Should stimulate social activities and improve social inclusion			x x x
Managerial team should have agricultural and technical knowledge (prerequisite).			x x x
Should enhance food security.		x	

			x
			x
Should contribute to poverty alleviation.		x	
			x
			x
Should present health and safety benefits to the community.		x	
		x	
			x
Economic perspectives			
Should give rise to financial gain for those involved.			x
			X
			X
Should be financially self-sustaining after a reasonable time period.			x
		x	
			x
Start-up cost should coincide with the type and size of practice.			x
			x
			x
Should attempt to reshape underutilised urban space in order to contribute to area-profitability.			x
			x
		x	
Should reduce the “food miles’ of produce, while also maintaining comparative advantage in terms of food prices.			x
			x

			x
Should provide financial benefits (in varying degrees), from position in market value chain, compared to rural counterparts.			x
			x
			x
Ecological perspectives			
Should present multiple safety benefits (with regard to the ecosystem and crisis situations).		x	
			x
	x		
Should contribute to urban greening, environmental protection and land rejuvenation.			x
			x
		x	
In order to improve the viability, should make up part of some larger nature conservation scheme, recreational services and/or tourism services within the urban space.	x		
		x	
	x		
Should be multi-functional in terms of ecosystem services provided. Evaluated in terms of Table 2.4: Ecosystem Services.			x
			x
		x	
Should complete or make up part of the waste management system, be it centralised or decentralised.			x
		x	
			x
Should make use of a variety of agro-ecological production methods.		x	
		x	
			x
			x

Should create multi-habitat, heterogeneous environments through the use of variant production and typology methods.			x
	x		
Should improve the environmental quality.			x
			x
			x

Source: Stander (2016:133-137).