

**GLOBAL EDUCATION PROGRAMME
INTERNATIONAL DEVELOPMENT RESEARCH FUND**

FINAL REPORT

***THE SIGNIFICANCE OF URBAN AGRICULTURE IN FOOD
SECURITY AND SUSTAINABLE LIVELIHOODS IN
RESPONSE TO ECONOMIC RESTRUCTURING IN
ZAMBIA'S COPPERBELT PROVINCE***

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EXECUTIVE SUMMARY

Introduction

The rapid growth of cities in the South, and in Africa in particular, and associated concerns about rising levels of urban poverty and looming food shortages has positioned the issue of the production of food within cities as a key theme on the international development agenda (FAO, 2012). Within this context Urban Agriculture (UA) has long been recognised for the critical role it plays as an urban survival strategy in the cities of the South. UA involves the production of food and the rearing of domestic livestock within or immediately adjacent to built-up settlements. It plays a key role in supplementing the food budget and often serves as a source of income as part of livelihood diversification. This role was enhanced by structural adjustment, jobless growth, deindustrialization and rapid urban growth in the South, and it is estimated that UA accounts for between 20% and 60% of household income in Africa (Smith, 2002). In certain cities, as this study shows, UA can account for nearly half of all vegetables and other food crops (such as maize) that are consumed in the city.

While UA clearly plays a key role in terms of issues such as urban food security, income and gender empowerment, it remains an activity which governments seldom support and often do not tolerate, as it is viewed as being incompatible with the perceived characteristics of a 'modern' urban environment. A notable exception is the city of Ndola in the Copperbelt province in Zambia, where local government recently initiated a UA policy, the genesis and outcomes of which may well be instructive in guiding local government policy further afield.

A further challenge with UA is that because it is frequently small-scale and seasonal in nature accurate assessments are often difficult, causing some authors to question its significance (Webb, 2011). This questioning provided an initial justification for this study, namely the need to undertake detailed empirical research in an area in Africa where UA appears to play a key role in household survival, in order to gauge just how significant UA actually is.

The decision to initiate a research project in three cities in the Copperbelt province of Zambia (Ndola, Kitwe and Luanshya) was further grounded upon the recognition that this area, whose economy was grounded on the exploitation of copper, suffered a significant economic downturn from the 1980s/90s as a result of the falling price of copper, rationalization of mining and the near collapse of the associated industrial sector. As a result, mine employment fell from 16.9% to 9.7% of all jobs, in Ndola, the primary manufacturing centre, some 75% of manufacturing firms and 9000 jobs had gone by 2000, overall unemployment rose to 45% and poverty increased to 75% by 2005 (CSO, 2007).

Mass unemployment, together with the weakened links that people have with rural areas because of the long established nature of urbanization in the area, have forced families to

adopt various forms of self-reliance, including UA. Two quotes serve as evidence of this reality:

‘Because of poverty levels, urbanisation and structural adjustment, there is no employment. The best way to intervene is to encourage agriculture and involve people in small-scale agriculture in the surrounding area, or where they are residing’ (NGO Project Leader, Ndola, 2010).

In Luanshya, mine closure ‘was prompt and everyone was taken by surprise ... The only thing available for them (the ex-miners) to find an income was to fall back on farming’ (Town Clerk, 2011).

In response to the identified need to gauge the role which UA plays as an urban survival strategy in the Copperbelt, and whether policy initiatives in Ndola are having an impact, a successful application was made for research support to the NZAID programme in New Zealand, leading to the undertaking of the research investigation in 2010-13.

Research Aims and Methodology

The primary aim of the research investigation was to assess the significance of UA among poor households, both for its nutritional and income value, particularly since a considerable proportion of food production is often undertaken by women. The degree to which policy changes are or might make a tangible difference in the practice of UA was also assessed. The research then focused on possible support mechanisms, both in the shape of policy directives, such as those introduced in Ndola, and also in terms of tangible support which UA producers identify as crucial to increasing their production and enhancing the sustainability of their household livelihoods.

The study also identified the following objectives:

- 1) What recent economic changes have affected Copperbelt Province?
- 2) Why are certain communities (geographical, economic, gender, age) in Copperbelt Province increasingly attracted to UA?
- 3) What is the significance of UA in household food security and in sustaining livelihoods relative to other livelihood sources, especially for poor and HIV/AIDS affected households.
- 4) Why has Ndola acted pro-actively to support UA when other cities are much less supportive?
- 5) To what extent is there a match between available support and the needs of UA practitioners?
- 6) What operational challenges are impacting upon the institutionalization of support for UA?
- 7) How might livelihoods evolve in the future and what are the needs of UA?
- 8) What lessons can the Copperbelt and, more specifically, Ndola’s experiences, provide in developing appropriate measures to support UA elsewhere in Sub-Saharan Africa and beyond ?

Using funds granted from the NZAID programme the researchers initiated a research project in 2010 which engaged a PhD research student from the University of Otago, Jessie Smart, who played a key role in both data collection and analysis. In addition, collaborative links were established with the Copperbelt University in Kitwe, the University of Zambia in Lusaka, the Ndola City Council, the Ndola branch of the national Ministry of Agriculture and local NGOs, notably the 'Seeds of Hope' NGO based in Ndola. A research team of 7 local students was recruited to assist with survey administration. In total, 58 key informant interviews were undertaken, 679 households were surveyed to gauge whether they were practising UA, and 326 questionnaire surveys were administered in purposively selected residential areas in the cities of Ndola and Kitwe (selected on the basis of being the region's biggest industrial and mining centres respectively), and Luanshya (selected because it is the town which has experienced the greatest loss of employment on the Copperbelt following rationalization of the mining industry).

Key Findings

This research investigation has revealed some striking findings concerning the practice of UA in the Zambian Copperbelt. The magnitude of the economic and employment loss which took place following rationalization of the mining industry and the associated collapse of the manufacturing sector, have meant that urban residents were often forced into destitution and, given the long-established urban nature of settlements, this meant that for many households there are no longer any rural homes to return to. Urban Agriculture has clearly become popular as a low risk option to meet subsistence needs and to supplement income, however UA appears to be perceived as holding the lower status of informal sector employment as most respondents would prefer paid formal employment but indicated an unwillingness to risk investment or collateral in more formal business ventures.

Key findings from both the survey and key informant interviews revealed the following issues;

- 1) The practice of UA is widely regarded as one of the few logical responses to the scale of the economic collapse which affected the area. In the survey, it was established that only 44% of responding household heads are employed in the formal sector, the balance being unemployed or self-employed in the informal sector, suggesting that survival strategies such as UA play a significant role in the area. High levels of economic insecurity prevail in the area with 50% of respondents indicating that they suffered from economic stress, including job loss, while 56% believed that they are not economically secure.
- 2) Crush *et al* (2010) found that rates of practising UA in 10 cities in southern Africa averaged around 22% of households. The present study, by contrast, based on detailed street level interviews and surveys, discovered UA practising rates of 84%, which is

significantly higher than levels recorded in published surveys undertaken elsewhere in Africa. . This in itself is one of the study's key findings. In Luanshya, we recorded some 93% of surveyed households were engaged in UA (94% in low density areas; 91% high density). In Kitwe, the corresponding figures show an average participation rate of 83% (low density 94%; high density 72%), whilst in Ndola a 78% average was recorded (low density 81%; high density 76%). The remarkably high figures in Luanshya and Kitwe are probably directly attributable to the loss of mine jobs (Musasa, 2012; Key Informant interview). The relatively lower figures in Ndola are probably due to the fact that the city's economy has always been more diversified and less dependent on the vulnerable mining sector.

- 3) The above findings indicate that low density areas (i.e. wealthier areas) have higher levels of practising UA, showing that the middle class have also been affected by the economic downturn. This endorses the findings of Webb (2011) and Crush *et al* (2012) who note that better resourced, middle income people often have better access to land and resources to farm, than low income households. The study indicated that issues of yard ascetics and business skill development to raise the status of UA was potentially more of an issue for this middle class sector.
- 4) Overall, some 90% of respondents indicated that they practice UA to supply food and income, and only 10% regard it as a recreational activity.
- 5) In terms of gender issues, 45% of the heads of households practising UA were women, emphasising the key role they play in single parent families and in the domestic economy which seldom receives the necessary levels of support. In addition, high levels of dependency prevail within households, which have an average of 5.8 dependents and in some cases this can be as high as 12.
- 6) In the Copperbelt study it was found that 90% of respondents practice UA to produce food and save money. Some 50% of practitioners were forced into UA because of economic stress and/or job loss. As a result, some 67% are now 'food secure' and 63% can meet their basic needs. These considerations emphasize the value of UA as a viable alternative to economic crises and job loss.
- 7) Another key finding from the study was the reality that UA is a not insignificant provider of employment. In total, the 326 households interviewed had employed 467 people and the farmers had been engaged in UA for between 6-15 years.
- 8) Sales figures from UA are higher than have been noted elsewhere in research undertaken in Africa, with some 37% of practitioners selling some of their produce, whilst 39% of those who sell produce have UA as their primary source of income, and for a further 44% it was the second most important income source.
- 9) In terms of food security, it was found that in the households surveyed, UA supplies 49% of UA households' vegetables and 45% of their maize. Of the food produced, the households consume 63% of the maize crop and 72% of vegetables. They give away 12 % (maize) and 13% (vegetables), and sell 23% (maize) and 12% (vegetables).

- 10) To date, minimal state support has been received by UA practitioners and there exists a strong desire for state assistance with extension support and for land and water access.

A key aspect of the research project was a detailed investigation into the very distinctive case of UA policy support which has been initiated in Ndola. The project team are not aware of any similar policies elsewhere in Africa. The field-based research indicated that external Dutch NGO involvement, high levels of local engagement, and proactive support from the Ministry of Agriculture had helped to drive an ambitious policy development process which culminated in the formal adoption by Ndola City Council of a UA policy in 2010. Key elements in the policy include proposed support for land and water access, marketing and extension support, training and advocacy. Sadly, as our research and the 2013 follow up shows, policy has been difficult to implement because of a lack of wider awareness of the policy locally, lack of funds and resources, sector group meetings struggling to achieve single objective agreements and resourcing challenges, and the subsequent disengagement by the supporting Dutch NGO. Despite this, however, one of the key outcomes has been the active support which the Ministry of Agriculture has been able to provide in the urban area. In the next section of this report some policy recommendations are identified based on the field surveys and knowledge of the policy process in Ndola.

Policy recommendations

This study has identified a set of clear policy recommendations for Ndola and for other cities which wish to support UA. Although tacitly supporting UA, Luanshya and Kitwe do not have formal support processes in place, so these recommendations are equally relevant to these two urban centres. These suggestions should be read in conjunction with the recommendations of the FAO (2012) and Crush *et al* (2010) (see final section of this report).

The key recommendations emanating from the present study are as follows;

a). Ndola;

In terms of the way forward for Ndola, even though allocating additional resources and finances to UA is the logical answer, the reality is that the Council is ill-positioned to afford such expenses. As a direct result, the way forward may in fact be more grass-roots based and focus on encouraging local interest and awareness and supporting self-action by UA participants and encouraging their input in conjunction with other parties.

- Continued encouragement of the positive actions of the Ministry of Agriculture, these include extension support, in particular in urban situations. This should take the form of advice about matters such as water harvesting, composting, nutritional crop knowledge, contamination management, UA business development and the distribution of farm inputs such as fertilisers.

- Actively ensuring that local citizens are aware of the city's support of UA and its adoption of a tolerant approach in terms of access to land and non-destruction of growing crops.
- As noted by the Ministry of Agriculture, the existence of formal policy helps to assure land designation and avoid conflict. In parallel, it is recommended that UA needs to be incorporated into formal physical planning processes.
- Investigating whether by-laws may be amended and what the legal obstacles are in terms of national law.
- Helping to provide better market access to UA farmers.
- Incentivising and encouraging the private sector to utilise UA produce.
- Providing access to business skills in UA as a low risk option to achieve income enhancement and thereby increasing the status of UA.
- Encouraging local stakeholder forums which network key providers and practitioners in the field and which can lobby local government and initiate self actions to support UA activities.
- Developing access to seed funding with lower collateral requirements and flexibility in payments.
- Seeking and incentivising joint funding and contributions from other parties, for example from large business interests, to support seed funding, networking, training, marketing and research.
- Providing advice on sales, marketing, processing and preserving food is needed.
- Encouragement of local NGOs such as Seeds of Hope, who have some capacity, through international donations, to provide UA training and supply water to UA through sinking boreholes.
- Links between the NGO's, City Council and Ministry of Agriculture must be strengthened to better service the needs of UA practitioners.
- Research is required to provide evidence of links between UA, malaria and contamination by mine activity and sewage.
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b). Lessons for other cities;

- UA is an urban reality and a key source of food security and income which needs to be both recognised and supported, especially in an era of growing global food shortages and rapid urban growth, as identified by the FAO (2012).
- Local awareness of the key role which UA can and does play in urban food security and what support is available locally is essential.
- Cities can play a key role in supporting UA, but they will need to have the resources, staff and funds in place to push through with desired actions.
- Cities must collaborate with a range of stakeholders, and need especially to work collaboratively with the local branch of the Ministry of Agriculture and NGOs to maximise impact.

- Participants must be encouraged to self initiate solutions within their individual areas of responsibility, rather than seeking unanimous agreement. Sector UA participant groups, including private companies involved in distribution to and from UA participants, should be encouraged.
 - Donor support plays an important role, but donor dependence must be avoided.
 - Restrictive by-laws need to be identified and adapted where possible.
 - Considerations of land access and tenure, water supply and market accessibility are critical and need to be factored into support mechanisms.
 - Support for UA needs to be incorporated into urban physical planning processes through the formal provision of land for urban farming.
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THE SIGNIFICANCE OF URBAN AGRICULTURE IN FOOD SECURITY AND SUSTAINABLE LIVELIHOODS IN RESPONSE TO ECONOMIC RESTRUCTURING IN ZAMBIA'S COPPERBELT PROVINCE

1) INTRODUCTION

The rapid growth of cities, particularly in the global South, has in recent years been identified as one of the greatest challenges facing humanity. It is not only the speed of growth which is a challenge, but the reality that this growth is taking place in a context of poverty and under-resourced state services, leading to the phenomenon of the 'urbanization of poverty'. Unlike in countries of the global North, many urban residents are forced to become totally self-reliant in a range of basic services including housing, employment and food supply within a context of what is often the near absence of state infrastructure, housing and social services. While self-employment and self-provision of housing, more specifically referred to as the 'second economy' or the 'informal sector', has been recognised as a reality which has enjoyed some degree of recognition, if not explicit support, in the South for decades. However, the supply of food within urban areas is a practice which is less widely acknowledged practice or supported. Despite this, it is apparent that in many cities in the South, the growing of food or the rearing of animals within or on the periphery of urban areas is a vital source of food supply and often a significant source of remuneration for urban households. It is believed that some 50% of urban food needs are met by producers within the urban boundaries. Generally known as 'Urban Farming', 'Urban Agriculture' (UA) or 'Urban and Peri-Urban Agriculture' (UPA), the practice is gradually being recognised as critical to sustainable and successful urban growth and household survival. This is particular so in a global era marked by rapid urbanization, growing global food shortages, rural land overcrowding and degradation, foreign 'land grabs' and weak economic performance. Such practices now enjoy the active support of the FAO (UN Food and Agricultural Organization) who argued that UA supplies food to millions and creates jobs for thousands. As a direct result, FAO argues that 'African policymakers need to act now to steer urbanization from its current, unsustainable path towards healthy "greener" cities that ensure food and nutrition security, decent work and income, and a clean environment for all citizens' (FAO, 2012, p.i).

What is UA?

Urban agriculture (UA) refers to the "growing, processing, and distribution of food and non-food plant and tree crops and the raising of livestock, directly for the urban market, both

within and on the fringe of an urban area” (Mougeot, 2006: 4).¹ Although not without its detractors, urban agriculture is widely acknowledged to be a significant economic activity and contributor to food production on an international scale. In a global context of ever increasing urbanisation, economic instability and environmental degradation, urban agriculture seems to provide a possible, although significantly only partial, solution to the increasing difficulties created by growing urban populations, especially those in the developing world. The belief in the potential of urban agriculture as a development strategy is linked to its encompassing nature. It is suggested that if properly supported by official institutions, urban agriculture could strengthen the link between the social, economic and environmental concerns of modern urban life. Connections between urban agriculture and health, food security, income generation and environmental management have been observed in many cases in both the developed and developing world.

Of particular note is the apparent importance of the practice as a coping strategy in times of economic crisis. In general, agriculture has been observed to be one of the most popular strategies mobilised during urban economic hardship, whether located in the city proper or in rural areas (Owusu, 2001). Urban agriculture has been found to increase in prevalence during times of crisis, with urban residents using any available space in order to mitigate the effects of economic decline. As the primary concern of development studies is the plight of the poor, the majority of the research on urban agriculture and crisis describes the practice as a survival strategy in the face of poverty and hunger. However, the significance and pervasiveness of UA for disadvantaged and marginalised sectors of urban society has more recently been brought into question. Case study evidence has emerged that in southern Africa, the ‘poorest of the poor’ are not as engaged in urban agriculture as initially thought, and the benefits of engagement in terms of nutrition or income are not as expansive as have hitherto been put forward (Crush *et al.*, 2010; Webb, 2011). Further, drawing on evidence from African cities which were hard hit by economic crisis and structural adjustment during the 1970s, 80s and 90s, it has been found that agriculture is one of the most important livelihood strategies for urban residents in the middle or professional class (Owusu, 2001). For these groups, multiple livelihoods are drawn upon to prevent further decreases in household living standards and, once the crisis has abated, strategies such as UA continue to be used to maintain or improve living standards.

UA Challenges

Despite the widespread acknowledgement of the importance of UA, it is a practice which is seldom acknowledged by policy makers, with authorities in the South often treating it as a rural practice which is believed to be ‘unsuited’ to the modern city. In addition, it is often

¹ The terms urban agriculture, peri-urban agriculture, urban gardening, urban farming and urban cultivation will be used interchangeably to refer to any farming or gardening activity which is either in or around an urban setting. Further comprehensive definition of scale, activity and location will be provided in the literature review.

associated with the challenges of alleged health risks and questionable access to land. At a broader level, given seasonal variations in the practice, the fluid nature of the way in which it is practiced, and uncertainties about the degree to which urban residents rely on it, certain issues are apparent regarding its characteristics and how to support it. These include;

- Uncertainty regarding what percentage of urban residents practice UA and what percentage of urban food requirements it provides?
- Who practices it, and is it practiced by only certain income groups in the population?
- Has the practice become more significant in recent years in light of rapid urbanization and the poor economic and employment prospects which prevail in many countries in the South?

The Zambia Case Study

The country of Zambia, and more specifically the cities in the mineral rich province of the Copperbelt (see Figure 1), were selected as an ideal case study of the practice of UA for the following reasons;

- The area's long history of urbanization which led to the area being one of the most urbanized in Africa in the mid-20th century.
- The long established nature of UA and limited tolerance of the practice in the region.
- The dramatic nature of the country and the Copperbelt's economic collapse from the 1980s with an associated shedding of tens of thousands of mining and industrial jobs which has forced urban residents into high levels of dependence on the informal sector and UA. This dependence on UA which is arguably more so than in other countries, is because of the long history of urbanization in the area which, after several generations severely restricted the ability of urban residents to return to former rural homes, or to seek rural resources to support them in the cities. The result has been the *in situ* escalation of urban poverty and, by implication, the generation of a higher than average dependence on UA. Despite its considerable mineral wealth, in 2011, Zambia's HDI (Human Development Index) was rated at 0.43, placing it at the 164th position out of 187 reporting countries. Whilst this was a slight improvement over the 1980 score of 0.401, what the figures mask is that between 1980 and 2011 life expectancy in Zambia fell from 52 to 49 years, and per capita GNI fell from US \$ 1415 to \$1254 (UNDP, 2011). In 2012, it was reported that 64% of the population was living below the poverty line (CIA, 2012), while in the preceding year it was estimated that 82% of the population were surviving on less than \$2 / day (Population Reference Bureau, 2012). This poor economic and social welfare performance requires urgent attention through carefully targeted initiatives which can improve human welfare, employment levels and nutritional status.

- The fact that the city of Ndola was one of the first cities in Africa to recognise the importance of UA, to pass supporting policy, and to engage in direct support of the activity, provides a useful case study in terms of identifying what form UA support might take in African cities, what opportunities and constraints 'official' support for UA might experience and, significantly, whether these support mechanisms are replicable in other cities in the South.

The Funded Project

With the above arguments in mind, the researchers successfully secured support from the NZAID Programme of the New Zealand Government's Ministry of Foreign Affairs and Trade to fund a study entitled:

The significance of urban agriculture in food security and sustainable livelihoods in response to economic restructuring in Zambia's Copperbelt Province

The project was designed with the following aim and objectives:

The primary aim of the research will be to assess the significance of UA in poor households both for nutritional and income reasons, where a considerable proportion of food production is often undertaken by women. The degree to which policy changes are or might make a tangible difference in the practice of UA will also be assessed. The research will then focus on possible support mechanisms, both in the shape of policy directives, such as those introduced in Ndola, and also in terms of tangible support which UA producers identify as being crucial to increasing their production and enhancing the sustainability of their household livelihoods.

The study also investigated the following objectives:

1. The nature of recent economic changes in Zambia's Copperbelt Province.
2. Why are certain communities (geographical, economic, gender, age) in Copperbelt Province increasingly attracted to UA?
3. The significance of UA in household food security and sustaining livelihoods relative to other livelihood sources, especially for poor and HIV/AIDS affected households.
4. Why has Ndola acted pro-actively to support UA when other cities are much less supportive?
5. The match between available support and the needs of UA practitioners
6. What operational challenges are impacting upon the institutionalization of support for UA?
7. How might livelihoods evolve in the future and what are the needs of UA?
8. What lessons can the Copperbelt and, more specifically, Ndola's experiences provide in developing appropriate measures to support UA elsewhere in Sub-Saharan Africa and beyond?

Using funds secured from the NZAID programme, the researchers commenced a research project in 2010 which engaged a PhD research student from the University of Otago, Jessie

Smart, who played a key role in both data collection and analysis. In addition, collaborative links were established with the Copperbelt University in Kitwe, the University of Zambia in Lusaka, the Ndola City Council, the Ndola branch of the national Ministry of Agriculture and local NGOs, in particular, 'Seeds of Hope'. A research team of 7 local students was recruited to assist with survey administration. In total 58 key informant interviews were undertaken, 679 households were surveyed to gauge whether they were practising UA, and 326 questionnaire surveys were administered in purposively selected residential areas in the cities of Ndola and Kitwe (selected on the basis of being the region's biggest industrial and mining centres) and Luanshya (selected because it is the town which experienced the greatest loss of employment following rationalization of the mining industry) (see Figure 2).

Plan of the Report

The report presents the following information;

- Literature on UA is discussed.
- The significance of recent economic developments in Zambia and Copperbelt Province are discussed in light of the historical and urban significance of the area in Africa.
- The methodology employed in the study is outlined and dissemination of the study's findings is discussed.
- Key findings from the surveys and interviews are presented.
- Policy related issues, drawing on the experience of Ndola are then explored.
- Key conclusions and recommendations are discussed.

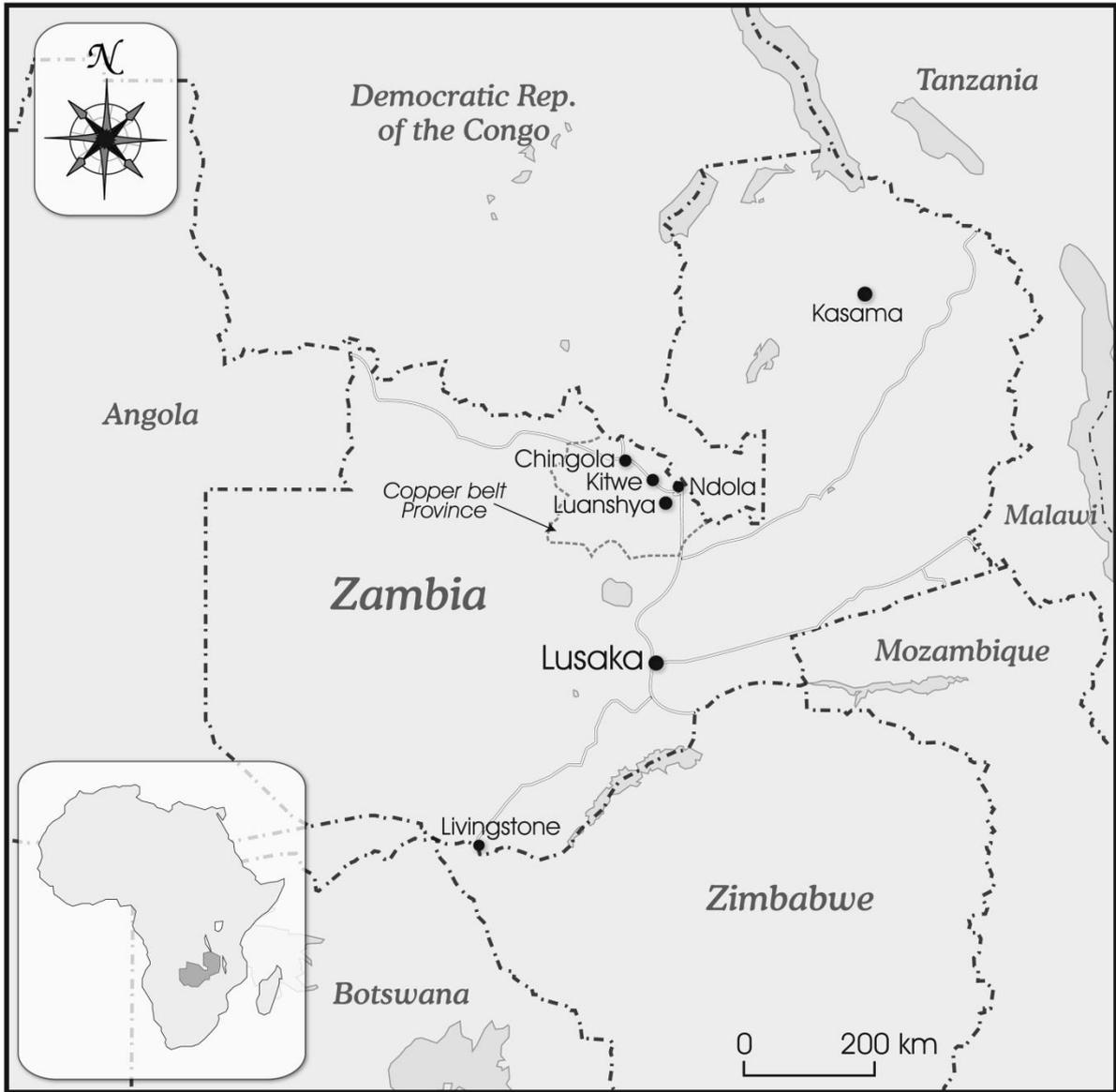


Figure 1: Zambia and Copperbelt province

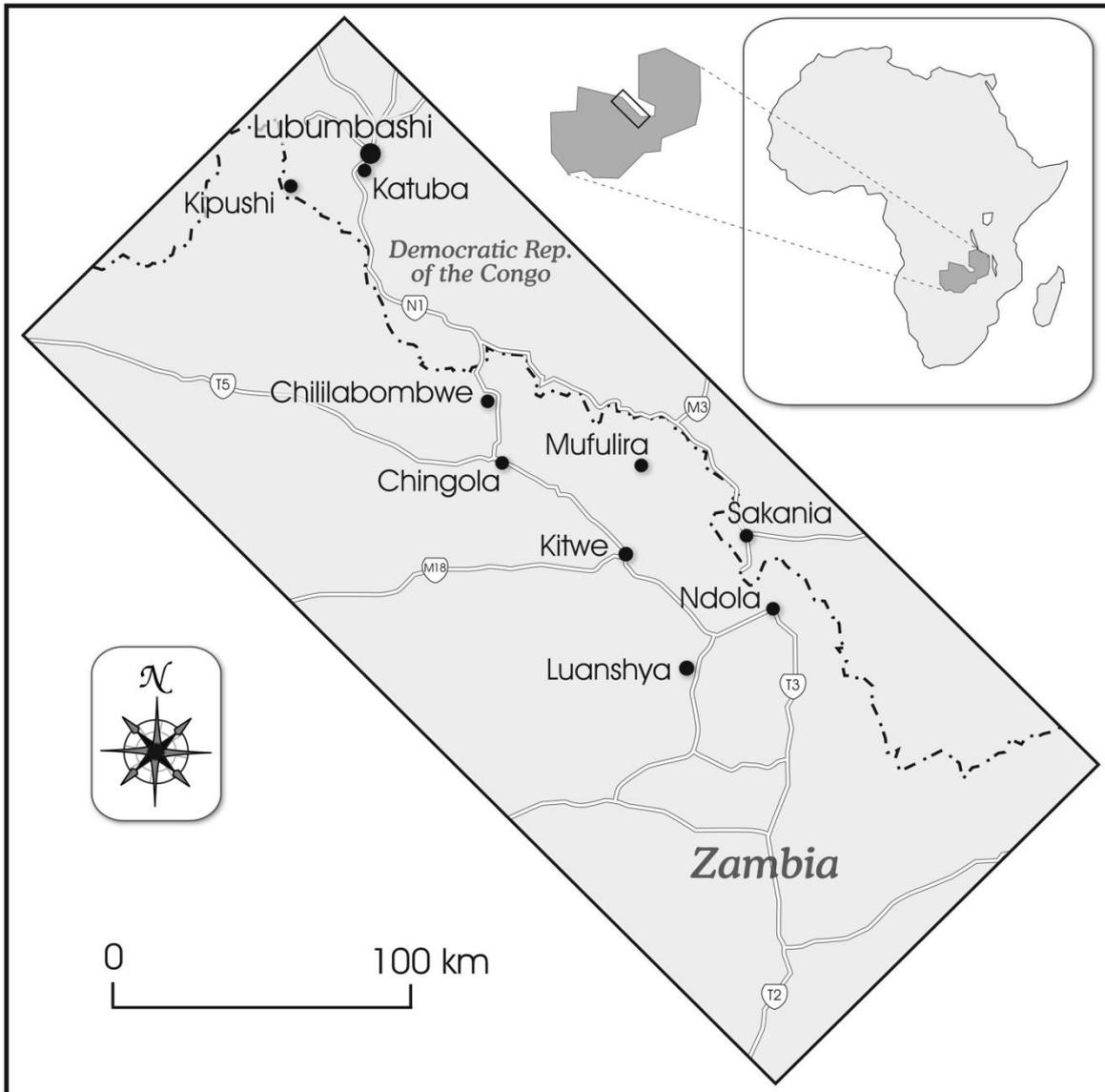


Figure 2: The Copperbelt

2) LITERATURE REVIEW

Rapid urban growth and the role of UA

At some point during the last few years an unseen, but not unnoticed, event marked a turning point for humanity. For the first time in history, the world's urban population exceeded the size of its rural population (Steel, 2008). Mankind is now a predominantly urban society and, if future predictions are correct, the urban proportion of the population could reach as high as 80% by 2050 (Steel, 2008). While this may be a somewhat generous projection, as the level of such figures vary, it is indisputable that rapid urbanisation is taking place in the world around us.

What is particularly worrying is, not that the urban world is continuing to grow, but that the majority of future growth will occur in the developing world. The total population of the developing world already exceeds that of the developed by approximately 1.3 billion people (UN-HABITAT, 2006). While the urban population of the developed world is currently growing at a rate of around 0.54% per annum, the urban population in the developing world is growing at five times this rate, at 2.53% (UN, 2008). Sub-Saharan Africa holds the record for the highest annual urban growth rate of 4.58%, more than twice that of the global average of 1.98% (UN-HABITAT, 2006; UN, 2008).

Not only are the rates of urbanisation presently found in the developing world much higher than ever experienced in the developed world, the size of their base populations is also much larger (Potter, *et al.*, 1999). In 1950, during the peak of the developed world's urban growth, urbanisation was at just 2.33%, comparably almost half of that which is currently seen in Sub-Saharan Africa (UN, 2008). This represented a numerical increase in the urban population of approximately 10 million per year (UN, 2008). At present, cities in the developing world are gaining on average 5 million people per month (UN-HABITAT, 2008).

In the developed world, both overall and urban growth rates are now in steady decline (UN, 2008). In light of the predictions above, it is frequently stated that the majority of future growth will be in the developing world. Asia and Africa are expected to dominate urban growth throughout the next thirty years, with 95% of the growth in the world's poorest regions being accounted for by the cities of this region (UN-HABITAT, 2006). In terms of scope, this review will be focusing on the difficulties faced in the urban regions of the developing world where rapid urbanisation is proving increasingly hard to manage.

The expansion of cities has already caused an array of development challenges throughout the globe, and in the developing world this exponential growth is happening within a context of declining institutional and financial capacity (Smit, *et al.*, 1996). The issue of the growth of slums illustrates this point. Globally, many cities are unable to formally house their growing populations. However, this issue is much more pronounced in the developing world than the developed (Mougeot, 2005).

By 2005, the population of slum dwellers had almost doubled in Sub-Saharan Africa, reaching 199 million and representing 71.8% of the urban population (UN-HABITAT, 2006). Globally, more than 1 billion people already live in informal settlements (Mougeot, 2005).

Slums are expected to be the predominant form of housing in the developing world in the future, and if current trends continue, numbers may reach as high as 1.4 billion within the next decade (UN-HABITAT, 2006).

In many nations, the combination of in-migration and local population growth has long surpassed the ability of city authorities to provide even basic services or infrastructure such as housing, water or sewage management systems (Cohen, 2006). The lack of access to safe and affordable water and sanitation can seriously affect the health of the urban poor (UN-HABITAT, 2008). Without proper management, pressure on necessities such as food, housing and water can become pushed beyond breaking point.

Rapid urbanisation creates many adverse conditions which can make the city an unpleasant and difficult place to live. Already, in both the developing and developed world the environmental effects of urban living are visible to varying degrees. Whether in relation to household rubbish or sewerage, waste management is a particularly concerning issue in the urban environment (Pinderhughes, 2004). Insufficient waste-water management can lead to serious degradation of waterways especially during the dry season when there is not enough rainfall to dilute contaminants (Binns, *et al.*, 2003).

Urban agriculture (UA) has arisen as a possible, although significantly only *partial*, solution to the increasing difficulties posed by growing urban populations. Although growing food in and around the city is a longstanding practice, academic research on urban agriculture is a relatively new phenomenon. Since the 1980s, urban agriculture has secured its place on the development agenda to become a key focus of many programmes on an international scale (Mougeot, 2006). As interest increases and more examples become apparent, the capacity and importance of urban agriculture has become increasingly acknowledged (Mougeot, 2005).

UA definitions: Complex meanings and understandings

Like many of the key concepts used in the discourse of development, a simple definition of urban agriculture has been difficult to find. The importance of the development of a conceptual framework, and thus definition of the elements involved in urban agriculture, has been emphasised (Mougeot, 2000). As such, a number of definitions have been developed and used within the available literature and there are a few common themes which can be found throughout. However, many problematic issues remain inherent within the delineation of the parameters of urban agriculture.

Before expanding on these common themes and problematic aspects, we will draw on two of the most succinct definitions. Smit, *et al.* (1996) defines urban agriculture as:

'an industry that produces, processes and markets, food and fuel, largely in response to the daily demands of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intense production methods, using and re-using natural resources and urban wastes, to yield a diversity of crops and livestock.'

This definition is referred to and revised in Mougeot's (2000) review to include a distinction between and inclusion of both urban and peri-urban agriculture, as well as to emphasise a number of additional elements. In this revised definition, Mougeot (2000) proposes that:

'UA is an industry located within (intra-urban), or on the fringe (peri-urban) of a town, a city or a metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services to that urban area.'

Continuing this process, a later edited collection of research papers on urban agriculture published by the International Development Research Centre (IDRC), acknowledges Mougeot's definition as being widely used for 'technical and training purposes' (Mougeot, 2005). This short evolution of ideas draws attention to the fact that such a definition is in no way a static or rigid concept. Over time, with the addition of new applications of the term, new pieces of information and understanding will provide additional aspects to the definition of urban agriculture (Mougeot, 2005).

Urban and Peri-Urban Agriculture

'Place' is a defining feature of urban agriculture. The fact that it is practiced in the urban environment gives urban agriculture unique characteristics and issues, which are considerably different from its rural counterpart. However, it has proved hard to delineate a firm spatial boundary to distinguish between what constitutes rural, peri-urban and urban agriculture. Such static boundaries would theoretically require clear, unproblematic ways of knowing where the 'city' stops and the 'country' starts. The reality of the complex relationships between urban and rural space make this a near impossible task.

The inter-linkages and facets of these relationships are not fully understood, reinforcing their complexity. Interactions between the urban and rural through the movement of people, money, ideas, food and natural effects are largely under-examined and at times unacknowledged (Lynch, 2005). Furthermore, the steady outward sprawl of traditionally urban activities can confuse understandings of urban and rural space when traditionally 'urban' activities are pushed further into the rural hinterlands of the city and vice versa.

In terms of location, the definition of urban agriculture is less problematic than its peri-urban counterpart (Mougeot, 2000). In saying this, the boundaries between the two can be incredibly blurred. There is no officially agreed set of limits used to define the difference between the two, but criteria which have been used have included the level of rural or urban influence on a particular area, population densities or size, and city limits or municipal boundaries.

Additional elements of differentiation and definition

A number of activities are included under the umbrella of 'urban agriculture'. What is important to note is that urban agriculture is not limited to the cultivation of fruit, vegetables and other food generating plants. Examples of urban agriculture include; general horticulture; aquaculture for both ornamental and eating fish; arboriculture and the gathering of nuts and other products for fuel or small-scale industry; apiculture for honey and wax; vermiculture, including silkworms and worms for composting or fodder for chickens; livestock rearing and husbandry with guinea pigs, rabbits, goats or cattle; poultry for eggs and meat; medicinal plants and herb; mushrooms; beverage crops for herbal teas and alcohol; flowers from ornamental horticulture, and even snails (Egziabher, 1994; Smit, *et al.*, 1996; Pinderhughes, 2008). While this list may seem extensive, it is but a brief snapshot of some of the instances of urban agriculture found in cities around the world.

Urban agriculture can be found in open spaces, vacant lots, rooftops, windowsills, back yards, roadsides, public and private land and community gardens - ultimately any space which can be utilised usually is (Smit, *et al.*, 1996; Pinderhughes, 2008). Furthermore, urban agriculture is practiced for different purposes and at various scales. There are many cases of larger scale, entrepreneurial UA with commercial intentions (Greenstein & Sungu-Eryilmaz, 2004). In this review, emphasis will be placed on UA practiced on relatively small scales, cultivated for the home and market. This level of urban agriculture is usually practiced by low income producers for whom UA is a necessity, essential to the family's survival.

It is clear that urban agriculture incorporates a range of locations, activities, methods and purposes. This wide reach influences the complexity of the limitations faced and challenges posed for the future practice of urban agriculture. However, the broad scope of urban agriculture also contributes to the practice's usefulness as an appropriate strategy for more holistic and integrated solutions to urban development challenges.

The evolution of urban agriculture: A historical perspective

For some, when combined, the words 'urban' and 'agriculture' would seem an oxymoron. However, it is important to note that in reality the practice of food production within the city has been an integral part of city life throughout history. Numerous discoveries have been made of intricate, and at times large-scale, agricultural systems in and around the cities of ancient civilisations around the world, such as Rome, Persia and the 15th century Incan settlement of Machu Picchu (Smit, *et al.*, 1996; Vijoen, 2005; Mougeot, 2006).

In the Global North, formally supported UA has often been in response to economic crisis. The British Allotment Act of 1925 and Victory Gardens of the Second World War, the War Gardens of Canada, and Shrebergaertan in Germany after the Second World War, were all supported by governments in an effort to alleviate the difficult circumstances of the time and improve food security (Mougeot, 2006; Deelstra & Girardet, 2000). In the Second World War Britons were urged to 'Dig for Victory' and the system of community allotments still exists in the UK and continues to be economically viable with a range of other valuable environmental and social benefits (Perez-Vazques, *et al.*, 2005).

Although such examples exist, official policy has somehow largely developed a negative attitude towards agriculture in areas traditionally deemed as being 'urban' (Pinderhughes, 2004). New understandings of what constituted appropriate urban behaviour developed alongside technological advancements in the fields of transportation and the industrialisation of agriculture (Steel, 2008). With the spread of the colonial civilising mission, traditional food systems, both rural and urban, became highly visible symbols of backwardness, irreconcilable with the values of modernisation and progress (Hough, 1995). In extreme cases, urban agriculture was made illegal, as it was perceived as an inappropriate and unsightly activity for the urban environment (Asomani-Boateng, 2002; Simatele & Binns, 2008).

These advances have meant huge changes in the way people who live in cities obtain food to eat. The exceptional economic growth which has marked the post Second World War period has resulted in people buying food rather than producing it (Deelstra & Girardet, 2000). These shifting patterns of consumption have worked to diminish the visibility of the links between urban and rural areas (Hough, 1995). Today, this is especially apparent in the developed world, where many urban dwellers are entirely unaware of the gargantuan effort it has taken for products to reach the primary mode of food access, the supermarket.

From Ecuadorean mangoes, to green beans from Ethiopia, the products stocked in the supermarkets of the Global North have travelled inconceivable distances to get to the table (Steel, 2008). Any season, any food, year-long availability and convenience has become commonplace for many in developed nations, while the environmental costs grow and hunger continues to be a major problem for the poor throughout the world (Steel, 2008). In saying this, the urban population is not entirely unaware or apathetic to these issues and backlash against the lack of sustainability of food production and consumption networks can be seen. Growing environmental and economic concerns can be traced through the increasing popularity of organic and free-range produce, 'buy local' movements, community gardens, farmers markets, and concepts such as 'food miles' and 'ethical eating' (Steel, 2008).

In the developed world, although it has largely ceased to be a necessity, many cities have made the connections between the practice of UA and the encouragement of other values such as resource recycling & conservation, education and community development (Mougeot, 2006). In cities which have acknowledged these links, supportive and positive policy direction which recognises the importance of urban agriculture is increasingly present in city planning (Mougeot, 2006). However, although progress is apparent, many urban centres are yet to acknowledge the benefits of such initiatives.

Many cities in the Global South still have extensive and often informal urban food production systems functioning within their borders (Smit, *et al.*, 1996). Although levels of support vary considerably, urban agriculture has been recognised by some as an integral part of the overall food supply network of the city. With a long history of urban agriculture, many cities in China have achieved large-scale, non-grain self-sufficiency in light of the positive integration of food systems into urban planning (Smit, *et al.*, 1996; Pinderhughes, 2004; Steel, 2008).

Today, with the effects of the global financial crisis we are seeing a resurgence of interest in household food production and self-sufficiency in both the North and the South. Residents of cities all over the world are feeling the pressure of the global recession and economic climate not dissimilar to that of the Great Depression of the inter-war period. Ironically, for the first time since World War Two, a vegetable garden has been dug on the grounds of the White House (*BBC New Online: Americas*, 20 March 2009). Closer to home in New Zealand, garden centres report rising sales and are persistently selling out of food producing plants (Barry, 2008). With the legitimacy and sustainability of the consumption trends of the Western world frequently questioned, and the development of the Global South a concern for us all, the relevance of urban agriculture seems to be ever increasing.

The scale and practice of UA

In the last two decades, there has been a good deal of empirical research undertaken on the phenomenon of 'urban agriculture' in African towns and cities (see, for example Mougeot (ed.), 2005). UA in Africa usually involves the growing of crops (grains, vegetables and fruit) within the built-up area, most commonly in 'gardens' within family compounds or in vacant plots. Evidence suggests that urban agriculture can make a significant contribution to ensuring food security, particularly among poor households, as well as generating household income and providing work in situations where there are high rates of unemployment. Structural adjustment programmes, leading to retrenchment of civil servants and others, have been an important factor in the growth of urban agriculture. There is also evidence to show that some of this food is sold in urban markets, helping to satisfy growing consumer demand in Africa's burgeoning cities, and also providing valuable financial rewards for producers and sellers (Binns and Lynch, 1998; Ellis and Sumberg, 1998; Lynch, Binns and Olofin, 2001, Simatele and Binns, 2008). A survey conducted in the late 1990s by Smith in a number of West African cities found that urban agriculture accounted for between 20% and 60% of urban household income and savings (Smith, 2001). In Nouakchott, Mauritania, urban agriculture covers over 150 hectares and is the only source of income for some 6,000 people (Cissé, Gueye and Sy, 2005). In light of the steep increase in the price of basic foodstuffs during 2007-8, it seems that urban agriculture has become an even more significant activity in many African cities.

A survey undertaken in 1996 in the rapidly growing northern Nigerian city of Kano (population c.3 million), discovered that considerable amounts of fruit and vegetables were being grown in and around the city. Most cultivators in Kano were men since, according to local Hausa Muslim law, women of child-bearing age must remain in seclusion. Whilst wealthy households and businessmen regarded fruit trees as a form of investment, resource-poor cultivators grew vegetables and fruit, mainly for home consumption and sale. One large area of cultivation in the city was located underneath the Federal Aviation Authority's transmission masts, an area that was opened up in the early 1980s with permission from President Shagari under his 'Green Revolution' initiative. Prospective cultivators must first seek permission from the Aviation Authority's officers, with land allocated on a 'first-come, first-served' basis. Vegetables and fruit were generally head-loaded or transported by bicycle to a local market on the southern edge of the production

site, though in some cases crops were sold directly to local consumers, market traders and middlemen (Binns and Lynch, 1998; Lynch, Binns and Olofin, 2001).

As in Kano (Nigeria), plot sizes in Lusaka (Zambia) vary in size, but are generally between 5 and 15 sq m. Typical crops grown are maize, cabbage, pumpkin, tomatoes, groundnuts, okra, beans, cucumber and sweet potato. As in Kano, household sustenance and income generation are the main objectives of urban agriculture in Lusaka. In Chilenje, a planned medium-/low-cost housing area in Lusaka, 30% of respondents interviewed between October 2004 and December 2006 reported that urban agriculture contributed 65% of their vegetable requirements. In the poorer centrally located settlement of Garden Compound, 48% of respondents said that urban agriculture provided 75% of all their vegetable requirements in the rainy season when these crops are mainly grown. A female respondent commented, 'Life in Lusaka has become difficult. Although my husband and I do not own land, growing our own food has helped us a lot because we are now able to feed ourselves and to save a bit of money for other things' (Simatele and Binns, 2008: 11).

The Eastern Cape Province of South Africa is one of the poorest regions of South Africa, with an estimated 72% of the population living below the poverty line, compared with a national average of 57% (Southern African Regional Poverty Network, 2004). In a field-based study undertaken in 2003-2005, in Grahamstown, Eastern Cape (population c.100, 000, including a black population of c. 85,000), Thornton found 1,080 occurrences of urban agriculture, some 947 of which were located in the 'black township' of Rhini, where most of the poorest and unemployed households live, and where 71% of households were subsisting on social welfare grants (Thornton, 2008). Urban agriculture, on small plots averaging 1-2 sq metres, was providing subsistence for the 'poorest of the poor', many of whom were attempting to survive on well under US\$100 per month. On average, the poorest households in Rhini saved up to US\$25 per month from growing food in their gardens, though social grants, and particularly old age pensions, provided the majority of poor households with the means to purchase food. These grants were especially important where there was a high proportion of people with HIV/AIDS who were unable to work. South Africa has a national HIV prevalence rate of almost 19% among the 15-49 age group (World Bank, 2008), and it is likely that the figure in poor townships such as Rhini is considerably higher. But Thornton's overall conclusion was that, despite South Africa's post-apartheid governments encouraging agricultural production by poor households on unused municipal or commonage land, the existing social security system seems to militate against this, whilst there seemed to be a particularly strong resistance to farming among young people which, Thornton suggests, 'links subsistence agriculture to the apartheid legacy of the homeland system' (Thornton, 2008:258).

Urban agriculture in the developing world

Official attitudes towards urban agriculture

In the developing world, supportive, or at least permissive, attitudes towards urban agriculture do exist. City officials in China have long understood the importance of urban and peri-urban production, and are often largely self-sufficient with intensive cultivation systems practiced adjacent to the city itself (Deelstra & Girardet, 2000). This official

recognition and inclusion in planning practice saw city boundaries enlarged to allow for the inclusion of urban agriculture and circumvents the issue of competition for other uses such as housing or industry (Mougeot, 2006).

In Latin America and the Caribbean, a number of cities have strong links with the International Development Research Centre (IDRC) in Canada, and important programmes enabling knowledge dissemination have been developed and refined (Mougeot, 2006). In particular, the IRDC supported a regional project which linked cities in Argentina, Brazil, Cuba, Ecuador, Honduras, Mexico and Uruguay. This project conducted in-depth research projects documenting the extent of UA and associated issues, as well as encouraging informal and formal interaction with municipal authorities (Mougeot, 2006).

In Cuba, when faced with dramatic economic hardship in the 1990s, the government turned to the people in a bid to make sure the nation did not starve (Altieri, *et al.*, 1999). Departing from communist ideals, law reforms loosened up restrictions on the sale of produce, the government supported seed banks and research into organic bio-controls (Steel, 2008). The use of land was carefully monitored and where unused, it was redistributed so all land available could be fully utilised. By 2003, the island nation, once dependent on outside help, was nearing complete self-sufficiency in terms of fruit and vegetable requirements (Steel, 2008). The project's success has made Cuba into one of the most commonly cited examples of successful integration of support and community involvement.

Within the research on urban agriculture, a good amount of case study evidence from Africa is available. Urban cultivation has long been an integral part of city life with examples to be found consistently throughout the continent (Smit, *et al.* 1996). With some of the worst development indicators, particularly among sub-Saharan nations, some cities are now showing an increasingly positive attitude towards urban agriculture. In the 1970s, amidst economic meltdown, some city authorities relaxed longstanding prohibition of the rearing of livestock, poultry and cultivation of indigenous crops (Asomani-Boateng, 2002). Pro-urban agriculture policies were followed in a bid to combat urban unemployment during Nelson Mandela's regime in post-apartheid South Africa during the 1990s (Smit, 2002). In the cities of these countries, authorities recognised the impact that even small-scale cultivation has in improving the lives of the poor and its considerable potential to alleviate more general urban pressures.

Although there are examples of supportive policy, urban agriculture has received remarkably little attention from policy makers (Hubbard & Onumah, 2001). Negative attitudes towards the practice mean that, although UA is a common practice, it has often been dismissed as a marginal or temporary activity which is regarded as inappropriate for the urban environment (Smit, *et al.*, 1996; Mougeot, 1999). For example, authorities in Pakistan argue that UA takes up valuable land which would be better used for other purposes, such as housing or industry, and have outlawed the practice (Hubbard & Onumah, 2001).

It has been documented that in many developing cities urban agriculture has been suppressed (Hubbard & Onumah, 2001; Sanyal, 1985; Simatele & Binns, 2008; Maxwell, 1999). This apparent 'hangover' from colonial times is generally based on

misunderstandings about the nature of urban cultivation and generalisations made in relation to rural behaviour (Smit, et. al., 1999; Mougeot, 2006). Although much evidence exists to suggest otherwise, it is still believed that UA is predominantly practiced by recent migrants clinging on to rural practices and demonstrates that those involved are not assimilated into urban life (Mougeot, 2006; Sanyal, 1985).

In addition to such ideas, there are a number of common misconceptions which are frequently used to argue against the practice of urban agriculture. These are mostly related to issues of health and safety, environmental degradation and improper or illegal use of land (Smit, *et al.*, 1996; Mougeot, 2006). These issues can often combine to create difficult conditions for urban agriculturalists. Security of tenure, access to resources and harassment through lack of official support, are cited as some of the common challenges for urban cultivators.

Health and Safety Issues

It is true that improperly managed urban agriculture can pose health and safety risks to cultivators and consumers (Smit, *et al.*, 1996). The risks associated with UA commonly include disease and poisoning, environmental contamination and the use of polluted waste water. In the following section, we will examine these hazards before looking at the possibility of avoiding these risks where they exist.

Some forms of UA are thought to provide breeding grounds for mosquitoes, and because of this have been strongly opposed by local government and health officials. This is especially true in East African towns where the cropping of maize may lead to increased instances of standing water, notably in the cobs and leaves of the maize plant (Egziabher, 1994). Since standing water provides a breeding ground for mosquitoes, and because malaria is one of the leading causes of death and illness in the developing world, these links must be taken very seriously. Although available evidence suggests that UA does not significantly contribute to malaria increase, these associations remain a key element of arguments against urban agriculture (Egziabher, 1994).

Other risks include the development of zoonotic diseases, which can be transmitted from animals and birds to people (Mougeot, 2006). Zoonotic diseases can develop when humans and livestock live in close proximity to each other. A recent example of this was the outbreak and spread of avian flu in a number of Asian nations during December 2003 (WHO, 2009). This disease can pass from poultry to humans and has a high fatality rate. Human cases of the disease caused widespread panic, although increased cases of human to human transmission have not led to the virus reaching the level of pandemic (WHO, 2009).

Disease caused by the exposure to contaminants and pathogens has also been associated with urban agriculture. Risk of exposure to such dangers can be increased by farming in urban areas and, with high levels of competition for suitable land, the poor are the most likely to have plots in unsuitable locations (Mougeot, 2006). Soil contamination through chemical and trace metal pollution can be found in previously industrialised sites, and untreated waste-water is often used to irrigate crops. The impacts of contaminated soils, pollution of waterways and the use of pesticides and sewage as fertilisers can be hazardous

to both the urban farmer and the surrounding community (Sanyal, 1985; Jaeger & Huckabay, 1986).

With water often scarce, but essential, untreated sewage is a cheap and easily accessible input for many urban farmers. This nutrient rich resource is a valuable and often free source of fertiliser and moisture, but is not without its dangers (Lynch, 2005). For example, some of the waste-water used to irrigate urban farms near Hubli Hospital in Hubli-Dharwad, India was found to be contaminated with various forms of surgical waste such as needles and syringes (Lynch, 2005). The use of sewage in urban agriculture, combined with limited amounts of clean water to wash produce, has been associated with outbreaks of cholera and other diseases through the eating of contaminated food (Smit, *et al.*, 1996; Simatele & Binns, 2008).

Many authors point to the dangers of chemical inputs, such as pesticides and fertilisers which, when improperly used, can be seriously detrimental to the health of both those using them and those consuming the contaminated produce. However, this is not an issue for many urban farmers, since expensive chemical products are frequently unobtainable or too expensive for low-income or small-scale producers (Mougeot, 2000). More intensive, commercially orientated agriculture, such as is found in Lomé, Togo, is more reliant on agrochemicals. Cases of farmers mixing poisons in potentially dangerous combinations, and the inappropriate and extensive use of chemical pesticides, have been connected to inexperienced or illiterate workers who work without protection and are exposed to high-levels of harmful chemicals (Lynch, 2005; Mougeot, 2006). In his study of the use of pesticides in Lomé, Tallaki (2005) points to several major constraints faced by market gardeners which cause the misuse of dangerous chemicals on their crops. These include; a lack of education and information, with gardeners unable to identify and treat pest problems correctly; the spread of pests through the close proximity of agricultural plots; and the high price of the recommended pesticides compared to cheaper ones with broad coverage (Tallaki, 2005).

Women and children are identified as the group which are at greatest risk from pesticide poisoning, as well as exposure to other contaminants and pathogens whilst working in the field (Lynch, 2005; Mougeot, 2006). This is a generalisation which does not take into account differences which have appeared in particular studies. These differences have been found to relate to social and cultural practices concerning the gendered division of labour (Tallaki, 2005). The division of labour within a particular place is often strongly connected to cultural norms and often dictates who does what in relation to farm work and income generating activities.

Available evidence suggests that those who raise concerns about potential health and safety issues are justified in doing so. In the developing world, urban farmers often live and cultivate in densely populated and largely unmonitored areas with limited access to health care or clean water (Mougeot, 2000). Food handling and hygiene practices, as well as crowded living arrangements, allow disease to spread rapidly and at worst could cause widespread health emergencies. However, when properly managed, UA has the potential to avoid such hazards and in some places can improve the conditions of the urban environment (Smit, *et al.*, 1996).

As Tallaki (2005) found, pesticide misuse is not common to all instances of urban agriculture, and is primarily related to issues surrounding lack of knowledge and larger-scale commercial production. In many cases, urban cultivators avoid the use of chemical based pesticides and fertilisers, instead using innovative solutions to utilise the limited land and water resources available (Pinderhughes, 2004). Studies have pointed to a general preference for the use of organic inputs wherever possible, since many urban producers have limited financial resources (Altieri, *et al.*, 1999; Tallaki, 2005).

In Cuba, an extensive programme which includes organic agricultural technology development has been pursued. Alternative and traditional techniques are explored and refined, with methods such as integrated pest management, biological controls, and organic soil management being encouraged throughout the nation (Altieri, *et al.* 1999). Technology, information and resources are made available to all producers through 'Seed Houses' and a number of smaller scale community agricultural clubs, ensuring access throughout society (Altieri, *et al.*, 1999).

The careful management of resources in urban cultivation can be connected to improved urban conditions. Where modern sewerage systems exist, the primary method of wastewater management is to 'dump' it into waterways (Steel, 2008). Before the advent of such systems, urban cultivation was the primary means of managing organic and human waste (Pinderhughes, 2004). The contamination of already scarce water resources through improper waste management is a major issue in the developing world, and urban agriculture has the potential to transform this problem into a valuable resource (Mougeot, 2006). There are a number of examples where low-tech solutions are used to treat sewage to an acceptable standard for use on vegetable crops and thus closing the nutrient loop. An example of this can be found in Dakar, Senegal where a number of integrated management, treatment and reuse projects are being developed (Mougeot, 2006).

Schemes such as this have the added benefit of creating further employment opportunities for urban dwellers by creating an industry geared towards the use of waste (Smit, *et al.*, 1996). The potential of such initiatives is huge. Urban agriculture already shows higher average yields than rural agriculture, even with the limited availability of resources, through the development of farming techniques that use very little water and land. If properly managed, urban agriculture can absorb significant amounts of waste, mitigating the adverse environmental effects of urban settlements, enhancing the urban environment and lessening the threat of disease (Smit, *et al.*, 1996; Mougeot, 2000).

Security of Tenure

Questions relating to the legality of urban agriculture and security of tenure must be addressed in any discussion of urban agriculture (Lynch, *et al.*, 2001). This is a key issue for urban producers throughout the world. There are many examples of urban agriculture practices with permits and leases in place, but there are undoubtedly many more with no formal agreements made between the cultivator and the landowner (Smit, *et al.*, 1996). When public or private land is used without permission, cultivators can be seen as illegal squatters and are subject to removal (Smit, *et al.*, 1996). A survey in Kampala (Uganda)

found that 60% of participants used public land for cultivation, of these 65% had no formal agreement, 10% held secure tenure and 40% could be considered squatters (Smit, *et al.*, 1996). In Kano (Nigeria), tenure security was found to be a major problem for cultivators city-wide, and only two of all the sites in the 1996 study were found to have security of tenure (Lynch, *et al.*, 2001).

In Africa, because of considerable ambiguity around legal rights and a general lack of clarity of rules within the tenure system, land security is a particularly pronounced issue (Lynch, *et al.*, 2001). Evidence has been found in Kampala of a 'use-rights' land market system where maintaining occupation has become an acceptable form of short-term ownership (Lynch, *et al.*, 2001). In Kano, Lynch and Binns (1998: 785) found land acquisition to be largely a case of 'first come, first served'. Such informal systems of 'ownership' can cause conflict between the formal landowner and the informal tenant.

While tenure insecurity is most common among low-income farmers, in places where urban agriculture is officially prohibited by law, no farmers have rights towards security of tenure. This is the case in Lusaka (Zambia), where urban agriculture is considered an illegal activity (Simatele & Binns, 2008). In Lusaka, all agricultural use of land is regarded as an inappropriate urban activity. If landowners, public or private, choose to develop a site cultivated by an urban farmer, there are no avenues through which the farmer's rights may be protected (Simatele & Binns, 2008). Ideas about what constitutes appropriate urban development arise in this context, as the informal and illegal nature of urban agriculture makes cultivation a high-risk income generation strategy.

The importance of urban agriculture: Food security and income generation

Whatever the risks involved, urban agriculture remains a significant economic activity and is thought to contribute upwards of a third of the food consumed in the world's cities (Smit, *et al.*, 1996; Mougeot, 2005). Since the 1990s, several surveys have suggested that urban agriculture is growing, and it has recently been estimated that over 800 million people are involved in the practice worldwide (Mougeot, 2005). There are many reasons which have contributed to UA expansion, but two with particular importance are food and economic security.

According to the United Nations Food and Agriculture Organisation (FAO), food security:

'means that food is available at all times; that all persons have means of access to it; that it is nutritionally adequate in terms of quantity, quality and variety and that is acceptable within the given culture. Only when these conditions are in place can a population be considered food secure' (as cited in Koc, *et al.*, 1999).

In the developing world, urban agriculture is often a crucial method of achieving food security for the urban poor (Koc, *et al.*, 1999; Smit, *et al.*, 1999; Mougeot, 2005). With increasing food prices in the past few years, the number of undernourished people in the world is steadily climbing (FAO, 2008a). Although the modernisation of agriculture has

increased the possibilities for large-scale agricultural production and distribution, hunger and malnutrition are still cited as the number one risks to health in the world (WFP, 2008). With 25,000 adults and children dying from hunger each day and almost a billion people with not enough to eat, these technological advances have not and cannot solve the problem of global hunger (FAO, 2008a; FAO, 2008b).

With services and support inaccessible in the best of conditions, in times of crisis the urban poor are particularly at risk. Self-provisioning through informal strategies such as urban agriculture become essential elements of the urban population's survival strategy in such situations. Economic meltdown, natural disaster, civil war and disease, or any combination of these, have been found to lead to a rise in the prevalence of UPA (Mougeout, 2005). Food security has been recognised since time immemorial to be essential to political stability. In each instance, recent worldwide 'food riots', from Latin America to Southeast Asia, brought together tens of thousands of people in violent protest over the rising price of staple foods (*CNN Online*, 14 April, 2008).

Urban agriculture has been acknowledged as a valuable source of essential nutrients as well as protein and calories which would not otherwise be accessible. The health of the urban population can be improved by UA and strong correlations between urban farming and improved child nutritional status have been found (Maxwell, 1995). In Maxwell's (1995) study of Kampala (Uganda), there was no significant difference found between the nutritional status of the lowest and highest income groups surveyed where low-income households practiced urban agriculture. Comparatively, among non-farming households the difference between these groups is two and a half times as large (Maxwell, 1995).

In many developing nations, past structural adjustment policies have led to increasing unemployment and retraction of state services. With the removal of the 'safety nets', instances of UA increase and become a valuable source of income for the growing urban poor (Smit, *et al.*, 1996). Smith (2001) points to the economic significance of urban agriculture, which contributes between 20 and 60% of household income and saving. In Namibia, the practice of urban agriculture saves households on average 60 Namibian dollars per month, a significant amount in this context (Frayne 2005).

Recent debates in the UA literature

It is important to be aware that the overall significance of UA in Africa has been questioned in recent literature. Whilst not seeking to develop a counter-argument here, it is perhaps important to note that while authors such as Crush *et al* (2011) and Webb (2011) point out that many of the claims about the participation rates in UA in South Africa and a selected set of cities across the sub-continent seem to have been exaggerated, our detailed field evidence, as presented below, suggests that in our case studies at least these general claims cannot be supported, and that the sheer burden of job loss and economic transformation has forced people into higher levels of dependency on UA than seem to be the norm elsewhere in sub-Saharan Africa.

Some key points which emerge from this newer critique include the reality that participation rates may be higher among the less marginalised owing to better access to land, resources

and political favour. As we will show, there are clear parallels with this in our case studies. Some authors also point out to seasonal variations in supply which impact upon usage rates, and in the case of South Africa available state welfare appears to diminish dependence on UA (Crush *et al*, 2011; Webb, 2011). Crush *et al* (2011), based on a study of 11 cities, estimates that only 22% of households grow their own food, though this does vary considerably from 64% in Blantyre (Malawi) to 3% in Windhoek (Namibia). Their claim is that UA, 'is not as widely practiced, or as important to food security of the urban poor in southern Africa as is sometimes claimed. Urban food production plays a relatively minor role in the food supply of most households and very few derive any kind of income from the sale of home-produced goods' (p.298). Recent literature has also drawn attention to the gendered nature of food insecurity and the reality that female headed households are the most vulnerable to marginalization (Dodson *et al*, 2012).

UA and policy considerations in Zambia

Lusaka is the capital of Zambia and is situated within Lusaka province. With a population of reaching 1,391,329 at the time of the 2000 census, the city of Lusaka accounts for 32% of Zambia's total urban population, dominating the country's urban system (CSO, 2004; Chama, *et al.*, 2007). Migration trends and high internal population growth have led to a growth rate in Lusaka city which is double that of Zambia's overall average of 2% between 1990 and 2000 (CSO, 1994 and 2001 as cited in Chama, *et al.* 2007).

In Lusaka, urban cultivation probably dates back to the foundation of the original township in 1929 (Schlyter & Schlyter 1979; Sanyal, 1985). Nowadays, in addition to the use of urban spaces and back yards, urban agriculture is being practiced widely in other locations such as 'between railway lines, around industrial areas, along roadsides, in the middle of roundabouts, under power lines, around airports, along rivers or river valleys, on land occupied by educational and administrative institutions, around dams and sewerage installations, and on land which has been officially designated for residential development'(Simatele and Binns, 2008:8). A recent study has shown that as many as 90% of those engaged in urban agriculture in Lusaka are women (Hampwaye *et al*, 2007). With high unemployment and around 68% of the city's urban population living in squatter settlements or poor unplanned housing, self-provisioning through urban agriculture is long proven an important survival strategy for many of Lusaka's citizens (Sanyal, 1984; Simatele & Binns, 2008).

During the 1970s, Zambia experienced a period of severe economic crisis (Smit, *et al.* 1996). This led to an immediate rise in household food production and by 1994, 80% of families within low-income communities reported practicing some form of urban farming. Simatele and Binns (2008) attribute the sustained increase in prevalence of UA to two main motivations. In Lusaka, UA has become a major source of both traditional and exotic foodstuffs for households, contributing greatly to the overall household food 'budget' (Simatele & Binns, 2008). Additionally, the sale of produce, and even the renting out of available land, has been recognised by participants as a valuable opportunity to generate income (Simatele & Binns, 2008)

In Lusaka, urban agriculture is discouraged by official city policy, making the cultivation of food crops an illegal activity within the city limits (Simatele & Binns, 2008). Negative attitudes towards UA in Lusaka mean that there are no formal support systems in place and the practice is generally ignored and overlooked in city planning (Simatele & Binns, 2008). This attitude was clearly articulated by the former Mayor of Lusaka, Fisho Mwale,

'Urban agriculture is associated with urban land squatting and is viewed as a socio-economic problem, not a solution. Authorities are hesitant to be more proactive on UA because it is largely seen as resulting from a failure to address adequately rural development needs.' Mayor Fisho Mwale, Lusaka, Zambia (as cited in Mougeot, 2006)

As they are largely viewed as illegal occupants or squatters on the land they cultivate, UA farmers face the constant threat of eviction with no legal rights to protect their interests. Authorities in Lusaka have been known to strictly and often short-sightedly clamp down on agricultural activities in the city. In the drought year of 1992, whilst the city was facing extreme food shortages, officials forced farmers to destroy their crops (Drescher, 1999).

In Lusaka, there was much concern among urban farmers about security of tenure, in the event that cultivated land is developed for some purpose by titled land owners, government agencies or other land developers. In fact, government legislation in Zambia actually works strongly against the practice of urban agriculture. The Control of Cultivation Act 1995 (CAP 480, Section 110 of the Laws of Zambia) states that, 'except with the permission of the Council, no cultivation of any kind will be permitted on un-alienated or unoccupied land within the boundaries of the township' (GRZ, 1995). A number of African governments and urban authorities, including Lusaka, also show concern about the possible health effects of growing crops in close proximity to housing. The Public Health Act, Act 13 of 1994 (CAP 295 of the Laws of Zambia, 1995), stipulates that, 'a person shall not within a township permit any premises or lands owned or occupied by him or over which he has control, to become overgrown with bush or long grass of such nature as in the opinion of the Medical Officer of Health, is likely to harbour mosquitoes' (GRZ, 1995). There have been occasions when Lusaka City Council workers have been instructed to destroy growing crops in the urban area, though this has not happened in recent years (Hampwaye *et al*, 2007).

The attitude and policies of urban authorities can have a significant impact on urban agriculture. As Hampwaye *et al* (2007) suggest in the case of Lusaka, 'In short, urban agriculture has been considered as the antithesis of modernization and indicative of an official failure in the urban development process. Accordingly, urban agriculture was stigmatized as 'backward', 'rural', and 'traditional', an activity that had no place in the context of modernizing cities'(Hampwaye *et al*, 2007: 557). Cissé *et al* found similar perceptions in their study of Francophone West African cities – that agriculture cannot be permitted as an urban activity (Cissé *et al*, 2005). In Kano (Nigeria), it seems that the local authorities generally adopt a 'permissive' attitude to urban agriculture, in effect 'turning a blind eye' to the practice. Meanwhile, in South Africa, official policy has been to encourage urban farming in order to improve household food security in the face of unemployment rates which in some 'black townships' are as high as 80%.

Drescher (1999) notes that as the development of Lusaka's central urban district continues, urban agriculture is likely to be pushed further towards the periphery of the city, making it increasingly difficult for low income urban farmers to access and utilise available land. As Mougeot (2006) points out, access to land is often more of a constraint than availability. Interestingly, in the recent study by Simatele and Binns (2008), a contradiction arose between the official line and the reality of land availability. Town planners and officials working in the Ministry of Local Government and Housing and Town and Country Planning consistently repeated that there was no more vacant land left in the city (Simatele & Binns, 2008). In reality, almost of half (c. 49%) of the total land surface in Lusaka exists in open spaces or is completely unutilised. Rather than the land being used, it has been allocated to various groups and developers, but remains undeveloped (Simatele & Binns, 2008).

A recent study of mining in the Zambian Copperbelt town of Luanshya (Musasa, 2012), one of this study's case studies, provides insight into the key role which UA has played, both past and present in the area. As early as 1935 it was noted that there were some 2000 subsistence plots in and around the town, many of which were cultivated by women. They played a dual role of supplying food to mining families, but also as a source of livelihood for unemployed workers which helped them to remain in situ and not return to rural homes, thus providing the mines with easy potential access to labour when needed. In 1995, the closure of the mine caused extreme suffering and forced many people to forage for wild fruit and to 'turn to the bush to cultivate' (Musasa, 2012, 577), leading to a sense of village life and practice in the urban areas in an effort to survive. At a broader level it is reported that some mines are encouraging grain, meat and fish production in the vicinity of their mines to diversify incomes, and that, 'At a household level, many Copperbelt residents carry out backward and small-scale agricultural activities not only for subsistence but also as a way to earn an income' (Musasa, 2012, 583).

Conclusions

Urban agriculture has links with a wide range of issues operating at different scales. Global level issues can have serious local level manifestations and urban agriculture can help alleviate food security issues at the city and household level. Unfortunately, as is seen in Lusaka, Zambia, those who would benefit most from supportive policies towards UA are faced with a local government which strongly opposes the practice and fails to appreciate its importance. Tenure insecurity, health and safety hazards, and illegality make urban agriculture a risky and difficult form of survival. Yet, in a similar line of response to that of people in squatter settlements continuously faced with eviction and physical removal from their land, urban cultivators show remarkable resilience in the face of adversity.

Urban agriculture has the outstanding ability to address a number of connected issues. This is a valuable feature since it is increasingly recognised that for equitable development more holistic strategies must be initiated. In the developing world, urban agriculture has the potential to alleviate the pressures generated by many of the core issues faced by towns and cities, notably food security, employment and environmental management. A large

number of studies have shown that urban agriculture is neither marginal, nor temporary and policy must change to acknowledge this.

In relation to policy, several recommendations can be made. In local municipal government, planning attitudes must change if urban agriculture is to reach its full potential. Allowing for urban agriculture in the city can dramatically improve living conditions for the urban poor as well as the overall urban environment. In planning documents and legislation, urban agriculture should be designated as a land-use class, as well as an appropriate use of public land. Vacant and underused land should be made available to urban cultivators, since while unused this represents a wasted urban space. Where public parks and open spaces already exist, programmes should encourage edible gardens and environmental education around techniques such as composting, worm farms and sustainable biological controls..

Key issues around water supply, waste management and tenure security must be resolved. Already, a number of innovative initiatives have been launched, tackling the issues of waste management and urban poverty. These initiatives focus on closing the nutrient gap between waste and agriculture, improving water quality and utilising available resources. Waste must be recognised as a valuable resource rather than as a problem of disposal. Low-tech solutions, such as filtration and basic biological treatment, are already available and must be made accessible for all urban agricultural producers. Tenure security must protect the rights and needs of all groups involved, stressing the importance of access and security rather than ownership. In terms of food security policy, food is a basic right, and urban agriculture must be recognised as an important strategy for securing this right.

Strong networks allowing information dissemination are crucial. Many of the concerns about the possibility of negative side effects of UA can be easily avoided by providing appropriate education and advice to cultivators. By providing technical support and encouraging links and partnerships within and between organisations, communities and individuals, better practice can be achieved. Such networks are already promoted by organisations such as the IRDC, encouraging collaborative, mutually beneficial relationships and the pooling of resources. Such relationships have the ability to recognise the importance of local-level expertise and knowledge, thus enhancing the role of community-based development initiatives.

There is an urgent need for governments and urban authorities to look upon urban agriculture more favourably and to consider the possibilities of incorporating it more formally into urban planning strategies. But, as Cissé *et al* suggest, 'The recognition of urban agriculture's current or potential importance has not yet been translated into an effective inclusion in the legal and statutory provisions of African countries'(Cissé *et al*, 2005: 153). Such a move could be seen as a pro-poor strategy which encourages food production and provides employment. Furthermore, urban agriculture could be part of a 'greening of the city' process, and in semi-arid Sahelian countries could contribute to combating drought and potential land degradation. Cissé *et al* found 3670 palm trees and 1,464 fruit trees in Nouakchott's (Mauritania) urban farming area (Cissé *et al*, 2005). However, in many African countries, urban planning continues to be based on models which were inherited from the colonial period and used in European countries, whilst the relatively few planners employed by African local urban authorities have invariably received training which is closely aligned

to these models. For example, Lusaka's Master Plan of the late 1970s, which is strongly based on the UK's 1947 Town and Country Planning Act, is still the basis for urban planning some 30 years later. Greater dialogue between planners and various actors involved in urban agriculture is long overdue, such that more appropriate policy and interventions can be devised and better coordinated.

3) ZAMBIA AND THE COPPERBELT

The Zambian Context – Challenges for Development

Zambia is a landlocked nation in sub-Saharan Africa which shares borders with Namibia, Angola, the Democratic Republic of the Congo (DRC), Tanzania, Malawi, Zimbabwe and Botswana. With a land area of 752,612 square kilometres, Zambia lies between 8° and 18° south and 22° and 34° east (Anyangwe *et al.*, 2006). The country is probably best known for its mineral resources, particularly the rich copper deposits situated in and around the Copperbelt Province, and its dramatic history of economic 'boom and bust'. Today, although the economy shows some signs of renewal, Zambia remains in the category of least developed countries (LDCs) and is ranked 164 out of 187 on the Human Development Index (HDI) (UNDESA, 2012; UNDP, 2011).² The unusual shape of the border demarcating the boundary between Zambia and the DRC can be directly attributed to the careful division in the 19th century of the geological region called the 'Copperbelt' between the colonial powers of Belgium and Britain in the former colonies of the Belgian Congo and Northern Rhodesia (Potts, 2005). The ore reserves found in this region are some of the largest known deposits in the world, and for Zambia the rise and fall of copper prices on the global market can be directly linked to the rise and fall of the national economy (Fraser & Lungu, 2009). Since its 'discovery' by the Northern Territories Exploration Company (BSA) in 1895, copper has been one of the most important catalysts for change in almost all aspects of Zambian history.³

Since the early years of the 20th century, the economy of the central African country of Zambia has been dominated by the core industrial and mining zone of the Copperbelt Province. Despite the dangers of having a virtual mono-economy, by the 1960s the Copperbelt was regarded as the continent's core economic zone outside of South Africa, helping to provide the country with a per capita GDP which was nearly three times that of other states in the region (Ferguson, 1999). The net result was the emergence of one of the most urbanised areas in Africa and one characterised by considerable wealth and opportunity.

In 1969, Zambia was classed as a middle income nation and widely viewed as the leading example of modernisation and progress in Africa. The Zambian economy was already one of the strongest in Africa and had already surpassed the GDP of some middle income

² Zambia was admitted onto the least developed countries list in 1999. LDCs are low-income nations recognised to be facing the most severe challenges to sustainable development. The current criteria used to identify LDCs are gross national income per capita (GNI), the Human Assets Index and the Economic Vulnerability Index (UNDESA, 2012).

³ Copper was known to local populations well before European exploration of the region. In Zambia, copper objects such as jewellery have been found by archaeologists and there is evidence of ancient workings on mine sites in and around the Copperbelt that are thought to date back to the third and fourth century (Herbert, 1984).

developing nations. With growth and industrialisation appearing to mirror the European experience some predicted that it was likely that Zambia could soon become part of the developed world (Ferguson, 1999). However, in the mid-1970s, the Zambian economy began to falter. Since then the country has suffered through several decades of pronounced economic decline, prompted by the falling price of copper, structural adjustment and state control of industry and mining (World Bank, 2004). As a net result, according to Ferguson (1999, 6), in what had been regarded as a 'middle-income country', 'the African Industrial Revolution slipped off the track'. Although the collapse of the economy on its own was dramatic, Zambia's development prospects have been additionally damaged by the severity of the HIV/AIDS epidemic, the ongoing socio-economic effects of structural adjustment and skyrocketing external debt.

Far from succeeding in acquiring the label of 'developed nation', Zambia today fits into the 'low human development' group, with an HDI which is below average for countries falling within this group and those situated within sub-Saharan Africa (UNDP, 2011 – HDI pages). In 2000 Zambia was given its lowest ever HDI ranking of 0.32, (UNDP, 2011 – HDR Report). In 2011 the country's HDI (Human Development Index) was rated at 0.43 placing it at the 164th position out of 187 reporting countries. Whilst this was a slight improvement over the 1980 score of 0.401, what the figures mask is that between 1980 and 2011 life expectancy fell from 52 to 49 years, though the latter shows an increase from the low of 41.9 years in 2000. In 2012 it was reported that 64% of Zambia's population was living below the poverty line (CIA, 2012), while in the preceding year it was estimated that 82% of the population survive on less than \$2 / day (Population Reference Bureau, 2011). This poor economic and social welfare performance requires urgent attention through initiatives directed towards improving human welfare, employment levels and nutritional status.

The privatization of state assets, including the mines and manufacturing, during the 1990s led to significant job losses, which in the case of the primary economic centre of Ndola amounted to the loss of approximately 75% of manufacturing plants and some 9000 jobs in manufacturing by 2000 (PADCO, 2001). Unemployment in Ndola rose from 13.5% in 1990 to 33.2% in 2000 (CSO 2004). By the end of the 1990's it was estimated that 86% of Ndola's poorest households were engaged in the informal sector (NCC 2000). In neighbouring Kitwe between 1992 and 2002, some 317 companies closed with a job loss of 3499 (CSO 2007). Unemployment increased to 45% and poverty rose to 75% in the early 2000's (KCC 2005 a). Of the 47% of household heads who were economically active in 2005, only 36% were in formal employment, the rest being self-employed, including farming and non-farming activities (KCC 2005 b).

In the decade between 1990 and 2000 the employed population on the Copperbelt increased by only 7.8%, while the unemployed population rose by 88.6%. In the same period, the number of people working in mining fell from 16.9% to 9.7% of total employment, whilst manufacturing declined from 10.3% to 6.4%. Agriculture (including UA)

increased from 16.8% to 37.5%, while trade rose from 6.5% to 13.2%, showing the growing significance of UA and informal sector activities. (CSO 2004, Fallavier *et al* 2005). Another feature of the Copperbelt has been the net out-migration of people, making the area a somewhat unusual case of counter-urbanization in Africa which reflects the enormity of the prevailing crisis (Potts, 2005).

Within this somewhat gloomy context, it is easy to appreciate why thousands of people have had to resort to UA as a form of livelihood support and to ensure food security in the face of adversity. Given the scale of the crisis which has occurred in the Copperbelt, support for UA is one of the few economic options available to households, communities and authorities, and it is therefore no surprise that UA is beginning to receive formal recognition in the region (Hampwaye, 2008), thus justifying research into the role which UA currently plays and the potential for further strengthening this role.

Broader development challenges

Development in Zambia has historically been very uneven, with the majority of investment and growth occurring in urban centres of the Copperbelt Province, the home to the mining industry. Among the challenges which Zambia currently faces are;

- Continuing dependence on the mining industry, despite significant loss of jobs, income and tax revenues from this sector, and despite repeated attempts to diversify the economy. Nowadays, as indeed for the last century, Zambia's prosperity is largely associated with the vagaries of fluctuating world copper prices. Uneven industrial development and service delivery, based on providing infrastructure and services for the mines and mine workers.
- Uneven population distribution and high levels of urbanisation in the Copperbelt, with urban and economic growth along the main railway line (Potts).
- In addition to economic dependency on copper, aid dependency and external debt are two key factors which continue to have a profound effect on Zambia's development. International assistance through financial aid and loans quickly became a lifeline as economic crisis deepened during the 1970s. As national revenue plummeted, the Zambian government struggled to keep its extensive social welfare system afloat. Conditional loans in the form of structural adjustment packages (SAPs) from international financial institutions and overseas grants of financial aid were soon Zambia's main source of income and the country became one of the most heavily indebted and aid dependent nations in the world.
- The Zambian government has entered into loan agreements with the World Bank and the International Monetary Fund (IMF). At its most indebted, Zambia owed external debt reaching US \$6.7 billion by 1995 (Ferguson, 1999).

- Zambia was one of the first nations to complete conditions outlined in their Poverty Reduction Strategy Paper (PRSP) reaching the Heavily Indebted Poor Country (HIPC)⁴ completion point in 2005. External debt was reduced from US\$7.1 billion to US\$4.5 billion at this point, and in 2006 was reduced again to US\$600 million (Fraser, 2007).

4) METHODOLOGY AND DISSEMINATION OF FINDINGS

The research investigation adopted a mixed method approach, relying on both quantitative and qualitative research. Quantitative research took the form of descriptive statistics garnered from census and statistical releases to clarify the socio-economic changes which have taken place in the study area. Qualitative research focused on the gathering of information from key informants and communities through semi-structured interviews, questionnaire surveys employing student researchers, and participatory workshops were held with practitioners and officials.

The research comprised the following six phases;

- 1) Reconnaissance – in March-April 2010 a reconnaissance trip was undertaken to Zambia, to establish the viability of the proposed research, to meet key stakeholders and to lay the basis for this application. This trip verified just how serious the economic predicament in the Copperbelt is, and the widespread practice of UA by HIV/AIDS affected and other households.
- 2) Desk top research – this was undertaken in both Zambia and New Zealand, and included the analysis of available census and statistical data to determine key socio-economic trends and patterns. This phase of the research focused on the analysis of secondary material pertaining to UA, cities in the South, Zambia, and the Copperbelt and an examination of various local development responses. The information gathered provided both the context for the study and also informed subsequent phases of the research enquiry
- 3) Field-based research – field research was undertaken from October-December 2011 (this trip was delayed owing to the Zambian national elections being held in mid-2011 and associated civil unrest which was experienced in the Copperbelt province). The primary foci of the research consisted of;
 - a. Semi-structured interviews, which were undertaken with key government officials, municipal officials, Ministry of Agriculture support staff, staff of the Copperbelt University (who actively support UA), community leaders, NGOs who support UA and the leaders of community urban gardens. In addition, leaders in currently supported UA projects were selected for interview including; the Ndola Nutrition Support Group (which has external support to work in HIV/AIDS affected communities); the Community Resource Centre in Chifubu, and the Ministry of Agriculture supported UA activities in the Chikalafusu area of Ndola. In total, 58 key Informants were interviewed (Appendix 1 indicates who the Key Informants were, and Appendix 2 indicates the key questions which were asked of them).

- African Studies Association of Australasia and the Pacific Conference – Canberra, Australia, November 2012.

Academic research articles and further international conference presentations are currently being planned, and findings will also be incorporated into Otago University PhD student Jessie Smart's PhD thesis which will be submitted during the course of 2013.

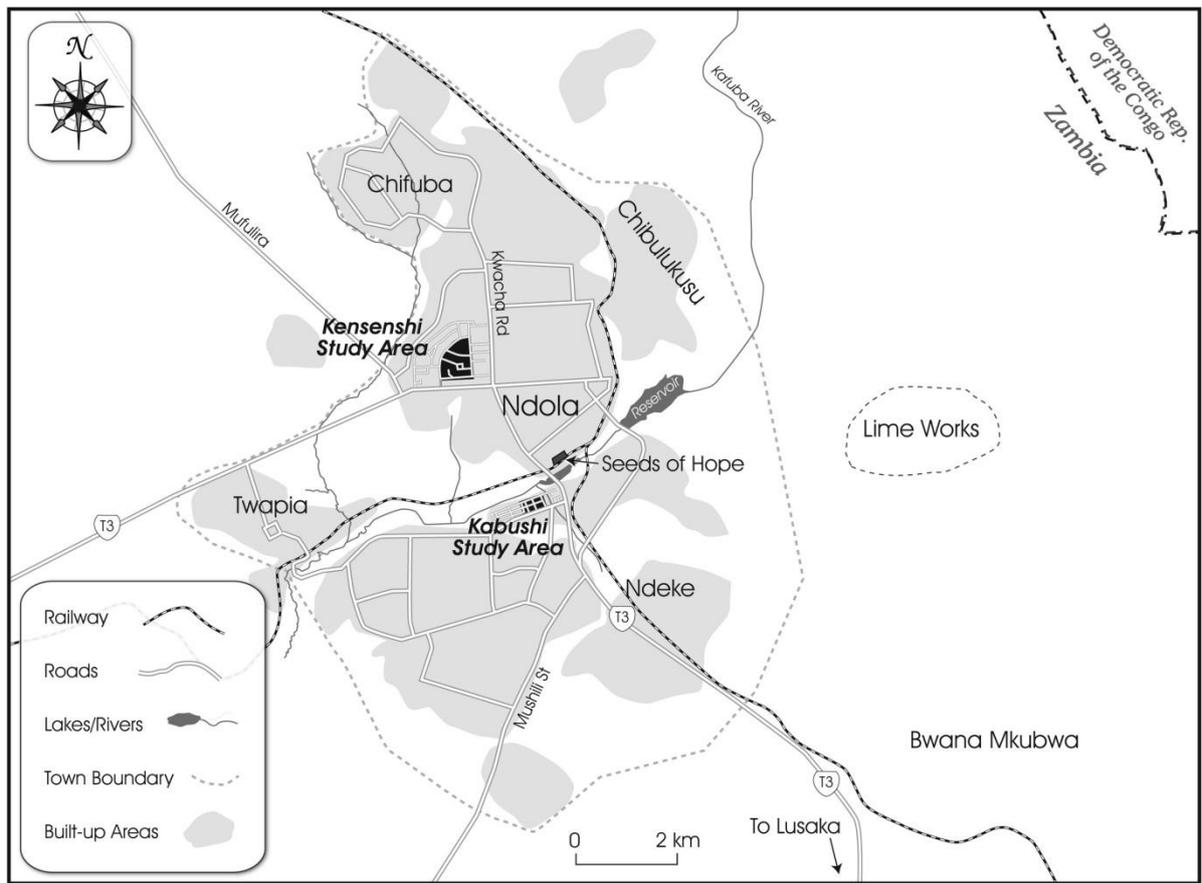


Figure 3: Ndola and research study sites: Kensenshi (high income) and Kabushi (low income)

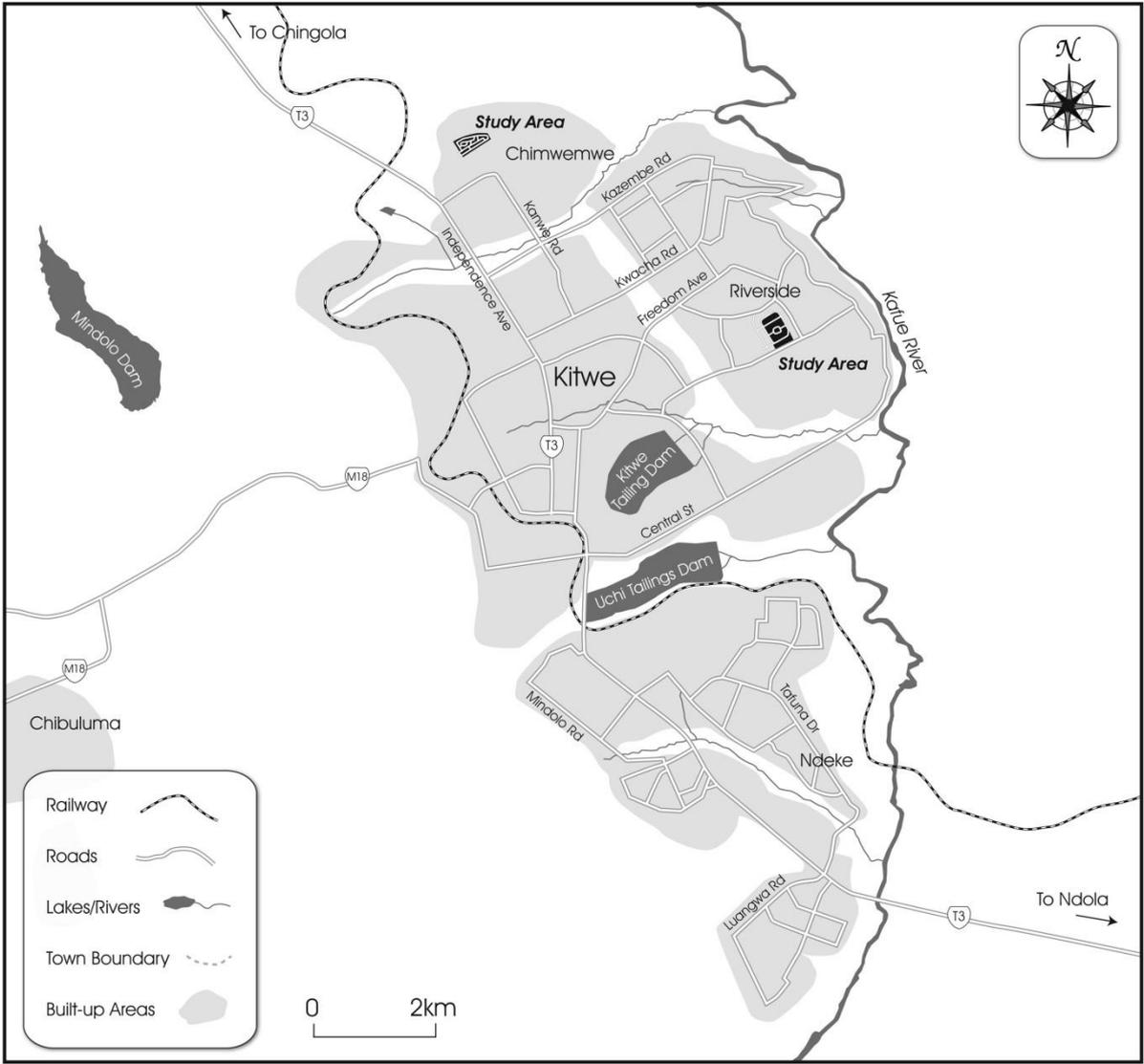


Figure 4: Kitwe and research study sites: Riverside (high income) and Chimwemwe (low income)

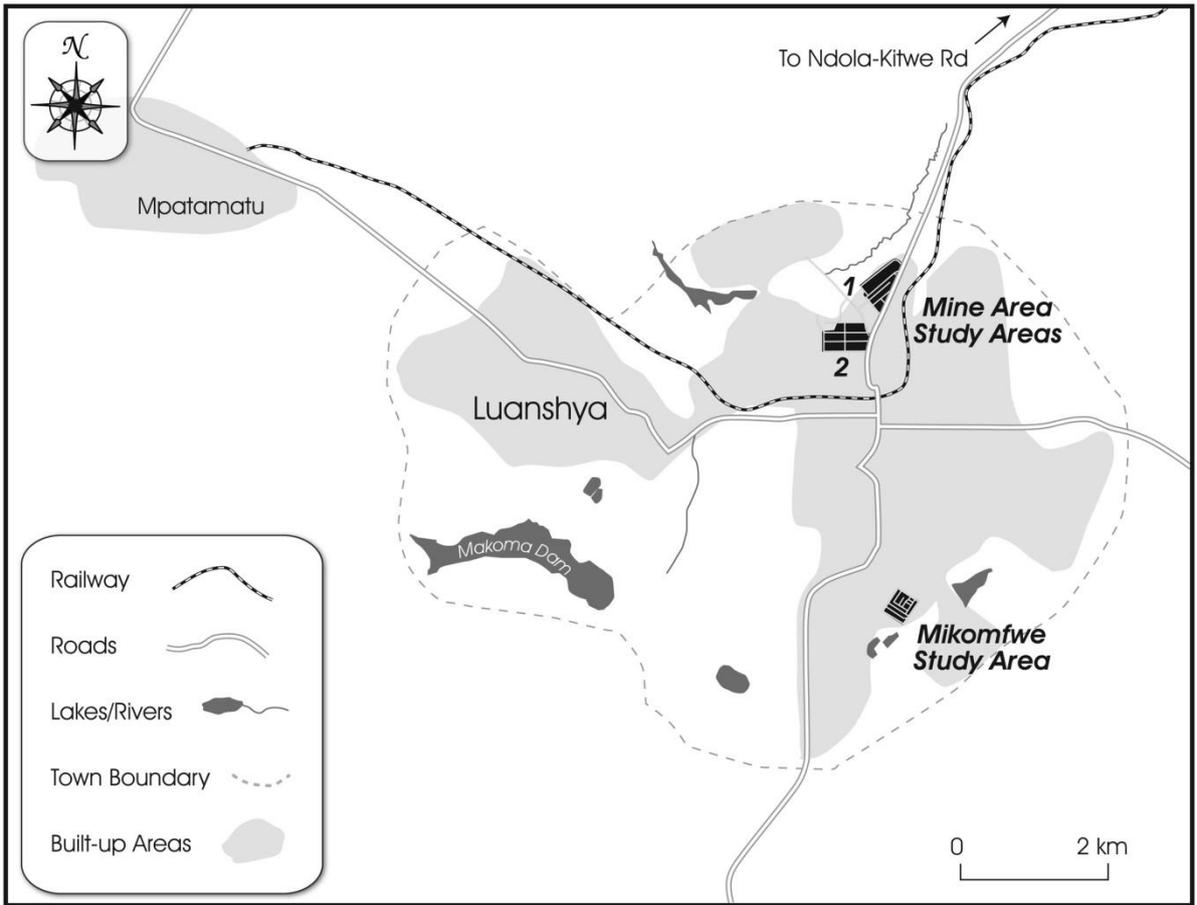


Figure 5: Luanshya and research study sites: Mine Areas 1& 2 (high income) and Mikomfwe (low income)

5) RESULTS

A- SURVEY

This section details the key findings from the questionnaire survey which was administered in six areas (three low-income and three high-income) in the three study areas centres (Ndola, Kitwe and Luanshya). In this section each of the key results tables is derived from the questionnaire survey (included as Appendix 3) and is briefly discussed so as to draw attention to key findings discovered about the practice of UA.

In this section the following codes are employed:

- L: Luanshya
- K: Kitwe
- N: Ndola
- LD: Low Density i.e. upper income area
- HD: High Density i.e. low income area

It should be noted that in the tables below there are variations in the data base size which is drawn upon to answer each question. This is dependent on the number of usable answers received, and the fact that in some instances data was also derived from non-UA practising households.

1. Degree to which households practice UA in the study area

Table 1a indicates that 84% of the 679 households assessed in the study areas are practising UA, with figures of 94% being recorded in some areas. These figures are very significant and indicate usage rates which are far higher than those which have been established in other surveys internationally, suggesting the degree to which the level of economic stress in the Copperbelt has forced a very obvious reliance on UA. Table 1b indicates the key variants in scores detailed in Table 1a.

Table 1a: Incidences of Urban and Peri-Urban Agriculture in Approached Households				
Area Surveyed	No. of Households Practising UA	No. of Households not Practising UA	Total Households Approached	Households Practising UA (%)
LLD	92	6	98	94%
LHD	95	9	104	91%
Luanshya	187	15	202	93%
KLD	109	7	116	94%
KHD	87	34	121	72%
Kitwe	196	41	237	83%
NLD	89	21	110	81%

NHD	99	31	130	76%
Ndola	188	52	240	78%
High D.	281	74	355	79%
Low D.	290	34	324	90%
Total	571	108	679	84%

Table 1b: Variations in UA practice		
Highest % of UA by Sub-Area	Luanshya Low Density	94%
Lowest % UA by Sub-Area	Kitwe High Density	72%
Highest Overall by Town	Luanshya	93%
Highest Overall by Density	Low Density	90%
Lowest Overall by Town	Ndola	78%
Lowest Overall by Density	High Density	79%

2) Results of the questionnaire survey – Data collected and household data

In total 326 questionnaires were administered within the study areas, Table 2) indicates the distribution of information gathered from the six study sites.

Table 2: Total Surveys Completed				
	Short Surveys	Long Surveys	Non-UA Surveys	Total
LLD	30	14	1	45
LHD	30	16	3	49
Luanshya	60	30	4	94
KLD	30	15	1	46
KHD	30	14	9	53
Kitwe	60	29	10	99
NLD	30	15	6	51
NHD	30	15	7	52
Ndola	60	30	13	103
High D.	90	45	19	154
Low D.	90	44	8	142
Total	210	89	27	326

Table 3 below indicates the number of dependents per surveyed household. Predictably, there is a range of scores from lows of 0 to noteworthy highs of 14. The average of 3.8 dependents per household would be considered high by western norms of approximately 1.7.

Table 3: Number of Dependents												
	LLD	LHD	LUANSHYA	KLD	KHD	KITWE	NLD	NHD	NDOLA	LD	HD	TOTAL
Average	3.5	4.3	3.9	3.7	4.1	3.9	3.4	3.9	3.7	3.5	4.1	3.8
Minimum	0	0	0	0	0	0	1	0	0	0	0	0
Maximum	10	11	11	8	13	13	6	14	14	10	14	14

Table 4, which indicates the number of contributors to household income, reflects the reality that households have multiple income streams. However, as indicated in a subsequent table, a high number of contributors are self-employed which may well reflect participation in low income informal sector activity.

Table 4: Number of Contributors to Income												
	LLD	LHD	LUANSHYA	KLD	KHD	KITWE	NLD	NHD	NDOLA	LD	HD	TOTAL
Average	1.8	1.5	1.7	2.1	1.5	1.8	1.7	1.4	1.5	1.9	2.3	2.1
Mode	2	1	2	2	2	2	2	1	1	2	1	2
Minimum	0	0	0	1	0	0	1	1	1	0	0	0
Maximum	4	5	5	4	3	4	3	4	4	4	5	5

Table 5 indicates the key role which women play in the domestic economy, often in the context of being the key breadwinners and heads of households. Women represented 45% of the 185 households which indicated who was the household head.

Table 5: Female headed households												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Yes	9	21	5	12	14	22	28	55	30	17	36	83
No	26	4	34	20	17	1	77	25	30	54	18	102
Total	35	25	39	32	31	23	105	80	60	71	54	185

Households tend to be large, with an average size of 5.8 members, and many households with more than 12 members (see Table 6), reflecting dependency levels and perhaps the degree to which the extended family derives support from household heads.

Table 6: Total Household Size												
	LLD	LHD	LUANSHYA	KLD	KHD	KITWE	NLD	NHD	NDOLA	LD	HD	TOTAL
Average	5.5	6.3	5.9	6.0	6.0	6.0	5.4	5.8	5.6	5.6	6.0	5.8
Minimum	2	1	1	4	4	4	1	1	1	1	1	1
Maximum	12	13	13	10	14	14	8	16	16	12	16	16

Table 7 indicates the employment status of household heads. Even though the unemployment level is relatively low at 8%, this needs to be seen relative to the high level of self-employment 48%, and the reality that in the absence of a state welfare system in Zambia, the unemployed are forced to secure alternative forms of livelihood.

	LLD	LHD	KLD	KHD	NLD	NHD	Total
Unemployed	1	8	0	4	0	16	29 (8%)
Employed	47	24	63	40	54	26	154 (44%)
Self-Employed	32	40	30	24	22	20	168 (48%)
Total	80	72	93	69	76	62	351

Building on from Table 7, Table 8 indicates just how important the informal sector is, contributing some 35% of all employment opportunities. The final tally of 451 is derived from instances where there were more than one income source available to the household.

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Formal	47	31	82	35	56	28	185	94	78	117	84	279
Informal	26	35	11	31	20	35	57	101	61	42	55	158
Unemployed	2	8	0	4	0	0	2	12	10	4	0	14
Total	75	74	93	70	76	63	244	207	149	163	139	451

Table 9 indicates the occupational sector in which household heads are engaged. The relative wide distribution of scores reflects the employment of higher income interviewees, whilst the high score for 'trade' should be read as predominantly indicating participation in informal sector activities.

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	L	K	N	Total
Agriculture	3	4	2	8	4	22	9	34	7	10	26	43
Manufacturing	3	4	12	7	2	2	17	13	7	19	4	30
Mining	16	0	9	10	7	1	32	11	16	19	8	43
Trade	23	29	24	18	12	15	59	62	52	42	27	121
Tourism/ service	0	9	5	6	6	8	11	23	9	11	14	34
Government	6	2	6	1	2	2	14	5	8	7	4	19
Professional/ Teacher	10	5	24	5	4	11	38	21	15	29	15	59
Other	10	1	3	5	37	1	50	7	11	8	38	57
Total	71	54	85	60	74	62	230	176	125	145	136	406

3) Urban agriculture practices

Assistance in the garden/farm is indicated in Table 10, which indicates that UA is both a family activity and, is, significantly, a source of employment in 51% of cases. 80% of households in low density areas employ someone to help in the garden or on the farm, while 24% have their family helping. By contrast, 23% of households in high density areas employ someone to help in the garden or on the farm and 76% of households have their family helping.

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luan	Kitwe	Ndola	Total
Family	11	26	5	22	6	23	22	71	37	27	29	93
Employees	21	4	30	9	23	9	74	22	25	39	32	96
Other	0	0	0	0	0	0	0	0	0	0	0	0
Total	32	30	35	31	29	32	96	93	62	66	61	189

Table 11 continues the theme of employment generation through UA, indicating that out of a sample of just over 300 UA instances, some 111 full time employment opportunities have been generated and 346 part-time / seasonal / casual opportunities. Rather than just being seen as a marginal activity, the employment generating capacity of UA is clearly not insignificant.

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Yes	63	81	43	65	46	65	152	211	144	108	111	363
Full-time	27	0	43	6	35	0	105	6	27	49	35	111
Part-time	10	0	4	1	5	6	19	7	10	5	11	26
Casual	41	3	0	55	0	24	41	82	44	55	24	123
Seasonal	73	0	73	4	33	24	179	28	73	77	57	207
Total No. Employed	151	3	120	66	73	54	344	123	154	186	127	467

4) Land access

Tables 12a & b below reflect the nature of land access for UA participants. The Table indicates that most farming is undertaken around the house on the plot (214 cases), but that off-plot farming is also significant (118 cases), while 64 respondents practiced both. Of the latter, only a third are in urban areas, while the remainder are in peri-urban / rural areas.

The use of land for livestock is not a significant practice with only 22 respondents (8.5%) indicating that they kept livestock. Only 10% of farmers grew indigenous and/or medicinal plants.

In terms of plot size (see Table 16), while size was difficult to assess accurately, generally backyard plots are less than 200 sq meters, while off farm plots average 3ha and above.

Table 12a: Type of Agriculture Practiced by Location (Frequency)

	LLD	LHD	L	KLD	KHD	K	NLD	NHD	N	LD	HD	TOTAL
BYG Rented	15	7	22	9	11	20	19	7	26	43	25	68
BYG Owned	27	28	55	36	14	50	26	13	39	89	55	144
Total BYG	43	35	78	45	25	70	45	21	66	133	81	214
OPA Rented	6	4	10	0	5	5	0	6	6	6	15	21
OPA Owned	18	22	40	10	12	22	3	1	4	31	35	66
OPA Squatting	0	2	2	1	6	7	1	18	19	2	26	28
Total OPA	26	28	54	11	23	34	4	26	29	41	77	118
BYG & OPA	25	17	42	11	5	16	4	2	6	40	24	64
Urban OPA	3	4	7	1	14	15	0	19	19	4	37	41
Peri-U. OPA	16	9	25	10	7	17	0	9	9	26	25	51
Rural OPA	6	15	21	0	3	3	4	0	4	10	18	28
Animals BY	5	3	8	1	2	3	0	5	5	6	10	16
Animals OP	4	1	5	1	0	1	0	0	0	5	1	6
Animals tot	9	4	13	2	2	4	0	5	5	11	11	22
No. Rspnds	44	46	90	45	44	89	45	45	90	134	135	269

Note: BYG: Backyard Garden, PA: Off Plot Activity (i.e. use of land which is not on the household plot)

Table 12b: Type of Agriculture Practiced by Location (Percentage)

	LLD	LHD	LUANSH YA	KLD	KHD	KITWE	NLD	NHD	NDOLA	LD	HD	TOTAL
BYG Rented	35%	20%	28%	20%	44%	29%	42%	33%	39%	32%	31%	32%
BYG Owned	63%	80%	71%	80%	56%	71%	58%	62%	59%	67%	68%	67%
BYG	98%	76%	87%	100%	57%	79%	100%	47%	73%	99%	60%	80%
OPA Rented	23%	14%	19%	0%	22%	15%	0%	23%	21%	15%	19%	18%
OPA Owned	69%	79%	74%	91%	52%	65%	75%	4%	14%	76%	45%	56%
OPA Squatting	0%	7%	4%	9%	26%	21%	25%	69%	66%	5%	34%	24%
OPA	59%	61%	60%	24%	52%	38%	9%	58%	32%	31%	57%	44%
BYG & OPA	57%	37%	47%	24%	11%	18%	9%	4%	7%	30%	18%	24%
Urban OPA	12%	14%	13%	9%	61%	44%	0%	73%	66%	10%	48%	35%
Peri-U. OPA	62%	32%	46%	91%	30%	50%	0%	35%	31%	63%	32%	43%
Rural OPA	23%	54%	39%	0%	13%	9%	100%	0%	14%	24%	23%	24%

Animals BY	56%	75%	62%	50%	100%	75%	0%	100%	100%	55%	91%	73%
Animals OP	44%	25%	38%	50%	0%	25%	0%	0%	0%	45%	9%	27%
Animals tot	20%	9%	14%	4%	5%	4%	0%	11%	6%	8%	8%	8%

According to Table 13, most respondents accessed land (both residential and off-plot) through the private market and government had very little influence.

Table 13: Residential Land Acquisition												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Private arrangement	25	26	35	13	25	1	85	40	51	48	26	125
Through government	0	0	0	0	0	6	0	6	0	0	6	6
Family	2	3	1	3	0	6	3	12	5	4	6	15
Other	13	10	9	10	20	8	42	28	23	19	28	70
Total	40	39	45	26	45	21	130	86	79	71	66	216
Offplot Land Acquisition												
Private arrangement	13	18	10	8	3	0	26	26	31	18	3	52
Through government	2	1	0	0	0	1	2	2	3	0	1	4
Family	3	3	0	4	0	2	3	9	6	4	2	12
Other	6	3	0	5	0	6	6	14	9	5	6	20
Total	24	25	10	17	3	9	37	51	49	27	12	88

It is significant to note that tenure/access was not regarded as a major obstacle to land access (see Table 14), which probably reflects both the security of private access to land and perhaps the tolerant approach of land-owners and local authorities to the practice of UA.

Table 14: Tenure Problems												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
YES BYG	1	1	0	2	0	1	1	4	2	2	1	5
NO BYG	39	37	45	24	45	23	129	84	76	69	68	213
Total	40	38	45	26	45	24	130	88	78	71	69	218
YES OPA	3	2	0	5	1	5	4	12	5	5	6	16
NO OPA	22	25	10	18	3	21	35	64	47	28	24	99
Total	25	27	10	23	4	26	39	76	52	33	30	115

Tables 15 a & b reflect how distant many farmers are from their off-plot lands. Only one third of farmers can access their land in less than 30 minutes and have it sited less than 5km from where they live. The fact that some people take more than 3 hours to access their land indicates the importance which it holds for people.

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
≤ 30 minutes	4	3	1	5	1	17	6	25	7	6	18	31
> 30 - 1 hr	10	5	4	5	1	2	15	12	15	9	3	27
> 1 - 3hr	9	15	4	5	2	7	15	27	24	9	9	42
> 3 - 5 hrs	1	2	1	2	0	0	2	4	3	3	0	6
> 5 - 7 hrs	0	1	0	2	0	0	0	3	1	2	0	3
> 7 hrs	0	1	0	0	0	0	0	1	1	0	0	1
Total	24	27	10	19	4	26	38	72	51	29	30	110

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
≤ 1 km	0	0	0	4	0	12	0	16	0	4	12	16
> 1 - 5 km	2	3	0	1	0	5	2	9	5	1	5	11
> 5 - 10km	1	4	0	4	2	2	3	10	5	4	4	13
> 10 - 20km	5	5	0	2	0	6	5	13	10	2	6	18
>20 - 30km	0	0	1	1	0	0	1	1	0	2	0	2
> 30 - 50 km	1	0	2	1	0	1	3	2	1	3	1	5
> 50 km	4	3	6	1	0	0	10	4	7	7	0	14
Total	13	15	9	14	2	26	24	55	28	23	28	79

5) Time-based involvement in UA

Table 16 indicates that on average respondents have practiced UA for 10 years or more, with economically weak Luanshya having the longest period of continuous cultivation, indicating this is generally a well-established practice and not something recently engaged in, which corresponds with the economic downturn of the area from the 1980s/90s.

	LLD	LHD	KLD	KHD	NLD	NHD	Total
BYG – Average no. years involved in UA	14.1	18.8	9.8	9.9	5.8	9	11.23
BYG – Range of size of plot			14 sq m	12-80 sq m	80-350 sq m	16-200 sq m	
OPA – Average no. years involved in UA	12.6	17.5	7.4	6.8	6.5	14.8	10.9
BYG – Range of size of plot			2-40ha	200-2500 sq m	2ha	600sq m – 2ha	

Table 17 indicates that farming tends to be a year round rather than just a seasonal activity.

	LLD	LLD	LHD	LHD	KLD	KLD	KHD	KHD	NLD	NLD	NHD	NHD	Total
	BYG	OPA											
Seasonal	4	19	7	23	0	7	4	15	1	4	1	9	94
YR	19	1	17	2	2	0	17	5	43	0	20	14	140
Both	20	5	11	2	42	2	4	3	0	0	0	3	92

6) Sale of products

Out of 269 reporting farmers, 37% indicated that they sold produce suggesting that UA makes a useful contribution to household income (see Table 18a). Very few farmers were willing to estimate income derived from sales, but of those who did, it is apparent that income levels of over K 1 million (approx. US \$ 200) were being earned.

	LLD	LHD	KLD	KHD	NLD	NHD	Total
No.	44	46	45	44	45	45	269
No. Selling	20	17	16	18	6	23	100 (37%)
Average Income	K 2.04m	K 750 000	K 45 m	K 1.35m	K 3.9m	K 1.26m	
No. reporting	6	7	1	6	3	10	

Table 18b indicates that many households had more than one income source. In 39% of cases (of the 100 selling produce) UA was the primary source of income, whilst for 44% it was a key secondary source of income.

Table 18b: Income sources in order of importance						
Incomes in order of importance	1	2	3	4	5	Total
Agriculture (Gardening, Farming or Poultry)	39	44	16	1	0	100
Total number of incomes	268	168	39	4	1	480
% of incomes resulting from agricultural activities	15%	26%	41%	25%	0%	21%

Of those selling produce, approximately 40% stated that difficulties were experienced in this regard (see Table 19)

Table 19: Selling difficulties												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Yes	12	7	4	10	3	2	19	19	19	14	5	38
No	8	10	11	8	3	21	22	39	18	19	24	61
Total	20	17	15	18	6	23	41	58	37	33	29	99

7) Food security

Table 20 indicates that the majority of respondents can meet their basic household needs (63%), many presumably through an ability to engage in UA, as suggested below.

Table 20: Can you meet your basic needs?												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	L	K	N	Total
Yes	17	3	29	6	27	30	73	39	20	35	57	112 (63%)
Total	30	30	29	30	30	30	89	90	60	59	60	179

In terms of food security, two thirds of respondents argue that they are food secure (Table 21).

Table 21: Are you food secure?												
	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	L	K	N	Total
Yes	18	6	30	9	29	28	77	43	24	39	57	120
Total	30	30	30	30	30	30	90	90	60	60	60	180

The estimated percentage of annual food supply met through self-production is shown in Table 22). It is apparent that with some variations, nearly half of vegetable and maize (the

staple food) requirements were being met through self-production, suggesting the key role that UA plays in nutrition and food security in this income insecure area.

	Maize	Grains	Vege	Fruit	Animal	Herbs/med
LLD	59%	4%	58%	25%	8%	8%
LHD	63%	4%	40%	1%	3%	0%
KLD	55%	2%	55%	26%	8%	6%
KHD	63%	4%	43%	2%	4%	0%
NLD	63%	4%	42%	2%	4%	0%
NHD	36%	7%	35%	2%	2%	1%
LD	44%	4%	56%	9%	5%	3%
HD	44%	4%	42%	2%	3%	0%
L	61%	4%	49%	13%	6%	4%
K	39%	6%	42%	1%	4%	0%
N	31%	1%	56%	1%	3%	0%
Total	44%	4%	49%	5%	4%	1%

Table 23 indicates the percentage of the two primary food types produced (vegetables and maize) that is consumed, given away or sold, as identified by respondents. It is apparent that nearly three-quarters of produce is consumed by the producing households, and less than 20% is sold, and the balance is given away. Once again, this emphasises the key role that UA plays in family nutritional intake and the lesser role played in income generation.

	Maize			Vegetables		
	Consumed	Give Away	Sell	Consumed	Give Away	Sell
LLD						
LHD	67	11	12	71	13	7
KLD	80	5	15	84	12	4
KHD	69	15	15	69	16	13
NLD	68	27	5	75	23	1
NHD	29	1	69	60	3	37
Average	63	12	23	72	13	12

8) Motivations for engaging in UA, challenges experienced and opinions

When asked why farmers engaged in UA, 90% stated that the primary reasons were for food, savings and sale, whilst 10% stated because they like to garden. In addition, 268/269 (99.6%) believed that it is important to produce your own food, primarily for health, nutritional and savings reasons. Some 268/269 stated that UA should be encouraged. In

terms of the source of the farming knowledge, the overwhelming majority indicated that family or friends were the primary source (over 85%) (Table 24).

	LLD	LHD	KLD	KHD	NLD	NHD	LD	HD	Luanshya	Kitwe	Ndola	Total
Family/friends	42	44	45	41	43	40	130	125	86	86	83	255
Schooling	7	4	0	3	5	2	12	9	11	3	7	21
Books/research	3	0	0	0	0	3	3	3	3	0	3	6
Agri. Extension	0	0	0	0	0	4	0	4	0	0	4	4
Other	0	1	0	3	4	2	4	6	1	3	6	10
Total	49	48	45	44	48	42	142	134	97	89	90	276

9) Support for and barriers to UA

Only 14 out of 269 respondents indicated that they had sought support for their activities and only 15 indicated that they had received any. However, 80% of all respondents believed that UA activities deserved official support. A small percentage of respondents (12%) participate in a cooperative (Table 25)

	Luanshya Low Density	Luanshya High Density	Kitwe Low Density	Kitwe High Density	Ndola Low Density	Ndola High Density	Total
Yes	14	5	0	3	3	8	33 (12%)
Total	44	46	46	44	45	45	269

In addition to lack of support, land access was a key problem for 80% of households.

In Ndola, where UA enjoys official City Council policy support, it was surprising that only 3 / 45 respondents in low density areas knew of the policy and only 1/45 in the high density areas. Despite this low score, when informed of the policy 45/45 and 33/45 from the two areas respectively believed that the policy would succeed, 21/45 respondents from the low density area stating that local government needs to communicate about its UA policies more effectively.

10) Economy and job security

When asked whether they have suffered from economic stress, 50% of respondents indicated that they had, with 50% also indicating that they had been affected by family tragedy. In the case of Luanshya, 39% of respondents had been directly impacted on by mine closure. A notable degree of economic insecurity prevails with 56% of respondents

indicating that they did not believe that they were economically secure (see Table 26a). Table 26b indicates that 19% of respondents had been affected by job loss, but in the case of Luanshya this figure was nearly 50% in the higher income areas.

Table 26a: Are you economically secure?							
	LLD	LHD	KLD	KHD	NLD	NHD	Total
Yes	11	3	42	9	45	9	119 (44%)
n.	44	46	45	45	45	45	269

Table 26b: Have you ever lost your job?							
	LLD	LHD	KLD	KHD	NLD	NHD	Total
Yes	21	11	2	10	0	7	51 (19%)
n.	44	46	45	45	45	45	269

B- KEY INFORMANT INTERVIEWS

Introduction

The detailed interviews undertaken with key informants provided valuable insights into the practice of UA in the Copperbelt, its constraints and opportunities, the key role which it plays as a response mechanism to economic crisis and job loss, and the nature of the policy process which has been undertaken in Ndola. These details enrich, explain and clarify details gleaned from the surveys. Interviews were undertaken with 58 key individuals from local government, government, educational institutions, NGOs, business associations, CBOs and churches.

A series of key extracts presented below should help to clarify the key role which UA plays and why this should be the case:

- 'Urban agriculture and peri-urban agriculture have helped to mitigate the dependence on handouts and have encouraged people to fend for themselves. They have created independence' (KI Ndola 5)
- 'UA has always been significant in Ndola' (KI N6)
- 'Almost every household has a backyard garden' (KI N11)
- In Kitwe, '60% of people resorted to farming and were earning an income by selling crops' (KI K 14)
- 'UA is a sustainable alternative source of employment' (KI K 4)
- 'It is difficult to sustain families without farming' (KI K6)

- In Luanshya mine closure ‘was prompt and everyone was taken by surprise ... The only thing available for them (the ex-miners) to find an income was to fall back on farming’ (Town Clerk, 2011)
- ‘Because of poverty levels, urbanisation and structural adjustment, there is no employment. The best way to intervene is to encourage agriculture, involve people in small scale agriculture in the surrounding area, or where they are residing.’ (NGO Project Leader, Ndola)
- ‘Other countries keep dumping on us: poor quality products, handouts and foreign ownership, this creates a cultural of dependency.’ ‘There is an attraction to suit and tie jobs, we need to encourage entrepreneurship, to sub-contract from these internationals, and urban agriculture is both a method of survival and a way of Zambians re-entering enterprise’. (CBO University director, Ndola)

Key themes which emerged from the interviews are as follows:

URBAN AGRICULTURE – OPPORTUNITIES AND CONSTRAINTS, INFORMANTS’ COMMENTS

The role which UA plays

Three key informants noted the following:

“Ndola was a heavily industrialised town, but with the coming of privatisation industry was paralysed and people resorted to farming. In the past there were no commercial farmers other than those with large-scale poultry farms or cash crops and it was all peasant farmers doing the manual labour” **(KI N13)**.

“Everybody is doing it. Nowadays if you are retired you want to farm” **(KI N13)**. “As the economy has picked up again we haven’t seen a decrease. Maybe it is because they see they can earn more than from just working. UA is being used for supplementation and it is a protection strategy for people to fall back on” **(AKA)**.

“I estimate that 70% of vegetables consumed in Ndola’s low-income areas originate from within the city.” **(KI K6)**

Participants in UA

Participants in UA are often in a situation of having more than one income stream, one of which is UA. This theme dominated the interviews and was supported in the survey results by the appearance of higher levels of UA among the low density higher-income bracket. Virtually all of the study’s informants reported that most people in formal employment were also engaged in urban agriculture. The reason given repeatedly for this was a lack of

trust in the security of their employment, given the volatility of the economic climate of the Copperbelt.

In Luanshya, one informant estimated that 75% of the population are involved in UA either fully or partially. There was general agreement among informants that the majority of those working also undertake UA to some degree, hence for many UA is a supplementary activity and part of a multi-livelihood strategy

Many informants noted the change from UA being an interest of mostly older retirees, to now attracting a number of younger people, including younger men. Two informants noted that younger women aged 16 -35 were not very active in U A, while others indicated a high percentage of (presumably older) women involved in production for household consumption, with men more involved in crop sales.

Motivation for entering UA

A common motivation for entering UA cited by informants was because it is a means of ensuring fresh vegetable availability for home consumption, and / or it serves a role in 'yard aesthetics', for some it was more about providing income from the sales of surplus produce. This result is supported by the survey which showed high participation among high density and associated low income neighbourhoods, but even higher levels of participation among low density and associated high income neighbourhoods. A few informants noted the need to consider UA more as a method of improving livelihoods beyond basic nutrition provision.

Education institutions and UA

North Rise University uses UA to both feed its students and to introduce them to agriculture as a form of enterprise. This need to teach entrepreneurship at schools and at tertiary level re-occurred in the interviews, with North Rise University being a good example of a proactive response in that they have a University farm, they have an entrepreneurial focus in their courses, and a philosophy to encourage graduates, not so much to get a job, but rather to 'create' a job, with a recent project cited of four students establishing a business drying human waste to use as fertiliser.

High schools and primary schools are reported as using UA to feed students and teach agricultural skills with support from the Ministry of Education's (SHN) School Health and Nutrition programme. Several schools in the Copperbelt reported using UA as a method of generating income for school resources, with one (Dola Hill Basic) estimating an income of 1.5m kwacha per month from UA. It is apparent that some schools are becoming

increasingly enterprising, with some informants also noting that certain schools make their own school uniforms, and selling them has become a major income generator for the school. However, school-based UA lacking technical expertise was mentioned as a problem several times, unless the schools offered agricultural studies as a subject in the curriculum.

Health institutions/NGOs/ prisons

Several community gardens were specifically targeted in their establishment to meet the needs of the vulnerable or ill (notably HIV) families with the need for ownership emphasised. Seeds of Hope actively support HIV families to grow their own food in the city. UA is also practised at prisons, but the degree to which technical or entrepreneurship skills were incorporated into prison gardens was not ascertained.

UA – Training, education and extension support

One informant saw a benefit in providing experimental plots for training purposes, to encourage the participants to avoid making mistakes. Knowledge shortages were mentioned frequently as an operational constraint and the shortage of extension officers was noted, as was fuel for their transport. An additional problem is that extension officers are more rural-based and focused and are generally not available to provide support in urban areas (except in Ndola).

The need to disseminate information by word of mouth to those with little or no education was recognised, and the lack of formal education was raised. A lack of adequate skills results in a limited ability to understand chemical fertiliser application resulting in the ‘burning’ of the land, poor understanding of acidic soils and the need for rotation, and a lack of acceptance of composting and water harvesting. The need was also noted for more education into the likely effects of various forms of mine and sewage contamination and poor water. The issue of poor interest in skills was noted with one informant noting that those who had recently developed an interest in UA did not necessarily have a linking interest in developing UA skills. One informant felt there was a requirement for education about food nutrition i.e. the low value of Insema derived from maize (which is just carbohydrates, bran is discarded). Good educational support from NGO’s like Seeds of Hope was noted.

Shortage of land / Constraints of land access

The shortage of land was identified by many respondents. A lack of planning in this regard was seen as an issue with the Ministry of Lands not allocating urban land for farming or

accepting the need for city based farming. Several informants noted that a system was required for the allocation of the limited available land to manage the competition of land for housing with the requirement of ensuring provision of land for farming. Ndola currently has a pressure for land for housing with current plot size only being large enough for a house. The space available for backyard urban agriculture was indicated to be insufficient to address the household's food requirements, hence the requirement for larger areas of land. One informant noted that plot allocation is now shared by more people, thus making farming unviable. In Kitwe, inner city land is in short supply and land on the periphery lacked transport to access it. One informant noted an issue with a lack of security with rented land.

Marketing

Support for the marketing of produce and food handling was mentioned as a requirement. Informants noted that production is dominated by particular traditional crops such as maize, fruit trees and keeping of small animals. As a result, sales to formal sector retail outlets are limited, although a few mentioned sales to the Quicksave supermarket in Ndola.

Environmental issues

Several respondents mentioned the discouragement of UA on river banks due to erosion damage, siltation and fertiliser run-off. Despite this, UA still occurred in these locations due to the need to produce food. Other activities such as bee-keeping and chicken rearing were encouraged as an alternative in these vulnerable areas. One informant mentioned the issue of deforestation around towns due to charcoal production, and that UA was leading to a loss of forest cover, but the actual impact of UA on this was unclear.

Fertiliser and contamination issues

Chicken waste and treated sewage was reported as being used a fertiliser resource, however several interviews raised concerns regarding the threats from bacteria, including typhoid, the misuse of pesticides, heavy metal contamination from the mines (Kitwe), and UA creating malaria breeding conditions. Luanshya had restrictions on maize and chickens, because of their risk in encouraging mosquitoes breeding and the spread of disease, noise and smell. Two council informants indicated that they only focused on addressing animal smell and noise in relation to UA. Two informants indicated a lack of clear proof of the link between malaria and maize and the need for better research. Two more said the risk of malaria had to be balanced with the need for nutrition, resulting in a halting of crop removal. Another indicated that crop removal was more motivated by illegal tapping into

sewer lines and river bank siltation, with the possibility that dried maize stalks made the city appear untidy and poor aesthetics may be a motivator.

Contamination was an issue from boreholes, broken sewage pipes, from mining effluent seeping into streams and aquifers, sulphur in the air mixing with rain and turning the land acidic are other concerns. Lack of education regarding fertilisers, composting and contamination were mentioned earlier.

Water supply

Water supply and contamination was repeatedly mentioned, in central areas such as Kansenshi and Northrise in Ndola, water supply is not a problem, but shortages occurred in the poorer townships like Kabushi and Masala, where water availability is erratic and requires the drilling of shallow wells. Backyard UA lacks water, and there is a lack of willingness to accept water harvesting information, hence only those few farms beside streams can engage in continuous gardening. One council informant preferred UA to be located out of town due to the demand for water in the built-up areas.

Financial issues

A few informants mentioned the need for start-up capital for seed, fertilisers, etc. at reasonable interest rates, and the risk of losing farms and homes as collateral claims. One mentioned the need for a credit line or a revolving fund, while some indicated success with such an established fund, or an informal version of the fund, others mentioned problems with setting up a revolving fund in Ndola. UA was noted as an option for business establishments with low input costs other than physical labour, and hence should be encouraged as a method of promoting entrepreneurship.

Informants also noted the lack of affordable water for normal domestic use, let alone agriculture, with informants citing problems with meeting water bills, especially after minimum threshold amounts are exceeded. One informant noted the expectation of the receipt of 'handouts' for projects as a barrier.

UA and sustainability

UA reaches its potential with its positive effects fully maximised; "It is not yet 100% sustainable because we are just getting into it and you can't have 100% positive results straight away. It will, over time and adjustment, create a sustainable means of nutrition for

households as well as income from surplus” (KI N5). As the comment from KI N5 suggests, sustainability is not understood solely in terms of environmental or economic parameters, but also the social. This section will discuss issues around all three of these aspects of sustainability in terms of UA in Ndola through the presentation of the results of key informant interviews on the subject.

Economic sustainability is an important consideration for any development activity. For Ndola, and indeed for Zambia as a whole, the dependence of the economy on the mining industry has been recognised to have jeopardised national economic progress and left the country open to economic instability and shocks. Because of this, in recent years there has been a strong emphasis in government rhetoric on the subject of economic diversification, “Agriculture provides an alternative in terms of diversification from other economic activities. Ndola needs to diversify as a district” (KI N12).

The barrier most commonly identified was the limited ability of poor producers to create income. It was commented that at present, worthwhile amounts of income generation were largely restricted to urban farmers who already had mid- to high-range incomes; “At the moment, UA doesn’t really provide a lot of income for poor producers. The income generation is more for middle scale” (KI K4b). Many explanations for this were suggested, including land insecurity, lack of knowledge and lack of access to the capital or credit necessary to ‘get ahead’, all of which are well aligned with current literature on the subject. Further, key informants from the Ministry of Agriculture commented that many farmers, especially the poorer ones, did not utilise the most basic ‘business skills’. This was identified as a major constraint to low-income farmers, and it was emphasised in all interviews with employees at the Ministry of Agriculture that the Ministry was trying to encourage a more business orientated attitude towards farming among urban farmer interviews. Very few who sold their produce used simple costing or any book-keeping practices to decide on the end sale price, instead opting to compete with or align their prices with others at the market. It was commented that because of this, producers in Ndola were left highly vulnerable to exploitation by ‘middle-men’ who buy from farmers at low, ‘wholesale’ prices and sell produce on at a large profit in the market, in turn also disadvantaging consumers.

Environmental Sustainability Although it is well recognised that urban agriculture can cause positive environmental effects, without proper management more adverse effects can easily result. In Ndola, evidence of environmental degradation in connection to urban agriculture is apparent. The more serious issues are related to the use of resources such as soils, forestry and water. In particular, some of the most pressing problems are related to the issue of forestry operations encroaching within the forest reserves on the outskirts of the city. Because of land access difficulties, many farmers have been forced to invade protected forest and other marginal areas in order to provide food and income for their families. Urban agriculture and other activities, such as charcoal burning and the collection of fuel, have come to be relied upon in the face of declining formal employment options. KI

N12 stated that forestry encroachment was directly linked to the retrenchment caused by the ongoing downturn and estimated that in some areas at least 80 per cent of forest cover has been lost. The problem is compounded by the fact that at present the mapping of forest loss is incomplete and, with limited state resources available, the policing of forest land is difficult.

During the initial stages of policy development, many in positions of authority viewed urban agriculture in a negative light mainly because of the perceived link between growing environmental degradation and the practice. Key informants stated that many officials had to be convinced of the possible benefits of urban agriculture before they supported the policy, as many feared that legalisation would mean the increase of unchecked UA UA and a subsequent increase in environmental problems. Once it was understood that the policy was intended to be used as a management tool to combat these issues there was no further opposition to either urban agriculture or its legalisation in official circles.

Although negative and unsustainable environmental impacts were identified, the potential of urban agriculture to promote environmental sustainability and positive environmental effects was strongly emphasised by key informants. Again, the potential benefits of urban agriculture are hindered by things such as a lack of resources, limited education and the lack of supportive planning legislation. **KI N4b** emphasised the need for knowledge, education and the appropriate use of resources commenting; “The environmental impacts of urban agriculture could be positive, but the ECZ (Environmental Council of Zambia) is not doing enough to mitigate and teach people behaviours that combat adverse effects. It is sustainable both economically and environmentally, but we need help to start sensitizing about where it should actually be done. This is the first thing that needs to be done because if we are not careful the city could become polluted.”

Nutritional and Social Sustainability refers to the effect of urban agriculture on ‘social goods’ such as health and education. Nutrition was identified as a key reason for officials to support urban agriculture and to realise improvements in macro and micro-nutrition, macro-nutrition affecting energy levels and micro-nutrition affecting growth and development. A respondent commented, “The link between nutrition and agriculture is important. Urban agriculture can help meet the nutritional needs of the people. Even what they are planting can provide a nutritionally balanced diet if they combine crops to make a balanced product. For macro-nutrition, maize provides carbohydrates and chicken provides protein. Vegetables are for micro-nutrition with important vitamins like A, E and C” (**KI N4c**). Urban agriculture not only provides added nutrients and calories, but with proper education can diversify and balance the diet. As has been the case in all industrialised countries, as modernisation took effect on food production systems and societies’ eating habits, the number of widely used staple and supplementary crops has been greatly reduced in Zambia.

Health The prevalence of HIV/AIDs makes a focus on nutrition even more essential. Urban agriculture is being used in Ndola to improve both the physical effects and lives of HIV

sufferers; “Those getting back on their feet need empowerment and income. We want to continue with agriculture even though the program has finished, as it is in line with aids mitigation because of the nutritional aspect and further, the income from surpluses means families are able to send their children to school” **(KI N5)**. Because of improvements in the general health of HIV/AIDS patients through the use of anti-retroviral drugs, NGOs have been able to begin to encourage a focus on income generating activities rather than assisting in a solely care-giving role; “Today we are seeing the need to engage in income generating activities. The ARVs have been made much more available and people are now healthy enough to start doing things again. They can stand on their own feet now” **(KI N5)**. The local NGO in Ndola, Seeds of Hope, has been particularly active in providing support to these communities, and by 2013 had had contact with over 2000 HIV patients and was assisting a number of them with food supply.

Differences between the towns

Kitwe Council had limited interest in UA, focusing more on city growth and mining. They still have land evictions and the slashing of maize continues. They have mapped land in the city and are prepared to consider a UA policy, but currently the Council places emphasis on other projects and priorities.

Luanshya Council is supportive of UA due to the history of economic shocks experienced as a result of mine closures. There is available land and water and a high incidence of UA due to high levels of unemployment, and despite the lack of formal support. However, public policy is against raising chickens and growing maize in the urban area.

Ndola Council has accepted a UA policy, however, there has only been limited support and implementation on the ground and there are low levels of local awareness of the policy. NGOs such as Seeds of Hope play a role, while the departure of the Dutch NGO, the RUAF Foundation was a considerable setback.

COMMENTS CONCERNING UA POLICY

The development and implementation of UA policy in Ndola is detailed in the next section. Policy was developed with the assistance of the Dutch NGO RUAF and the Southern African NGO (MDP) Municipal Development Programme. Both, however, wound up their involvement in June 2011. The effects of their departure were strongly felt by some informants, particular because of the seeming lack of action from the Council since that date in terms of supporting UA. The only Council policy actions indicated by Council informants

were the regular MSF (Multi-Stakeholder Forum) meetings to address issues raised in the city strategic agenda, and the UA project at Chipulukusu.

A few informants felt positive about the MSF meetings when they were held, noting that communication among stakeholders and different regions had improved practices, creating a snowball effect. However in this process, one informant noted that the Council was not involved. Difficulty funding transport and refreshments for meetings was cited as a problem in hosting meetings and, in contrast, one informant was critical of the lack of MSF meetings over the previous year.

There was repeated criticism of the progress from MSF meetings due to lack of power and dependence on RUA/MDP for action. Though MSF member motivation was high, the disparate objectives of the numerous member groups resulted in a lack of dynamic leadership on the combined objective of UA and about structural issues. Three Council informants felt that there had been no actions in regard to the Council policy, bylaws have not yet been amended, as they needed to go to the Ministry of Local Government, however, one informant felt that the policy could be implemented without changing the bylaws.

Most of the official informants noted there was a low understanding of the policy by other officials and practitioners other than those who drafted the original policy. This is supported by the analysis of the 'practitioners' surveys indicating a very low awareness of the policy and non-Council informants made few mentions of the policy. One informant noted there is a need to harmonise the different policies of the various ministries affecting UA.

Emphasis was placed on funding challenges by several Council informants, with one informant noting that UA needed to be a clear local government responsibility and funding priority or, alternatively, the responsibility of an NGO and privately funded. Drawing on private company support was also suggested by another.

Despite this tentative progress, as evidenced in the January 2013 research visit, the MSF is now in abeyance, the Chipulukusu project has ended. The key driver from the Council, the Director of Planning, has been transferred to another district causing a serious loss of local momentum.

There is an interest in Kitwe to develop their own UA policy. In Luanshya, support for UA was mostly focused on providing roadside trading space, though this created inconvenience issues. Again in Luanshya, changes in the law are at proposal stages only and in January 2013 were with the Ministry of Local Government.

GENERAL ECONOMIC CONTEXT

Preference for paid employment

One informant indicated that trading is stigmatised and not a preferred vocation, the preference being for formal paid jobs such as mine-work, teaching or working in the council. To some extent farming is seen in a similar light as trading as it is not formal or paid. Another felt that UA was becoming more popular.

Employment mix in the Copperbelt:

Based on the feedback from informants, with some variation in views, a general pattern did appear. In all three towns, most informants estimated that most people working in the formal sector work in civic activities: including council, road works, teaching, police, and health. The next largest employment sector in Kitwe and Luyansa (but the fifth in Ndola) tends to be the mine or mine services. The third highest employment sector is informal and formal trade (2nd in Ndola), the fourth is in personal services, and the fifth is in the manufacturing of non-mine related goods (3rd in Ndola), in Ndola these were in food and cement production. In Luanshya, other main employment activities are in explosives and copper cable production, mineral water, bread and sweets. Very few of the towns had commercial tax-paying farms or nurseries. However, most people who are working also report doing UA to some degree as well.

It appeared that UA levels were higher in towns with a high dependency on mining, Kitwe and Luanshya, with a slightly lower uptake of UA in the more diverse economy of Ndola. However, despite this slight difference in uptake between mining and a more mixed economy town, it should be noted that in all three towns there was a higher uptake of UA among residents in low density and correspondently higher income neighbourhoods. This supports the informants' views that those in employment were now entering UA as an additional activity for food supplementation, food quality, extra income and aesthetic reasons.

Informal employment in the Copperbelt

Formal unemployment levels in the Copperbelt are high, as is dependence on the informal sector. However, it could be speculated that a percentage of these people may be earning a non-tax paying income in the informal sector. Informants indicated that most working Zambians also have informal businesses in activities such as UA and informal trade. Some informants reported problems with managing informal staff and being taken advantage of..

This staff problem was not directly reported in the UA sector, possibly because close family members undertook the gardening, though it may be an issue.

Preference for formal paid employment in the Copperbelt

Several informants noted that the expectations of modernity among Zambians leads to a strong desire for regular paid employment in white collar jobs, government jobs, with key motivators being the receipt of a car, clothing, set hours and paid leave associated with good employment. For example, the popularity of training to be an accountant, aiming to work for a corporation was cited by several respondents. In contrast, a low level of interest was observed by informants in self-employment or entrepreneurship, with a very low level of interest in risking personal capital in small business investment. UA was cited as a low financial risk option to enter entrepreneurship.

Some informants noted a low level of interest in entrepreneurship in the Copperbelt, with some citing the disincentive of the 'tall poppy syndrome', or a criticism of those who achieve success in self-employment compared with the higher perceived status of paid employment working for another individual or company. Two informants indicated a preference among Zambians to work for another person due to the lower level of work energy required to be an employee as opposed to the high labour energy inputs required in self-employment. The preference for gaining 'suit and tie' jobs, and the unwillingness to risk investment or collateral, were also recorded as reasons.

Entrepreneurship in schools and at the tertiary level

Informants noted that North Rise University has a UA farm, and this university also has an entrepreneurship focus, and a philosophy for "graduates not to get a job, but to create a job". Four students recently established a business drying human waste to use as fertiliser. The University enters national entrepreneurship competitions and expressed a need for council or company sponsored regional enterprise competitions.

It was noted that high schools were reported as being 'enterprising', with some making their own school uniforms and selling them as a major income generator for the school. Several informants noted that some people cannot see how their skills or local assets could be utilised or the business opportunities which could arise from these. Others similarly felt that the utilisation of Ndola's good water created opportunities for beer, soft drinks, bottled water, PVC paint, and food processing of local products, for example, potato chips. Petrol processing also offered opportunities for bi-products.

Disincentives for Zambian entrepreneurship

Disincentives to employ staff formally were reported due to high employment requirements including 20 holidays per year and sick-leave, 2 'mother days' per month, funeral leave, lunch allowances, travel allowance and accommodation allowance which is typically 35% of base income.

According to a key informant from the Kitwe District Chamber of Commerce and Industry, "Zambians don't tend to invest, they look for jobs provided by outside investors...our education was not creative and we are only now training in entrepreneur skills, ...(and we are) not trusting of business partners."

'Unfairness' in the economic system was also cited as a reason for low entrepreneurship levels. Comments included the following:

- Mines windfall tax which reduces tax paid by the mines
- tax inconsistencies
- low mineral royalty tax
- local and national government special deals to outside investors, that are not available to locals, for example special economic arrangements such as Comesa which offered a special reduced import duty to investors from other African nations such as Egypt which established the Egyptian Electrometer factory in Ndola
- the Special Chinese Economic Zone (gated and located outside of Kitwe), which has tax free status, a privilege which is not available to other entrepreneurs. The Chinese firms operating in the Zone have no or very low levels of economic association with local businesses.
- There is an inability for local producers to access affordable loans or supply collateral, with very high interest rates on loans, strict repayments and no payment holidays, and complex political decision making systems
- corruption and general preferential tendering are also barriers.

Several informants noted the problem of the acceptance of poor quality imports into Zambia and the subsequent decline in local production of manufactured goods. Very limited controls on import standards was reported as making Zambia a 'dumping ground' for low quality products, resulting in the closure of furniture, sugar, car, fabric and clothing manufacturers in Ndola and the generally low interest in entering entrepreneurial activities. The following manufacturing businesses still based in Ndola include; biscuits, cooking oil, mealie meal, sweets, bread, beer, water, cola, home-based informal brick industry and backyard furniture manufacturing. The following businesses remain, but are in foreign ownership: cement and lime production, petroleum related industry, polystyrene foam production, electrometers, rope and sugar distribution.

The interviews noted a very high level of foreign business ownership in the formal sector in all three study towns with low levels of Zambian ownership. Larger food retailers were also foreign, notably South African owned supermarkets, Pick and Pay and Shoprite, which tended not to source from local suppliers, preferring instead to deal with large suppliers for quality control and discount reasons. Smaller supermarkets such as Quicksave do buy local produce, including vegetables and other fresh foods from school gardens. The study noted the limited appearance of processed foods and even fresh foods which were branded as being produced locally, however this was a very minor component of produce available. The researchers noted that informal markets had large volumes of local fresh produce however it could be speculated that most was from the rural rather than the urban area. A food retail representative mentioned the problems of local produce meeting quality and consistency of supply standards, and consumers' preference for South African brands over local brands - "we need to change the perception of local products." Several informants supported foreign investment, but indicated that this needed to be balanced with local spin-offs. Several mentioned the need for the higher ranking job positions to go to Zambians, which was not currently occurring.

New retail and commerce ventures tend to be disconnected from existing markets with one existing new shopping mall and two proposed malls (one Ndola, one Kitwe) located on the outskirts of the central activity areas, and which are unlikely to have spin-offs with local markets. Likewise, a large and gated special economic zone was located outside Kitwe, with access being restricted to certain specified Chinese companies.

Other recent economic trends

One informant noted that people engage in UA and in a range of other informal trade activities such as trading in East Africa and Congo and they travel frequently to these areas. It was noted by informants that there is the recent establishment of a number of ornamental nurseries resulting from a greater interest in yard beautification and the emergence of an income bracket with some discretionary income. The Chinese government has built a new soccer stadium to hold 40,000 people on the outskirts of Ndola, allegedly in return for access to copper, with one informant indicating that at least 1 in 10 employees are from China, who are generally in supervisory roles.

CONCLUSION

Both the interviews and the survey results indicate a high uptake of UA, in particular among those in low density neighbourhoods which correlates with reports of higher uptake among

those with other forms of employment in the council and business, who tend to reside in the lower density neighbourhoods. Unfortunately, various NGO's (RUIAF and MDP) who were undertaking UA have since withdrawn with extension officers remaining rural based rather than urban. North Rise University in Ndola and a few schools are active in UA and entrepreneurship training, however uptake by other schools in the UA 'training' aspect remains low. Market opportunities for UA are limited to the informal markets, with supermarkets and malls having poor linkages to local producers.

The policy actions by Ndola council and actions by the other councils, have been slow to occur in the areas of land allocation, water provision, contamination monitoring, education programmes in farming techniques (in particular in urban areas), water harvesting education, market access facilitation, including food processing/added value, and addressing problems with revolving financing schemes. These initiatives have generally not been achieved, a situation compounded by the withdrawal of NGO's. Bylaw amendments to assist UA have been delayed at Ministry level. The Ndola council sponsored UA Multi Stakeholder Forum meetings have only occurred sporadically in recent months, and encounter difficulties due to the diverse groups having differing agendas, leading to a disjuncture over reaching agreement on actions or identifying a body to implement actions. Regarding the sector meetings, it may be more advantageous for the future focus to be more on the individual groups, encouraging them to initiate actions that support UA within their area of responsibility. Issues have arisen in particular in the area of the need to encourage UA participants to uptake useful practices, to avoid contamination and to engage in more entrepreneurial activity. It is hoped that the sector groups may be able to address some of these needs within their areas of responsibility. Businesses may also be included in sector liaison and able to assist via offering market access and sponsorship of entrepreneurial competitions. Additional resourcing of actions remains unaddressed by council, government ministry, NGO, business or educational institutional options. The UA needs of the less well educated, or those on low incomes or with health issues, may require additional support from council, schools, churches and NGO's.

While the current make-up of the Copperbelt's general economy tends to focus on Zambians access to the formal economy and providing employment in often foreign owned corporations, there will continue to be a need to have opportunities to supplement both food sustenance and income via informal economic activity which UA can commendably achieve. Blockages to accessing land, water and knowledge in farming and contamination will need to be addressed.

Opportunities to enter the formal economy need to also be opened, to reduce the dependence on UA, and provide opportunities to enter the formal economy both through entrepreneurship and added value to products like agriculture. There is also a need to ensure that the foreign owned formal sector is actively encouraged to locate and

subcontract in a way that allows some spin-off to the Zambian entrepreneur. A levelling of the economic playing field that encourages Zambians to also enter, which may be a challenge after being off-field for so long, would represent a significant step forward. However, the field research in this study has clearly shown that urban agriculture could offer an opportunity for ordinary Zambians to enter or re-enter the world of enterprise.

6) POLICY CONSIDERATIONS: THE CASE OF NDOLA

As a development strategy, urban agriculture has been promoted because of its potential to alleviate urban poverty, food insecurity and malnutrition and the possibilities it provides to generate employment and income and enhance the urban environment. However, practising urban agriculture in the developing world is known to be both difficult and risky for urban farmers, particularly the poor. In order to mitigate the risks, break down the barriers and meet the potential of urban agriculture, many authors have called for more permissive and supportive institutional and technical frameworks (Mougeot, 2006; RUAFA, IDRC). Pro-urban agriculture policy at a local level is one aspect of this framework which is suggested by organizations such as the FAO (2012) as a response to the challenges faced by urban agriculturalists in both the developing and developed world.

However, movement toward official recognition of urban agriculture in Africa has been slow. Traditionally, the responses by local and national governments to urban agriculture have been largely negative, and the motivations and parameters of urban agriculture were for some time largely misunderstood. In many African cities, the practice is still outlawed in bylaws and public health acts and UA is seen as a nuisance, if not a threat to health and modernisation. However, there has been some movement away from repression and discouragement towards a more supportive or at least tolerant attitude to the practice. This represents a major shift in a region where urban agriculture has since the colonial period invoked strong associations with backward, rural habits, poverty, criminal activity and malaria. These 'colonial hangovers' have meant that urban farmers have faced harassment, lack of recognition of their land rights, forced eviction, and the slashing of crops or culling of livestock.

Despite these practices, the tide is changing and, as the FAO (2012) reports, numerous governments in Africa are at least considering policy options and urban planning interventions to support UA. One of the first cities to take concrete action to provide official support for UA was Ndola in the Copperbelt. While the key roles of UA plays are blatantly apparent, as the evidence presented above shows, it is significant that in a country characterised by a public health based animosity to UA (Hampway *et al*, 2007) that this city has both formally engaged with the process of UA and in 2010 released a policy document supporting UA in the city. This reality justified a particular focus of this study on the policy aspects of UA, with a view to determining why the policy was instituted in Ndola, what it stated, with what success is it being implemented, and, in terms of developing and disseminating good practice, whether any lessons for other cities can be derived from it.

Why was the policy introduced ?

Key informant interviews indicate that the coalescence of both external and local factors laid a basis for driving the policy process. While the reality of UA had long been recognised in Ndola and Kitwe by Ministry of Agriculture staff, it was when an external NGO, RUAFA (a

Dutch NGO- the Resource Centre for Urban Agriculture and Food Security), in collaboration with a Southern African collaborator, the MDP (Municipal Development Programme) based in Harare in Zimbabwe, recognised that given the scale of economic collapse which had taken place in Ndola that external support was necessary.

Starting in 2008, RUAF, in collaboration with the MDP and local stakeholders, initiated a three-fold process;

- It engaged local expertise, notably from the Copperbelt University in Kitwe, to undertake research into the viability of UA in the city and how it could be supported. The resulting documentation included a 'Strategic Agenda' for UA and a set of recommendations for the city to consider.
- A Multi-Stakeholder Forum (MSF) was established to oversee the process and to encourage networking between a wide group of stakeholders (government, farmers, NGOs, etc.) with the goal of providing broad-based support for UA.
- A RUAF funded project entitled 'From Seed to Table' was initiated to support UA activities in two communities, in collaboration with the City Council and the Ministry of Agriculture.

UA policy development in Ndola

In 2008, RUAF, the MDP and Ndola City Council produced a document entitled Key Issues and Recommendations on Urban Agriculture. This document clearly identified the key role which UA has played, stating, 'Ndola city has immensely benefitted from urban agricultural activities. Coming from a background of total economic collapse, a number of residents have had their livelihood upped due to these activities. Loss of jobs in the defunct industry left many without any resources for food. Urban agriculture has bridged the gap by providing food security' (p.iii).

This document identified that the following issues needed to be addressed to support and institutionalise UA in the city;

- Improving access to and ownership of land by streamlining land allocation and mainstreaming gender issues
- Reviewing policy guidelines and removing legal conflicts
- Improving access to water
- Improving access to markets and providing markets in each residential area
- Capacity building and extension support
- Council funding for UA.

In terms of policy research in 2009, another key document entitled: Urban Agriculture: Strategic Agenda for City Of Ndola, was produced by the Core Team (the MSF and researchers), the RUAF Foundation and the MDP. That document established the following:

- That the city covered 110 300 ha and had a population of 364 757 people in 2000; 59-63% of whom are poor; the dependency rate is 80.4 and the HIV/AIDS prevalence rate is 26%
- 'the city of Ndola has been engaging in urban agriculture since the time it was created' (p.1)
- 'the city is predominantly a commercial and industrial city. Change of economic policies in the 1990's saw a serious economic decline which led to the closure of many companies leading to a lot of people being jobless. Agriculture became an alternative for economic survival: however, since it had not been planned for earlier, some activities have been running into conflict with existing rules and regulations' (p. 1)
- 'A lot of the urban poor engage in urban agriculture in an effort to reduce poverty, improve food security, as well as to meet their nutritional needs. Therefore, urban agriculture has contributed greatly to economic empowerment, food security, nutrition and making available fresh foods to the population of Ndola' (p.)1 – but a lack of coordination prevents it from achieving its full potential.

The 2009 document proposed the following vision for the city and UA: ' A developed, legal and sustainable urban agriculture for the city of Ndola which is well coordinated, participatory and contributes to the city's economy while maintaining the resource base by 2015' (p.3).

Key foci identified included the following needs;

- To review laws and regulations and to develop a by-law on UA
- To create a land inventory and to provide tenure security to 80% of vulnerable UA farmers by 2010, and to provide land to 35% of the needy households by 2010
- To improve water supply and infrastructure to all wards
- To facilitate start-up capital for the poor
- To engage with all relevant stakeholders
- To undertake marketing research and training
- To train farmers, especially women.

In March 2010, Ndola City Council, based on the preceding research and policy process, and in collaboration with the MSF, MDP and RUAF, approved an: Urban Agriculture Policy For Ndola City Council. According to the document: 'The aim of this policy is to facilitate an enabling environment for the participation of all stakeholders in the development of urban and peri-urban agriculture ... Food security through sustainable agriculture has a significant relationship with poverty alleviation and sustainable development ...The principal aim of this policy is to facilitate a participatory environment in the sustainable development of urban and peri-urban agriculture in Ndola to create a framework for food security and poverty alleviation' (p.1).The Policy purpose was identified as the need:- to provide

guidelines for the development of UA in the city and to ‘formally recognise urban agriculture as a permissible land use and commercial activity in Ndola’ (p. 7).

The policy objectives to develop are:

- To devise an integrated strategy to maximize the city’s contribution to poverty alleviation and socioeconomic development
- To provide an enabling municipal environment to direct the development of UA and UPA
- To provide an institutional framework to ensure stakeholder participation, consultation, capacity building and the successful development and management of UA and UPA.
- To enhance the integration of UA into the city’s development plans and land use planning
- To ensure the availability of land and tenure security
- To ensure the provision of affordable and adequate water
- To ensure that poor households are food secure / to provide agricultural extension support, land access and sustainable and environmentally sound policies / to diversify agricultural production
- To build capacity
- Poverty alleviation – to promote sustainable job opportunities and income generation and to facilitate entrepreneurial and business development through micro-financing, and collaboration with all supporting stakeholders
- Marketing development – to train farmers
- To improve the keeping of livestock in the city and to prevent health risks.

Institutional considerations are:

- UA is to be housed in the Department of Development Planning of the NCC which will work with the Ministry of Agriculture, the Environmental Council of Zambia, various NGOs and government departments.

Work undertaken to date include; land use mapping and policy analysis, identifying conflicts between UA and forestry policy, council by-laws which restrict maize and the environmental policy which restricts cultivation of river banks .

Implementing Ndola’s UA Policy:

Despite the innovative and forward looking nature of the above policy process and the degree of legitimatization it has accorded to the practice of UA, unfortunately outcomes have not matched expectations.

On the positive side the Council has adopted a more tolerant approach to UA and the slashing of crops appears to have stopped, which has continued through to 2013. Equally significant, and what is probably the key success of the policy, as identified by Key Informants, is the reality that the existence of the policy has *de facto* legitimised the involvement of the Ministry of Agriculture with extension support within the city boundaries (which is not common practice in the cities in Zambia). The provision of advice and support with fencing and seeds, and help rendered to cooperatives have been significant support processes which, according to farmers interviewed appear to have made a tangible impact. In 2013, the Ministry was preparing to assist 6745 Ndola farmers with fertiliser inputs, and a plan is in place to encourage unemployed urban residents with land outside the city to move to that land and plant crops all year round, not just in summer.

On the negative side, the disengagement of RUA and MDP from Ndola in 2011, and the later cessation of the 'From Seed to Table' programmes, has been a significant step backwards. While the local will certainly exists in the City Council to support UA, the loss of external funding, support and assistance has been a major blow for the UA process in the city. The Council it would seem simply lacks the resources to implement the policy despite the full support of the Council and the City's Executive. The transfer of the Director of Planning, who had been the Council's UA champion, to another district has been a key blow to the Council process and engagement with UA.

Other negatives noted during Key Informant interviews were;

- The difficulty of amending by-laws because of the inevitable clash with national laws, particular those which pertain to public health issues. National laws need to be amended first before bylaws can, and at present national planning laws are undergoing a rather drawn out review process.
- The fact that the MSF has effectively ceased to exist owing to lack of funds to support the meetings
- The lack of the anticipated private and financial sector buy-in to the process.
- The absence of market support.

As a net result, NGOs have become very critical of Ndola City Council and the effective stalling of the process. Rather worryingly, as the survey indicated, hardly any urban residents in the city were aware of the existence of a UA policy, although most felt that a policy would be ideal. Only 6% of low density residents knew of the policy and 2% of high density residents. When told about the policy, 86% believed that the policy would succeed, but 45% believed the local government needed to communicate more effectively about the policy.

On the positive side, as a key official from the Ministry of Agriculture noted in 2013:

- A large local company is considering providing UA support through the Ministry to local farmers

- Despite the limited nature of interventions UA is now widely recognised and acknowledged, and the slashing of crops has ceased
This is a notable increase in local UA production in Ndola which is reflected in improved provision of local produce at the city's markets.

Another positive development, though more from the practice viewpoint than the policy of UA, is that the Seeds of Hope NGO are not operating some 8 ha. of land in the city as a demonstration and training site for local producers as well as a revenue generating exercise. The Ministry has had some engagement with the NGO which will hopefully strengthen over time and lead to them using the NGO to up-skill UA farmers.

Identifying a way forward

While the UA policy seems to have stalled in Ndola (with the exception of the significant activities of the Ministry of Agriculture and Seeds of Hope) this is a very unfortunate outcome, especially given the resourceful and supportive nature of the earlier policy development process and the clear importance of UA in the city. In some ways the outcome reflects the unfortunate outcome of donor driven processes.

In terms of the way forward, although allocating additional resources and finances to the issue is the logical answer, the reality is that the Council is ill-positioned to afford such expenses. As a result, the way forward may in fact be more modest taking the form of:

- Continued encouragement of the positive actions of the Ministry of Agriculture which include extension support and advice and the distribution of farming inputs such as fertilisers
- Ensuring that local citizens are aware of the city's support of UA and the adoption of a tolerant approach in terms of access to land and not destroying crops
- As noted by the Ministry of Agriculture, a formal policy helps to assure land designation and avoid conflicts. In parallel, UA needs to be incorporated into formal physical planning processes
- Investigating whether by-laws may be amended and what the legal obstacles are in terms of national law
- Trying to provide market access to UA farmers
- Trying to maintain the work of local stakeholder forums which network key providers and practitioners in the field and which can lobby local government
- Looking for seed funding e.g. from large business interests, to support networking, training and marketing in particular
- Advice with sales, marketing, processing and preserving food is needed.
- Local NGOs such as Seeds of Hope have some capacity through international donations to provide UA training and supply water to UA through sinking boreholes.

Links between the NGO/s, city council and Ministry of Agriculture need to be encouraged to better service UA practitioners.

Lessons for other cities;

- UA is an urban reality and a key source of food security and income which needs to be recognised and supported, especially in an era of growing global food shortages and rapid urban growth as identified by the FAO (2012)
- Cities can play a key role in supporting UA, but they will need to have the resources, staff and funds in place to push through with desired actions
- Cities must collaborate with a range of stakeholders, and need especially to work collaboratively with the local branch of the Ministry of Agriculture and NGOs to maximise impact
- Donor support plays a role, but donor dependence must be avoided
- Restrictive by-laws need to be identified and adapted where possible
- Considerations of land access and tenure, water supply and market access are critical and need to be factored into support mechanisms
- Support for UA needs to be factored into urban physical planning processes through the formal provision of land for urban farming.

7) CONCLUSION AND RECOMMENDATIONS

Previous research into UA in the Copperbelt has identified the key role which it plays in terms of helping to ensure both household food security and income, and in the case of certain vegetables, up to 80% of urban demand is met through UA (FAO, 2012). This study has broadly endorsed these findings and established not only the key role which UA plays both in urban survival and food security in Africa, but also the degree to which it can be supported and the obstacles which exist to such support. In this section the key findings of the study are summarised, and recommendations both for the study area and further afield are discussed.

Key findings

This research investigation has revealed some striking findings about the practice of UA in the Copperbelt in Zambia. The magnitude of the economic and employment loss which took place following rationalization of the mining industry, and the associated collapse of the manufacturing sector, meant that urban residents were forced into destitution and, given the long established urban nature of settlements, this meant that urban dwellers no longer have a rural base to return to.

Key findings from the survey and key informant interviews include the following considerations:

- 1) The practice of UA is widely regarded as being one of the few logical responses to the scale of the economic collapse which affected the area. In the survey it was established that only 44% of responding household heads are employed in the formal sector, the balance being unemployed, self-employed, or in the informal sector, suggesting the key role which survival strategies such as UA play in the area. High levels of economic insecurity prevail in the area, with 50% of respondents indicating that they have suffered from economic stress, including job loss, while 56% believed that they are not economically secure.
- 2) Crush *et al* (2010) found rates of practising UA in 10 cities in Southern Africa averaged around 22% of households. The present study by contrast, based on detailed street level interviews and surveys, found UA practising rates of 84%, which is higher than levels recorded any well else on the continent, based on comparisons with literature accessible to the authors. This in itself is one of the study's key findings. In Luanshya, on average 93% of households surveyed practice UA (94% in low density areas; 91% high density), in Kitwe the figures average 83% (low density 94%; high density 72%), and in Ndola an average of 78% average was recorded (low density 81%; density 76%). The remarkably high figures in Luanshya and Kitwe are probably directly attributable to the loss of mine jobs (Musasa, 2012; Key Informant

interview). The relatively lower figures in Ndola are probably due to the fact that the city's economy has always been more diversified and less dependent on the vulnerable mining sector.

- 3) The above findings indicate that low density areas (i.e. wealthier areas) have higher levels of practising UA. This supports the findings of Webb (2011) and Crush *et al* (2012) that better resourced middle income people often have better access to land and resources to farm than the destitute. Overall, 90% of respondents indicated that they practice UA to supply food and income and only 10% treat it as a recreational activity.
- 4) In terms of gender issues, 45% of the heads of households practising UA were women, emphasising the key role they play in single parent families and in the domestic economy which seldom receives the necessary levels of support. In addition, high levels of dependency prevail within households, which have an average of 5.8 dependents, and in some cases this is as high as 12.
- 5) The study found that 90% of respondents practice UA to produce food and save money. Some 50% of practitioners were forced into UA because of economic stress and/or job loss. As a result, some 67% are now food secure and 63% can meet their basic needs. These considerations emphasize the value of UA as a viable alternative to economic crises and job loss.
- 6) Another key finding from the study was the reality that UA is a not insignificant provider of employment. In total, the 326 households interviewed had employed 467 people and the farmers have been engaged in UA for between 6-15 years.
- 7) Sales figure from UA are higher than have been noted elsewhere in the continent, with some 37% of practitioners selling some of their produce, whilst 39% of those who sell produce have UA as the primary source of income, and for 44% it was the second most important source.
- 8) In terms of food security, it was found that in the households surveyed, UA supplies 49% of UA households' vegetables and 45% of their maize. Of the food produced, the households consume 63% of the maize crop and 72% of vegetables; they give away 12 % (maize) and 13% (vegetables), and sell 23% (maize) and 12% (vegetables).
- 9) To date, minimal state support has been received by practitioners and there exists a strong desire for state assistance with extension support, and land and water access.

A key aspect of the study was a detailed investigation into the distinctive and possibly unique case of UA policy support embarked upon in Ndola. The research indicated that external NGO involvement, high levels of local engagement and proactive support from the Ministry of Agriculture had helped to drive an ambitious policy development process which culminated in the formal adoption of a city-wide UA policy in 2010. Key elements in the policy include proposed support for land and water access, marketing and extension support, training and advocacy. Sadly, as our research shows, the policy has been difficult to implement because of a lack of funds and resources and disengagement by the supporting

foreign NGO. Despite this, one of the key outcomes has been the active support which the Ministry of Agriculture has been able to render in the urban area. In this next section, recommendations which can be drawn from the study's findings and from the policy process in Ndola are outlined.

Fulfilling the aims of the study

The primary aim of the research was to assess the significance of UA in poor households both for its nutritional and income value, particularly since a considerable proportion of food production is often undertaken by women. The degree to which policy changes are or might make a tangible difference in the practice of UA was also assessed.

The research undertaken clearly shows the key role which UA does play as a poverty relief mechanism, and the role which it plays in terms of helping to assure food security and limited income for some, not just for the urban poor, but also for wealthier people who also are vulnerable to economic threats. Women clearly play a key role in the process of UA as the results demonstrate. Policy development, though by no means yet complete, has drawn together stakeholders, increased the awareness of UA, and has significantly promoted active engagement in UA processes in the city by the Ministry of Agriculture.

In terms of achieving the proposed objectives for the study, the following can be reported;

1) *The nature of recent economic changes in Copperbelt Province.*

Statistics reveal the dramatic nature of post-1970s economic collapse and job loss and the degree to which people have had to become increasingly self-reliant on practices such as UA in order to survive.

2) *Why are certain communities (geographical, economic, gender, age) in Copperbelt Province increasingly attracted to UA?*

Job loss and lack of alternative opportunities – for both genders and all age groups are the key drivers. Existing skills make this a logical avenue of choice.

3) *The significance of UA in household food security and sustaining livelihoods relative to other livelihood sources, especially for poor and HIV/AIDS affected households.*

As has been demonstrated, UA can meet upwards of 50% of household vegetable and maize needs and it has helped to make households more food secure. It was difficult to ascertain the impact of UA on households with members who had HIV/AIDS, however, Seeds of Hope and the earlier RUAF programme have recognised the specific needs of this group and have offered direct support.

4) *Why has Ndola acted pro-actively to support UA when other cities are much less supportive?*

External donor action and key support from the local branch of the Ministry of Agriculture have been critical in driving the process and in encouraging council action.

5) *The match between available support and the needs of UA practitioners*

A mismatch exists- practitioners need land, water, security and advice and with the partial exception of Ndola these needs are not being met.

6) *What operational challenges are impacting upon the institutionalization of support for UA?*

A lack of funds and skilled staff in the Council, and associated slow progress with reforming by-laws.

7) *How might livelihoods evolve in the future and what are the needs of UA?*

As noted by the Ministry of Agriculture in 2013, the practice of UA appears to be increasing. There is little prospect of mass access to formal employment, so survival strategies such as UA will continue to play a key local role. UA needs support in terms of funds, resources, inputs, access to land, water, training, advice, market support and legal recognition.

8) *What lessons can the Copperbelt and, more specifically, Ndola's experiences provide in developing appropriate measures to support UA elsewhere in Sub-Saharan Africa and beyond?*

Refer to the next section.

Recommendations

According to the FAO (2012) and Crush *et al* (2010), policy makers need to pay closer attention to the potential of UA. While they hold the view that its current significance has been exaggerated, they are also of the opinion that its role can be enhanced through a range of strategic interventions including;

- Strengthening market chains, particularly through the creation of farmers' markets and seeking access into formal retail /supermarket networks
- Seeing UA as part of the urban food supply system as a whole and seeing food production within the broader social, economic and political context

- A lack of tenure security is regarded as a particular challenge which has forced people to farm on marginal and dangerous land e.g. floodplains. A clear argument exists to legitimise land access and to give some degree of security of tenure to encourage confidence among the producers and to reduce their fears and resultant lack of investment in what is often seen as land which they have limited access to
- Promotion of innovative strategies, techniques and new technology
- Training, technical advice and extension support
- Promoting preservation and providing storage facilities
- Improved access to inputs and credits
- Setting up farmers' associations / cooperatives
- Acknowledging the role of women and also children in the activity
- Monitoring for and addressing environmental risks
- Ensuring access to safe and reliable water supplies is a key issue in many cities.

In order to achieve the above, the FAO (2012) argues that;

- 1) There needs to be political and institutional support and the removal of restrictive legislation
- 2) Urban planning needs to allow for an incorporation of UA activities e.g. in Maputo, Mozambique, 'green zones' have been provided in the city for cultivation
- 3) Increasing production and improving quality of produce (through training, recycling and use of less harmful inputs)
- 4) Building an efficient horticulture supply system – through strengthening gardeners' associations and cooperatives to help achieve market access.

As stated above, this study has identified a set of clear recommendations for Ndola and for other cities which wish to support UA. As Luanshya and Kitwe, though tacitly supporting UA, do not have formal support processes in place, these recommendations are equally relevant to these urban centres. These suggestions should be read in conjunction with the FAO (2012) and the Crush *et al* (2010) recommendations. They are as follows:

In terms of the way forward for Ndola, even though allocating additional resources and finances to UA is the logical answer, the reality is that the Council is ill-positioned to afford such expenses. As a direct result, the way forward may in fact be more grass-roots based and focus on encouraging local interest and awareness and supporting self-action by UA participants and encouraging their input in conjunction with other parties.

- Continued encouragement of the positive actions of the Ministry of Agriculture, these include extension support, in particular in urban situations. This should take the form of advice about matters such as water harvesting, composting, nutritional crop knowledge, contamination management, UA business development and the distribution of farm inputs such as fertilisers.

- Actively ensuring that local citizens are aware of the city's support of UA and its adoption of a tolerant approach in terms of access to land and non-destruction of growing crops.
- As noted by the Ministry of Agriculture, the existence of formal policy helps to assure land designation and avoid conflict. In parallel, it is recommended that UA needs to be incorporated into formal physical planning processes.
- Investigating whether by-laws may be amended and what the legal obstacles are in terms of national law.
- Helping to provide better market access to UA farmers.
- Incentivising and encouraging the private sector to utilise UA produce.
- Providing access to business skills in UA as a low risk option to achieve income enhancement and thereby increasing the status of UA.
- Encouraging local stakeholder forums which network key providers and practitioners in the field and which can lobby local government and initiate self actions to support UA activities.
- Developing access to seed funding with lower collateral requirements and flexibility in payments.
- Seeking and incentivising joint funding and contributions from other parties, for example from large business interests, to support seed funding, networking, training, marketing and research.
- Providing advice on sales, marketing, processing and preserving food is needed.
- Encouragement of local NGOs such as Seeds of Hope, who have some capacity, through international donations, to provide UA training and supply water to UA through sinking boreholes.
- Links between the NGO's, City Council and Ministry of Agriculture must be strengthened to better service the needs of UA practitioners.
- Research is required to provide evidence of links between UA, malaria and contamination by mine activity and sewage.
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b). Lessons for other cities;

- UA is an urban reality and a key source of food security and income which needs to be both recognised and supported, especially in an era of growing global food shortages and rapid urban growth, as identified by the FAO (2012).
- Local awareness of the key role which UA can and does play in urban food security and what support is available locally is essential.
- Cities can play a key role in supporting UA, but they will need to have the resources, staff and funds in place to push through with desired actions.
- Cities must collaborate with a range of stakeholders, and need especially to work collaboratively with the local branch of the Ministry of Agriculture and NGOs to maximise impact.

- Participants must be encouraged to self initiate solutions within their individual areas of responsibility, rather than seeking unanimous agreement. Sector UA participant groups, including private companies involved in distribution to and from UA participants, should be encouraged.
- Donor support plays an important role, but donor dependence must be avoided.
- Restrictive by-laws need to be identified and adapted where possible.
- Considerations of land access and tenure, water supply and market accessibility are critical and need to be factored into support mechanisms.
- Support for UA needs to be incorporated into urban physical planning processes through the formal provision of land for urban farming.

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APPENDICES

Appendix 1: Key Informants / Categories of Informants

Appendix 2: Key Informant Interview Schedule

Appendix 3: Questionnaire Survey

Appendix 4: Key issues emerging from key informant interviews

Appendix 1 : Key Informants / Categories of Informants

1	3 individuals	City Council and MACO, Ndola
2	1	Luanshya Town Clerk
3	2	Ndola Nutrition Group
4	1	Extension Methodologist, MACO Ndola
5	1	DACO, MACO Ndola
6	1	Director of Development Planning, Ndola City Council
7	1	Senior Ag. Officer, MACO Luanshya
8	4	Director and staff, SOHIP, Ndola
9	1	Principal Inspector, Zambia Environmental Management Agency (ZEMA)
10	1	Deputy Director of Social Planning, Kitwe
11	2	DACO, MACO Kitwe
12	2	CBU
13	1	Director, Northrise University
14	2	Chamber of Commerce, Ndola
15	6	Owners, Local Business, Ndola
16	3	Directors, Zed Bionic Ndola
17	1	Fisheries Officer
18	1	SOHIP
19	2	Directorate of Physical Planning, Kitwe
20	1	Senior Ag. Officer, MACO Ndola
21	1	Director, Sustainable Agriculture Programme (SAP), Kitwe
22	1	Forestry Department, Kitwe
23	1	Programmes Manager, CINDI Kitwe
24	3	Agricultural Extension Officers, Kitwe
25	1	Citizens for a Better Environment, Kitwe
26	1	Agriculture Trainer, TransAfrica Theological College
27	1	District Fisheries Coordinator, Ndola
28	1	Dawn Trust, Ndola
29	1	District education board secretary, Ndola
30	1	Head Teacher, Dola Hill Basic School
31	1	Deputy Head Teacher, Kayele Basic Ndola
32	1	Director of Environment, Community and Health Services, Ndola City Council
33	1	Public Health inspector, Department of Public Health (NCC)
35	1	Livelihoods coordinator and programmes officer, Catholic Diocese,

		Ndola
37	1	Senior Lands Officer, Ministry of Lands – Southern and Northern Region, Ndola
38	1	Kafubu water
39	2	Kitwe Chamber of Business
40	1	Government Patents Office

Note: In several instances more than a single individual from an organization was interviewed, in addition, interviews were also undertaken with community leaders / leaders of community co-operative bringing the total interviews up to 58.

APPENDIX 2 – KEY INFORMANT INTERVIEW SCHEDULE

1. Name:
 2. Location
 3. Associated organisation and position:
-
1. What does the term urban agriculture mean to you?
 2. Do people practice urban agriculture in this city? If yes, continue to question 3a:
 - a. Who practices urban agriculture?
 - b. Why do these people practice urban agriculture?
 - c. What kind of urban agriculture are they practicing?
 - d. Where are they practicing urban agriculture?
 - e. How long do you think people have been practicing UA here?
 - i. Can you tell me anything about the history of UA here (motivations and parameters)?
 3. Do you know if urban agriculture is legal here, or anywhere else in Zambia?
 - a. What about at a national level?
 - b. Is legality important?
 - c. Has it been/is prohibited – till when / why / what actions were taken against it?
 4. What do you think the attitude towards UA is in ‘official’ circles?
 - a. Why do you think this attitude exists?
 - b. Is there a difference between this attitude and the reality of how UA is dealt with here
 - c. Has this attitude changed over time?
 5. How is urban agriculture currently managed?
 - a. Why is managed in this way?
 - b. In what ways could this be improved?
 6. In the past, how has economic change affected this town and the lives and livelihoods of the people here?
 - a. In relation to economic change, have instances of UA increased?

7. In general terms, do you feel that urban agriculture is sustainable?
 - a. What about in terms of the economy?
 - i. What is the potential of UA as an alternative source of employment/livelihood for urban residents
 - b. What about in terms of the environment?
 - c. Society?

8. In your opinion, what is the significance of urban agriculture for people in this town?
 - a. Prompt with themes: Environment, economy and society

9. Can you think of any particularly notable instances of positive or negative effects stemming from urban agriculture?

10. Do you know of any aid programmes that are running or occurred here in the past that incorporate urban agriculture?
 - a. Do you know what their aims were?
 - b. Were they successful?
 - c. What do you think the role of NGO's should be in relation to UA?

11. What about government programmes or activities?
 - a. What do you think the role of the government (local or otherwise) should be in relation to UA?

12. Do you practice any urban agriculture?
 - a. If yes, why do you do this?
 - b. If no, why not?

13. Are you aware of the urban agriculture policy that was adopted in Ndola last year?

Give a brief overview of the policy

 - a. What is your opinion of the policy?
 - b. What do you think the key challenges will be for the policies implementation?
 - c. Why do you think the policy has been adopted in Ndola?
 - d. What do you think the effects of formalising urban agriculture could be?

14. What are your expectations for urban agriculture in the future in your town?
 - a. Do you feel that it is a long-term livelihood strategy?

APPENDIX 3 – QUESTIONNAIRE SURVEY

I. BASIC PROFILE

1. Name of Respondent:
2. Location:
 - a. How long has your family been living at your current residence?
 - i. Where did your family live before this?
 - b. Does your family own or rent your home?
3. Do you or anyone in your household practice any form of agriculture
 - a. Indicate whether you are involved in any of the following (more than one answer is acceptable).

Backyard agriculture (on-plot)		Off-plot agricultural activities		Animal husbandry	
High-density residential area		Urban		On-plot	
Low-density residential area		Peri-urban		Off-plot	
		Rural		Same plot as previous	

II. HOUSEHOLD STRUCTURE

Household member Number	Relationship to head of household	Gender	Age	Education	Presently studying?	Employment Status	Economic sector	Occupation description	Multi-livelihood (list)
List all members from oldest to youngest	<ol style="list-style-type: none"> 1. Head of household 2. Spouse 3. Son 4. Daughter 5. Brother 6. Sister 7. Nephew 8. Niece 9. Uncle 10. Aunt 11. Grandchild 12. Extended family 13. Unrelated 	<ol style="list-style-type: none"> 1. Male 2. Female 		<ol style="list-style-type: none"> 1. Primary incomplete 2. Primary complete 3. Int. incomplete 4. Int. complete 5. Sec. incomplete 6. Sec. complete 7. Tertiary undergrad. 8. Tertiary graduate 9. Tertiary post-grad. 	<ol style="list-style-type: none"> 1. Yes 2. No 	<ol style="list-style-type: none"> 1. Unemployed 2. Employed 3. Self-employed 	<ol style="list-style-type: none"> 1. Formal 2. Informal 	<ol style="list-style-type: none"> 1. Agriculture/ farmer 2. Mining 3. Civil Servant 4. Clerical 4. Artesian 5. Trader 6. Retail 6. Service 7. Prof. /Teach. 8. Other ? 	<ol style="list-style-type: none"> 1. Yes 2. No <p>Specify number of income generating activities involved in ? and list key ones ?</p>

III. LIVELIHOODS

Household member	Nature of contribution	Contribution as percentage of household total	Domestic duties	Agricultural duties	Other (specify)
List contributing members from oldest to youngest	1. Income 2. Domestic duties 3. Agricultural duties More than one answer is acceptable			a. Land preparation b. Planting c. Weeding d. Watering e. Harvesting f. Transport g. Marketing h. Preparation of food i. Investing j. Other Specify BYG, OPA or both	

IV. FOOD AND ECONOMIC SECURITY

1. Household food security

- a. Please indicate whether the following happened never, rarely (once or twice), sometimes (3-10 times) or often (more than 10 times) in the past month: [SHOW CARD] – PERHAPS FOR LAST YEAR, TO ALLOW FOR SEASONAL VARIATION?

<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Often</i>
0	1	2	3

Did you worry that your household would not have enough food?	0	1	2	3
Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0	1	2	3
Did you or any household member eat just a few kinds of food day after day due to a lack of resources?	0	1	2	3
Did you or any household member eat food that you preferred not to eat because of a lack of resources to obtain other types of food?	0	1	2	3
Did you or any household member eat a smaller meal than you felt you needed because there was not enough food?	0	1	2	3
Did you or any other household member eat fewer meals in a day because there was not enough food?	0	1	2	3
Was there ever no food at all in your household because there were no resources to get more?	0	1	2	3
Did you or any household member go to sleep at night hungry because there was not enough food?	0	1	2	3
Did you or any household member go a whole day without eating anything because there was not enough food?	0	1	2	3

2. How much does your household spend on food each week?

a. Where do you buy food?

3. Are you able to meet the following household needs from your income?

a. Indicate what percentage of need is met

	Yes / No	20%	40%	60%	80%	100%
--	----------	-----	-----	-----	-----	------

Food						
School fees and related costs						
Clothing						
Rent/housing costs						
Service costs						
Remittances						
Repayment of loans						
Other (specify)						

4. Can you give an estimate of the total (cash) income available in your household per week?
5. In terms of your family's (living standards/ability to access food/services/jobs) do you think things have changed for the better or for the worse (in recent years)?
6. When has been the most difficult time in terms of the above for you and your household?
 - a. Why was this?
 - b. How was (economic hardship) experienced in your household?
 - c. What helped your household cope?
 - d. Which of these things (coping strategies) will/would you continue to do or build upon past the time of crisis?
7. Has anyone in your household lost their job due to retrenchment, business closure, rationalisation or privatisation?
 - a. If so, when did this job end?
 - b. What sector was this job in?
 - c. If the person in question is currently (or was) employed, how long did it take to find this job?
 - i. Where is (or was) this job?
8. What do you think makes a family or individual poor?

- a. Do you think your family is poor?

UA PARAMETERS: USE OF PRODUCTS, SAVINGS AND RETURNS

1. As a percentage how much of the total food produced from your garden do you consume, how much do you give away and how much do you sell?

	Backyard garden			Off-plot agriculture		
	Consume	Give away	Sell	Consume	Give away	Sell
Grains/mealies						
Vegetables						
Fruit						
Meat/animal products						
Herbs/medicinal plants						

2. What percentage of your households annual food supply do you meet through your own produce?

	Backyard garden	Off-plot agriculture
Grains and mealies		
Vegetables		
Fruit		
Meat/animal products		
Herbs and medicinal plants		

3. How much money (kwacha) do you think consuming food from your farm or garden saves your family from spending each week?

	Backyard Garden	Off-plot agriculture
Grains/mealies		
Vegetables		
Fruit		
Meat/animal products		
Herbs/medicinal plants		

4. How much do you earn annually through selling products from your farm or garden?

	Backyard garden		Off-plot agriculture	
	Earnings (kwacha)	Proportion of total household income (%)	Earnings (kwacha)	Proportion of total household income (%)
Grains/mealies				
Vegetables				
Fruit				
Meat/animal products				
Herbs/medicinal plants				

5. Selling

- a. How do you sell your produce?
- b. Where do you sell your produce?
- c. How do you decide on the price of what you sell?
- d. Which of the things you sell do you think is most profitable?
- e. Have you experienced any challenges or constraints (marketing, legal issues, competition, transport etc.) in terms of selling your produce?
- f. Do you sell to a trader?
 - i. Why?



ATTITUDES AND EXPERIENCES OF UA

1. What is your opinion on the practice of urban agriculture?
 - a. Do you think it should be encouraged?
 - b. Why/why not?
2. What are the things that could stop urban agriculture being successful here?
3. Where does your agricultural knowledge come from?
4. How do you grow 'well'? – maybe define
5. Why do you garden and/or farm?
 - a. Is producing your own food important to you?
 - b. Why is this?
6. What are the benefits of having a farm/garden?
7. What are the drawbacks?
8. Can you tell me about any challenges, problems or barriers to success that you have experienced in terms of farming or gardening?

SUPPORT AND INTERACTION

1. Have you ever sought out support for your farming/gardening endeavours?
 - a. If so, what was your experience of this? Was it positive or negative?
2. Has support ever been offered or received from an NGO, a government agency or any other source?
3. Are you part of any cooperatives or groups related to your farming/gardening activities (church/friends etc.)?
 - a. If so, how does your involvement benefit you?

NCC UA POLICY

1. Have you heard about the urban agriculture policy adopted in Ndola last year?
 - a. If so, what have you heard about it?

Give a brief overview of the policy

2. What are your thoughts on the policy?

3. Do you think it will be successful?
 - a. Why/why not?

4. What else does the NCC need to work to make the policy more effective (more than one answer is acceptable)? (Number in order of importance?)
 - a. Which do you feel is most important and why?

Land access		
Title to land		
Water access		
Inputs		
Marketing		
Advice		
Transport		
Advocacy/links to decision-makers		
Other		

Also ask if they have received any support / their comments on it /

APPENDIX 4: Key Issues Emerging from Key Informant Interviews

Who is doing urban agriculture?

	Youth	Gender	Class / income	Schools / Police etc.
Interview #1	<p>J: Previously only older people wanted to farm. Nowadays young people want to do farming too, maybe some piggery or some poultry because it is a good income. Now farming is not just for after you retire, you can work in town and at the same time have a farm outside with workers.</p> <p>J: This is a reflection of high unemployment; there is nowhere to find a job.</p>			<i>UA common in police camps, prisons and dambo's</i>
Interview #2	<i>Said that young men were farming, it was the case that only old people farmed previously but that has changed now</i>	<p style="text-align: center;">→</p> <p>A: There are more men invested in practicing agriculture and getting income.</p> <p>A: In Luanshya and in some extent in Ndola, what we discovered is that a certain age group or gender was excluded from UA and these are young girls between the ages of 16 and 35. They are not very active in UA and that is one thing we must look at, how do we engage these</p>	<p><i>J: Are these just the unemployed or also the casually employed?</i> It is both.</p> <p><i>J: What about people with permanent jobs?</i> There are also some of these relying on it. My Director of Finance has a farm and he also works here.</p> <p><i>J: Do you have a garden?</i> A: Yea, we have a farm (Town Clerk)!</p>	

		people for purposes of sustainability? Okay, in rural areas the scenario is different both the girls and the boys are involved ... and in fact most households are managed by the womenfolk.		
Interview #13				<i>Northrise University – practice urban agriculture to feed the students and to teach them how to be self-sufficient, want to move on to teaching sustainable agriculture as a business</i>
Interview # 17				<i>Mention of several schools that do agriculture on the school grounds that are urban or peri-urban – Labuto Basic, Ndola Basic and Dola Hill</i>
Interview #24 [Extension officer focus group]		<p><i>J: What is the ratio of women to men in farming and gardening here (Kitwe)?</i></p> <p>The percentage of women is high. The women, they work hard and the men, they are just drunk.</p> <p>The only time the men come is when it is time for selling!</p>		
Interview #30			In the past there were some who were interested but now everyone is, including me	<i>Ministry of Education encourages agriculture in schools through the School</i>

			<p>(District Education Board Secretary), I am looking for a way a can have some piece of land. It is interesting.</p> <ul style="list-style-type: none"> - Has a backyard garden 	<p><i>Health and Nutrition (SHN) program – This KI said that this is not in town because there is no space but some of the schools we saw in town were cultivating.</i></p> <p><i>Estimated that around a third of the basic schools in Ndola have agriculture programmes and most of the large secondary schools, that teach agricultural science as a subject, have plots.</i></p> <p><i>School children help in the field and are fed when possible</i></p>
Interview #37			<p><i>Thinks that everyone who is available have at least a small garden behind their home – including the formally employed</i></p>	
Dola Hill Basic School				<p><i>Had a lot going on – animals, crops, fruit trees, very forward thinking, looking to further diversify and expand ... sometimes even sold to Quicksave supermarket</i></p> <p><i>Located in what could be called a peri-urban area – close to Ndola but within the</i></p>

				<i>forest reserve</i>
Kayele Basic School				<i>Located in town – more traditional style, a lot of maize, onions etc. in large fields, one crop at a time</i>
Interview #37			<i>Compounds – the poor</i>	

Why do people do UA?

	To supplement their income	Because they don't trust the formal economy – Safety net	Because they have to - survival	Job loss / economic crisis
Interview #2		A: In fact what they do is this, my former driver is working for the mines, so the scenario is that they work in the mines from Monday to Friday and on Saturday and Sunday they fall back on their farming. They don't want to be taken by surprise again. It is a survival strategy so that they are not entirely dependent [on the mines or their employment], it is because of this they are engaged in some form of agriculture.	J: <i>I thought it was interesting how you said how ... people they don't trust their jobs ... so they've got the garden just in case!</i> A: Yes so they can survive.	
Interview #9			<i>Talking about UA on river banks, it is discouraged because of the damage ... “But now if you walk or drive</i>	

			around, you see a lot of such things and it is a serious issue of livelihoods, these guys don't have jobs, so they do it."	
Interview #30				<i>J: When people were losing their jobs what were they falling back on? "Some were starting some farming of some kind. They had to look for some pieces of land on the outskirts of town. As you can see there is no place for farming around here." This idea that there is no space in town was quite common, perhaps because of the nature of traditional agriculture, maize needs a lot of room.</i>

What are the positive effects of UA?

	Improvements in health and nutrition (sub-theme = HIV)	Income (Savings / Generation)	Environment (aesthetic / general improvements in conditions)	Poverty alleviation	Evidence: Successful projects	Sustainability	Other	Food security
Interview		<i>Mentioned</i>				<i>Mentioned</i>		

#2		<p><i>income when talking about differences between men doing farming and women doing farming – men said to be more likely to do commercially or as an income generating activity</i></p>				<p><i>sustainability as one of the purposes of engaging people as well as diversification of the economy</i></p>		
Interview #3					<p><i>Before the pump was stolen the Kaloko Clinic project was having positive effects:</i></p> <p>“They were selling and the money was going into their households for other uses.”</p>			

					<p><i>Believed in the potential of UA to make positive changes for the poor and emphasised the need for credit lines (talked about revolving funds)</i></p>			
<p>Interview #4</p>					<p><i>Those KI's who knew about FStT all said that there had been problems with the revolving fund but this KI said:</i></p> <p>“The revolving fund was not very successful but a number of participants have continued</p>			

					growing and contributing to a fund using their own resources.”			
Interview #6			<i>Mentioned UA as a strategy for environmental management</i>	“UA should be an economic activity that can alleviate poverty and help with food security.”			<p><i>Talked about the need to provide or find alternative to formal employment which was described as a ‘traditional economic activity’</i></p> <p>“UA is not there to cater for everyone, it is one alternative. Somebody can occupy themselves and raise an income.”</p> <p>“If properly managed [UA] can be</p>	

							very productive.”	
Interview #9					<i>Talked about problems with the fund but also said that a good number of participants were successful</i>			
Interview #12					<i>Same thing about mixed success: Agriculture as a 'stopgap' to deal with difficulties</i>		“We are interested in UA because we realise the needs of the community, with no formal employment they can't access bigger tracts of land. UA is their only hope to have a way to make ends meet.”	
Interview # 15							<i>A business that you can start with no resources</i>	

							<i>(capital) except your own hands</i>	
Interview #20								“To us it is normal, we are asking them and encouraging them to go into agriculture to have food in their homes ... and to have an income.”
Interview #23				“UA does work as a poverty alleviation and food security improvement strategy. It helps a lot and you will find that in the compounds they depend on their backyard gardens, although those who	<i>First harvest in project was a success, participants could pay for things like children’s school fees and medical bills</i>	<i>J: Will you continue to use UA in your programmes?</i> “Yes, we will continue to be putting this as part of our programmes ... it is an intervention for sustainability. You can’t just go around paying for		<i>Farming was suggested by beneficiaries when asked how they might improve household food security – this is how UA was brought into their program</i>

				aren't innovative struggle more. The food that the backyard brings is still not adequate but it is filling up some gaps in food insecurity, it is a significant contribution."		people's school fees and so on, something that is sustainable carries on, it can continue running after the funding is gone and people are on their own."	
Interview #25							"In terms of people having a complementary food source UA is good, having food growing in the backyard means that instead of buying vegetables all the time you only need to buy once in a while and you can rely on this backyard

								garden.” <i>Went on to talk about malaria</i>
Interview #35					<i>Three urban agriculture projects, including keyhole gardens and backyard gardens specifically targeted at vulnerable or ill (HIV) families – food security, sustainability (ownership a big emphasis here), nutrition – sounded like there had been positive results</i>			
Interview #33			<i>Talked about the possibility (and an example seen) of waste from</i>					

			<p><i>chickens being used in the garden as fertiliser:</i></p> <p>“If you look at chicken rearing, the waste can be used properly, thereby saving the environment.”</p> <p><i>Talked about treated sewage positively but was worried that it was not being treated properly:</i></p> <p>“We have stubborn bacteria, ones that can survive a lot.”</p>					
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What are the negative effects of UA?

	Pollution / environmental	Forestry loss	Health and safety issues	
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	degradation			
Interview #1	“[Demand for land] has resulted in forest encroachment with people squatting inside forest reserves. The Ministry of Forestry has de-gazetted land, given out plots and resettled people. At first plots were limited to either 5 or 10 hectares but now they are doing 3 hectares to accommodate as many people as possible.”			
Interview #2			<i>Mentioned restrictions (Luanshya) on maize and chickens in the backyard because of the breeding of mosquitoes and the spreading of disease/noise/smell</i>	
Interview #8			<i>NGO: Started growing lettuces because daughters school had had cases of typhoid from locally grown vegetables</i>	
Interview #9	<i>Riverbank agriculture especially destructive, water resources a key concern for ZEMA</i> <ul style="list-style-type: none"> - <i>Siltation</i> - <i>Fertiliser runoff</i> - <i>Rivers getting clogged</i> <i>Combine this with deforestation, through both</i>			

	<p><i>clearing for agriculture and charcoal burning and you have nutrient leaching of soils/loss of topsoil</i></p> <ul style="list-style-type: none"> - <i>Encouraging people to do other things, including apiary and chicken rearing rather than cultivation in vulnerable areas and involving them in water management</i> <p><i>Mention of untreated sewage being used on crops – pollution (?) and a health issue</i></p>			
Interview #12			<p><i>Said the opposite of most about maize and malaria:</i></p> <p>“The Public Health Act is a thing of the past, right now in most compounds you will see [UA/maize]. But there is still a major belief that there is a link between maize and malaria that has not been proven. The law exists but it is difficult to police with no money. In areas in the periphery, such as protected forest areas there has been slashing but we need to harmonise ...”</p>	
Interview #22	<p><i>Mentioned that forest loss was happening not due to a lack of</i></p>	<p><i>Said that clearing for agriculture was in a way worse</i></p>		

	<p><i>land (although he did put forward the idea that the kind of agriculture that was traditional – large plot, non-intensive – made a difference in how people viewed ‘space’) but because of nutrient depletion, this was mentioned by other key informants when talking about misuse of fertilisers *Find these examples – possibly in the interview with Zed Bionic</i></p>	<p><i>than clearing for charcoal because it was a permanent change, people will cut down trees, suppress their regeneration and settle in a place.</i></p> <p>“People prefer virgin forests because they have good soil fertility, there are forests that are becoming victims of agriculture.”</p>		
Interview #25			<p>“This is a tropical zone which means mosquitoes and malaria. Malaria is the biggest killer in this country and crops in the backyard are a big problem in terms of a breeding ground for mosquitoes. You have to make a choice, do you allow them to grow for food and let them die of malaria or do you destroy and potentially let them die of hunger. That is the challenge, which is the better evil?”</p> <p><i>Heavy metals from emissions (Kitwe) in the soils, misuse of pesticides and use of untreated sewage because people cannot afford fertilisers.</i></p>	

			<p>“The biggest problem is the control and use of pesticides - people harvest the crops before a safe amount of time has passed after using the chemicals, they are not educated on this and it endangers the consumer.”</p>	
Interview #32	<p><i>Would rather than agriculture was done out of town because of the demand for water in town</i></p>		<p><i>Mentioned the removal of chickens when there is a complaint but only talked about smell and noise.</i></p> <p>“We stopped [the slashing of maize] a long time ago. You can’t, with the poverty in Ndola you just couldn’t do it anymore. Here we stopped a long time ago.”</p>	
Interview #33			<p><i>When asked about the official position on maize and malaria:</i></p> <p>“That one is a little tricky because you know, the science ... the theories come, they are withdrawn ... it is in Uganda that they did the research and said that maize does not breed mosquitoes ... I know that mosquitoes do not breed in vegetables but they do provide</p>	<p><i>Aesthetics:</i></p> 

			<p>a resting place for mosquitoes. That is the official position.”</p> <p>“You know, we make the bylaws and our information needs to be updated constantly, we need more research. I’m not sure whether or not mosquitoes are harboured or breed in maize but we can also say that when the stalks dry out the city looks very dirty, I think if it was very green it would be alright. We don’t even have enough space to grow maize so I think it should be alright.”</p> <p><i>Slashing:</i></p> <p>“Alright, okay, we have done that for people who punctured the sewer lines and were watering their crops, we did that. That is why I say we need to get them together so we can teach them. Yea, we did that there and also on the river banks because it can lead to siltation. Right now I don’t think there is a problem with this because they go the message. But in the backyards</p>	
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			<p>we do not slash, it is only like this on the river banks or by the punctured lines.”</p> <p><i>Chickens: Nuisance because of waste (smell) and noise, where there are complaints they are “attended to”.</i></p>	
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Issues of policy:

	What has happened	Bylaws	Funding / support	Challenges	Interest and change	Comments - RUAF/MDP/Council
Interview #1	<p>“At the Council we haven’t done a lot yet apart from the project in Chipulukusu but the MSF continues with all the stakeholders meeting regularly. Currently, the MSF are working on some proposals in the hope of addressing some of the issues raised by the City Strategic Agenda.”</p>	<p>“The bylaws haven’t been amended yet. From here we need to go to the Ministry of Local Government to change the local bylaws.”</p> <p><i>Said that the policy can be implemented without changing the bylaws</i></p>	<p><i>Emphasised that the major challenge has been funding</i></p>	<p>“There are or could be issues if people do not understand the policy properly,</p>	<p>“New stakeholders have become interested in what is going on. It is having a bit of a snowball effect.”</p> <p><i>Effect of the work on UA: “I know the change might not come instantly but we are noticing that</i></p>	<p><i>RUAF/MDP wrapped up in June (FStT) and haven’t yet done an evaluation</i></p>

					<p>since last year urban farmers have been improving.”</p> <p><i>Similar movements in terms of UA anywhere else in the country?</i></p> <p>“We visit other colleagues, other colleagues visit us and we have regional meetings so others do know what we are doing here.”</p> <p>“We have friends in other districts that are doing more or less the same things as we are here but the Council is not involved.”</p>	
Interview #2	<i>E: Is you City Council in a position to help the urban farmers in Luanshya?</i>	<i>Said that they had worked on the proposal and the law is to be amended:</i>				

	<p>“Yes, we help them actually, like for example we have offered them space at the market. Those who are trading on the roadside, we have offered them space. But I don’t know, they find it convenient by the roadside even though we have provided space for them at the market.”</p>	<p>“We have made proposals to change the law which is in place now and we hope that once the law is amended it will accommodate some of the UA principals and it will help the situation.”</p>				
<p>Interview #3</p>	<p><i>Critical of progress and running of the MSF and how the Council is doing things with regard to UA. Sense of powerlessness but not necessarily a lack of motivation, hint of dependency on outside support – for success need RUAF/MDP to help</i></p> <p><i>*Money, structure –</i></p>	<p>“We have done a proposal and submitted it to the Ministry of Local Government.”</p>				<p>“UA either need to become part of local government so they fund it or like an NGO and source funds privately.”</p> <p>“At present those involved are giving more effort to other things that they are actually paid to do.”</p> <p><i>J: Has it become more difficult since</i></p>

	<i>bureaucracy especially, and will ID's as major problems - there are so many partners that nothing gets done, the core team is too big and nothing gets done, leadership weak</i>					<p><i>MDP finished up in June?</i></p> <p><i>"It is, very."</i></p> <p><i>"There is nothing that has happened."</i></p> <p><i>"Nothing."</i></p> <p><i>J: So they left and everything stalled?</i></p> <p><i>"Yes. We used to have meeting and maybe discuss something fruitful although nothing came about but now we have even stopped having meetings."</i></p>
Interview #4	<p>"Not much sensitisation has been done yet. If was mentioned in the Council's three monthly newsletter but not a lot of people read this. Perhaps roughly 25% of people know about the policy but it is likely they don't really</p>				<p><i>Said that some took interest but no documents have been finalised yet.</i></p> <p><i>"Some were showing an interest before the proposals</i></p>	

	<p>understand it.”</p> <p><i>From other KI interviews and the surveys it sounds like the only people who know about the policy are those who were involved in its creation, those who I told and the farmers involved in the projects</i></p> <p><i>Said that there was a meeting of the MSF coming up soon and they were trying to work on coming up with proposals for various companies to become involved in supporting the enhancement of UA in areas such as water use.</i></p>				<p>were even started.”</p> <p><i>The MSF has been trying to bring in more stakeholders and more companies have started coming in.</i></p> <p><i>Banks have not responded positively, none have ever shown up.</i></p>	
Interview #5					<i>Kabwe interested in the policy</i>	
Interview						<i>Problem: Getting</i>

#6						<p><i>people together at the same time, funding for transport, refreshments etc.</i></p> <p>“Important to disseminate information, although they have been doing UA they have not come to ask.”</p>
Interview #9	<i>Hasn't been to an MSF meeting for around a year</i>					
Interview #12	<p>“At the moment we are looking at the harmonisation of different policies from different Ministries and Departments – Forestry, Health ... certain sections think some agricultural activities shouldn't be done ... but when looking at livelihoods ...”</p>			<p><i>Kitwe was meant to have learnt about what happened in Ndola</i></p> <p>“People are keen but need someone to kick-start them.”</p>		<p>“We weren't ready for MDP to leave.”</p>

What problems or barriers do UA practitioners face?

	Competition for land	Tenure security	Lack of access to financial support	Lack of education / technical support / coordination	Lack of water / inputs	Legality of UA	Pollution
Interview #1	<p><i>Commented that Zambia hasn't got a very good allocation system – there are problems with confusion over rights and access</i></p> <p><i>“All of a sudden all the people are interested in land but there is not enough to go around”</i></p> <p><i>[Interesting... this is a major theme in all interviews but the attitudes about</i></p>		<p><i>“Many have plots but need to access start-up capital.”</i></p> <p><i>“The banks don't lend to farmers. Farming is seen as risky business and subsequently the loans that are provided have very high interest rates. People often lose their farms and their homes because they have put them up as collateral.”</i></p>		<p><i>“Water is a big challenge. People are sometimes unable to really engage in UA because the water bill eats up the profits that are made.”</i></p> <p><i>Suggestions:</i></p> <p><i>“Dig a borehole or well but there is then the problem of contamination.”</i></p> <p><i>“The Water Board is overwhelmed with the huge amount of work that needs to be done, they have started looking</i></p>		<p><i>“The sewerage pipes are old or broken in many places and even piped water risks being contaminated because when the water is turned off, whatever is near the break gets into the pipe.”</i></p>

	<p><i>whether land is a problem or a potential are polar opposites: Some say that there is so much land, other say there is not enough – same with water]</i></p> <p>“The demand for land is quite recent.”</p> <p>“It is partially a problem of related to housing. People are looking for plots to farm on and competing with people who are looking for plots to build houses on.”</p>				<p>at water service and fixing meters, but they are yet to start looking at sewage.”</p> <p><i>Like power they are trying to start prepaid meters so waste is lessened</i></p>		
Interview #2				“You need to mobilise them because right			

				<p>now they are disintegrated, each one to themselves, so we want to mobilise them all through UA. Even to find ways of supporting them in terms of marketing their produce, the handling of the food they produce. We want to go into that and see how we can help them.</p>			
Interview #4	<p>“More plots that were being used are being given out for housing by the Council.”</p>						
Interview #5				<p><i>Talking about extension – extension</i></p>			

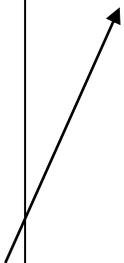
				<p><i>officers overstretched and don't have funds to get fuel for their motorbikes, farmers will sometimes band together and help the officer out.</i></p> <p><i>Extension is there for all:</i></p> <p>“Even in the intra-city people are encouraged to grow at least something but access to meetings is farmer driven. The Ministry must rely on people being proactive and word spreading</p>			
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				by word of mouth.”			
Interview #8							<i>Testing water in river and found it to be very polluted, ground water is better.</i>
Interview #12	<p>“Land is difficult in Kitwe because the population has grown so much. It is quite difficult for someone to get land within Kitwe, if they don’t have the means they must go to the peripheries then how accessible is this land, is there transport or services? Within the confines of Kitwe pieces of land are very small which</p>						<p><i>Pollution from mining – contamination from sludge, tailing dams bursting, dams polluted, streams running dry, aqua-life lost</i></p>

	demands intensive year round activities. We need to integrate conservation and low input farming, that will be the way.”						
Interview #16				“The majority of people in Zambia are poor and uneducated so they can’t use the chemical fertilisers. They end up burning the soil and it is expensive.”			<i>Vandalism of pipes on (visible from the rd into Kitwe):</i> “You will see the massive pipes and all their gardens.”
Interview #20				“Our area (Ndola) has acidic soils, this can be improved by things like rotation but this idea is one that has not been easily accepted.”	“There out to be more UA in the backyard but there is no water, for example, at my home there has been not even a drop between		

					<p>April to date (November). My orange tree has dried, the guava, avocado, mango ... all dried.”</p> <p><i>Said that people don't believe them when they try to teach about water harvesting</i></p>		
Interview #21					<i>Challenges with inputs</i>		
Interview #22					<i>Soil fertility – reason for forest encroachment</i>		
Interview #23	<p>“Land came up as a problem, most didn't have their own land so they had to rent, but there was no security in this, the owner could decide whenever they wanted to</p>			<p>“Production units [in schools] have gone down, they are lacking technical expertise, those who are doing well are usually those that have</p>	<p>“There is very little land near streams available for continuous gardening so most depend on rain fed production. Those that had</p>		<p>“During December last year I remember that a neighbour of mine had a very good garden with tomatoes but then after the first rains came,</p>

	<p>use it so the household would suddenly have nowhere to farm.”</p> <p>“At times I can be interested in doing backyard gardening but then if you look at the sizes of the land being allocated now the same size as before is being given to two or three people instead of one. There is no space for agriculture or gardening. [The Council] needs to look at leaving enough space.”</p>			<p>agricultural studies offered. Education is important.”</p> <p>“...those who are not innovative struggle.”</p>	<p>small pockets around streams are engaged in continuous gardening.”</p> <p>“If you go around household in town and in the periphery quite a number have gardens, they depend on it but there are big challenges. The production costs are high, the water bills for households using water from the Council are very high. If you exceed a certain amount it becomes even more expensive</p>		<p>the garden completely changed. The soils became very acidic from the sulphur dioxide in the air from the mines when it mixed with the rain and became sulphuric acid, this affected the crop.”</p>
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					per cubic meter.”		
Interview #24			“There are some that have potential but there is something limited them to reach that potential and that is the issues of capital ...”	“...and knowledge.” 			“Pollution can be a challenge here for backyard gardens, the soil is acidic and they can’t grow.”
Interview #37	<i>Ministry of Lands: Commented that there had been no land designated for farming/it wasn't an accepted land use in the city and that was a problem</i>						
Interview #32	“... and where will they find the space. Some of the plots are so small, you can				“People don’t have enough water for their domestic use so where will they		

	just fit a house.”				get the water for their crops ...” <i>Inputs, affordability of seeds, fertilisers etc.</i> “Because they don’t practice composting so I don’t know if they have the resources.”		
Interview #33	“We may not have enough space to do farming ... in as much as we say backyard gardening and the like, in the townships, they don’t even have!”				“...the water supply is a bit erratic. In the high cost areas, like government centre, Kansenshi, Northrise ... water is not a problem. Where there is a problem is in the townships, like Kabushi, Masala ... where people		

					have to resort to shallow wells and that because of the erratic water supply. Water comes, but not every day.”		
Interview #35	<p>“I don’t think it is true [that there is not enough land], I think it is just a mindset which has to be changed ... backyard gardening doesn’t need big land to do, it is just something that can be done behind their houses and the like. It is where they can just do a few beds or vegetables for consumption and</p>						<p><i>*For projects one of the biggest challenges is the handout mentality and the lack of ownership</i></p>

	any extra they make it for sale.”						
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What other coping strategies do people employ here?

	Trade			
Interview #2	“Of course they are engaged in other activities, most people travel a lot. They are engaged in trading, fishing, selling ... there is a very big market for clothes in the Congo so they buy clothes in East Africa and sell them in the Congo. Those people are based here in Luanshya, they travel everyday - to East Africa, Congo, Tanzania ... they are also engaged in trading activities it is not just farming.”			

What are people’s attitudes towards UA?

	Positive	Negative	Neutral	Changes in attitudes
Interview #1	<i>Supportive</i> “The importance of			“Yes the council has changed its attitude but there are still rules about which crops are appropriate where (health and safety issues, aesthetics).”

	urban agriculture is especially pronounced in the CB because it has a high incidence of urban areas.”			<p>“An interesting thing that we have noticed is that there are a lot of nurseries opening. The plants they are selling are mostly ornamental but there is a great deal of everything there ... The attitude of the people is changing; they want to love nature. You see a lot of people buying flowers and beautifying their yards so I guess it is market driven.”</p> <p>“Previously only older people wanted to farm. Nowadays young people want to do farming too, maybe some piggery or some poultry because it is a good income. Now farming is not just for after you retire, you can work in town and at the same time have a farm outside with workers.”</p>
Interview #2	<p><i>Supportive, really wanted a policy in Luanshya and for UA to be on the agenda:</i></p> <p>“I am very excited about UA and the experience we have had in Ndola. I would like it replicated here.”</p>			
Interview #10 (Shilla - Kitwe)			“The Council is quite flexible, we don’t prevent people from cultivating in their	

			backyards although other towns don't allow this.”	
Interview #12 (Raphael)	<p><i>Very supportive, involved in policy creation in Ndola mentioned benefits in terms of HIV, nutrition, resources for schools, having a better life and eventually having something to save.</i></p> <p>“...even in a small confined yard you can still do something meaningful to get your daily bread, as long as policies are harmonised, if this were done, UA would work for a lot of people.”</p> <p>“It is high time local authorities started planning for it. The land available to urban farmers has shrunk ... there is industry,</p>			

	structures have been built. Councils must plan for it, give out sections purely for UA, even flora-culture as well as food, it would help a lot of people.”			
Interview #13	“We need to know how to feed ourselves, you can have a business degree or whatever but it means nothing if you cannot feed yourself.”			
Interview #19	<i>(Kitwe, Council)</i> “I’d like to see us incorporate UA in planning, but it is still far off.”			
Interview #15				“There is a change, there is a shift in the Zambian mentality now, most of the people are working, be it in government or those in parastatals, they’ve got small field so at the end of the day or in the weekends they will go to their fields. They will have also employed a few people. At the end of the day, the harvest will feed them for the rest of the year and then they will sell some to buy some fertiliser and some more inputs for the next year. If you went into some homes, those who are

				clever like us; if we count in 50kg bags we have almost 170 bags [of mealie meal]. We use this for feeding our workers and ourselves. We do not buy mealie meal.”
Interview #22	“If you look at urban areas there is a lot of space available, the amount that is there could support the urban food system. But all the needs need to be put into one package. There needs to be a whole new view, agriculture is viewed as something that happens in the peri-urban or the rural, we need to start shifting these ideas and see it as an urban activity and as something for food security.”	<i>Compared agriculture to mining in terms of destruction of forest reserves but did think it was a good thing if not done in inappropriate areas</i>		
Interview #30	<i>Positive, supports having production units in schools</i>			
Interview #32	<i>Had definite misgivings about appropriateness of UA in terms of H&S and</i>			“It has become like anything ... everybody is getting into some business ... so no one complains anymore [about their neighbours

	<p><i>practicality (space, cost of inputs, water and cultivation near streams) but still though that his Department would support it.</i></p>			<p>having chickens]. It is one way of raising some cash and it is important for nutrition too. It is a long time since we have [slashed maize] because you know, people couldn't afford a cob, so how could you take that away."</p> <p><i>J: Do you think it started [to change] because the Council didn't have enough resources to go from door to door?</i></p> <p>"That could be one of [the reasons] but the Council also was poor so the workers were involved in the same."</p> <p><i>Referring here to the fact that even if you still had a job, your wages were probably not being paid.</i></p>
<p>Interview #33</p>	<p>"We know that urban agriculture is very important, it provides income and food security and the like but there should not be human conflict. The activities of UA should not endanger the health of the person practicing the health of others."</p>			

	<p>“I support the policy. You know, the principal is very simple. If there are no jobs what can you do to survive? You’ve got to create your own jobs. We can create employment ... so I support the policy.”</p>			
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Interview #2:

“In Luanshya I would say that 75% of the population wholly or partially rely on [UA].”

“In fact, we have been talking about urban agriculture and we are encouraging as many people as possible to venture into other activities other than mining.”

“Trading was more or less stigmatised and people were more in favour of formal jobs, working for the mines, teaching or working in the Council like myself. So trading was looked at more or less ... it was not a preferred vocation. To some extent [farming was seen in a similar light] because these formal jobs were paid.”

Interview #4:

“There has been a natural growth in the number practicing urban agriculture in Ndola rather than a spike.”

Interview #7:

“There is a gap; we haven’t even assigned an officer for the urban area. We have been more focused on the outskirts but now we have realised this there will eventually be one assigned so as we can spread messages and collect data in the urban area.” (Luanshya MACO)

Interview #12:

Families who were producing beyond what they could consume and selling the surplus: “I saw households that were coming from nothing being able to get a nice roof and to send their kids to school.”

Interview # 20:

“More have entered into UA but the increase in their know-how has not matched the increase in interest.”

Interview #23:

“The food thing is a prominent issue, it affects attendance etc. but how can we fix it? Supplements are costly and unsustainable and we have noticed that most schools have land that they want to use for gardens but are not producing to standard, they are trying but they need the knowledge.”

Interview#24:

“They are selling and saving some, they are improving.”

Interview#30:

“[Formalising UA] is okay ... I think that [UA] is very popular now, some are keeping chickens, pigs and having backyard gardens. It is important to recognise that UA is happening.”

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Things I want to find out through interviews and questionnaires

1. What do people understand about the concept of UA?
 - a. Awareness of the practice?
2. What 'kind' of UA is happening in the town and where?
3. Is UA perceived to be a habit of the poor?
4. Do informants perceive that there has been any change in terms of UA?
 - a. If so, what reasons are changes attributed to?
5. What effects have economic difficulties had on people's lives and livelihoods
 - a. Effects on poverty?
 - b. Do respondents perceive an increase of UA in relation to this?
 - o Maybe make more open ended, trying not to prompt with 'UA' in question
6. What is the RELATIVE IMPORTANCE OF UA in comparison with other livelihood strategies?
 - a. Significance?
7. Do the respondents have any examples of good/bad effects of UA in terms of the environment, the economy or society?
8. Is UA sustainable (in terms of economic diversification and other sustainability issues)
9. Policy: What kinds of challenges have come up so far... how have they been dealt with?
10. Is the attitude towards the policy and its future optimistic or pessimistic?
11. How socially embedded is the idea of UA?
12. Do people think about it in the same way as what we are thinking of it as?