Chapter 2
The Mythology of Urban Agriculture

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Abstract The literature on Urban Agriculture (UA) as a food security and poverty alleviation strategy is bifurcating into two distinct positions. The first is that UA is a viable and effective pro-poor development strategy; the second is that UA has demonstrated limited positive outcomes on either food security or poverty. These two positions are tested against data generated by the African Urban Food Security Network's (AFSUN) baseline food security survey undertaken in 11 Southern African cities. At the aggregate level the analysis shows that (1) urban context is an important predictor of rates of household engagement in UA—the economic, political and historical circumstances and conditions of a city are key factors that either promote or hinder UA activity and scale; (2) UA is not an effective household food security strategy for poor urban households—the analysis found few significant relationships between UA participation and food security; and (3) household levels of earnings and land holdings may mediate UA impacts on food security—wealthier households derive greater net food security benefits from UA than do poor households. These findings call into question the potential benefits of UA as a broad urban development strategy and lend support to the position that UA has limited poverty alleviation benefits under current modes of practice and regulation.

Keywords Southern africa · Cities · Food security · Poverty · Urban agriculture

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2.1 Introduction

Urban Agriculture (UA) is increasingly celebrated as playing a significant role in promoting food security, income opportunities, and economic growth in developing countries. According to the UN Food and Agriculture Organization's (FAO) first status report on Urban and Peri-urban Horticulture (UPH), UA serves locally grown, fresh fruits and vegetables to over 22 million people in Africa's cities, hence playing an important role in food supply and income opportunities (FAO 2012). On this basis, the FAO (2012) argues further that UPH could see even greater expansion—and help Africa's expanding cities achieve "zero hunger"—if better technical and institutional support is allocated to the sector.

The research and policy debate surrounding urban agriculture tends to divide between those who support it as an effective pro-poor development strategy (Smit et al. 2001; Cofie and Drechsel 2007; Kwambisi et al. 2011; FAO 2012) and those who are more sceptical about the extent of its positive impact on food security and poverty alleviation (Crush et al. 2011; Lee-Smith 2013; Stewart et al. 2013). Optimism about UA's potential benefits is demonstrated by respectable development institutions through several initiatives, e.g., the United Nations Development Program's (UNDP's) and UN Habitat's "Sustainable Cities Program", and Canada's International Development Research Centre's "Urban Poverty and Environment" program (Stewart et al. 2013). Despite such support, there is little empirical evidence on the scale and scope of UA to prove its level of impact (Stewart et al. 2013).

In Southern Africa, research based on data from the African Food Security Urban Network (AFSUN) demonstrates the levels and dimensions of UA (Crush et al. 2014), as well as the relationship between UA and food security (Crush et al. 2011). The results show that UA across the region is practised to some degree by about 22 % of the surveyed households, though there are major variations in the production levels between cities (Crush et al. 2011). These households rely upon several "coping strategies" to access food—income from wage and casual work, remittances (cash and food transfer), social grants, growing it and borrowing it from neighbours (Crush et al. 2014). As one of these coping strategies, UA is a comparatively less significant means of household food security, even in cities with policies to support and encourage it such as Cape Town (Battersby 2011). This chapter builds on this research, and uses data from the AFSUN and other urban studies to investigate the factors that explain households' engagement in UA as well as its effectiveness as a food security strategy in Southern African cities.

In this chapter, we demonstrate, first, that urban context is an important predictor of rates of household engagement in UA—the economic, political and historical circumstances and conditions of a city are key factors that either promote or hinder UA activity and scale. Second, UA is not an effective household food security strategy for poor urban households—the analysis found few significant relationships between UA participation and food security. And third, household levels of earnings and land holdings are good predictors of UA impacts on food

security—wealthier households derive greater net food security benefits from UA than do poor households.

Based on these findings, the chapter concludes that while some poor households in Southern African cities may practice forms of small-scale urban agriculture, they do not derive significant economic or food security benefits from these practices. These findings call into question the potential benefits of UA as a broad urban development strategy, and lend support to the second position evident in the literature—that UA has limited poverty alleviation benefits under current modes of practice and regulation. However, the importance of context highlighted by the analysis suggests that further comparative and more fine-grained research is required, which aims to understand specific factors within cities that either promote or hinder UA as a successful development strategy.

2.2 Methodology

This chapter is based on data from AFSUN that surveyed 6453 households in 11 Southern African cities in 2008–2009 (Table 2.1). The surveys were administered using a systematic random sampling of poor households in these cities and covered information regarding income, poverty, food security, the role of remittances and household demographic information. A full analysis of the results can be found in Crush et al. (2014).

This baseline survey measures household food security using the Household Food Insecurity Access Scale (HFIAS), the Household Dietary Diversity Score (HDDS) and the Months of Adequate Household Food Provisioning (MAHFP). We use Mann Whitney U tests to determine the significance and effect size of any differences in food security scores between households according to UA engagement. The effect sizes of these differences are categorized using the framework suggested by Cohen (1988) where: (a) effect sizes distributed around 0.10 are

Table 2.1 Household sample size by city

City	No.	%
Windhoek	448	6.9
Gaborone	400	6.2
Maseru	802	12.4
Manzini	500	7.7
Maputo	397	6.2
Blantyre	432	6.7
Lusaka	400	6.2
Harare	462	7.2
Cape Town	1060	16.4
Msunduzi	556	8.6
Johannesburg	996	15.4
Total	*6453*	*100.0*

categorized as small; (b) effect sizes distributed around 0.30 are categorized as medium; and (c) effect sizes distributed around 0.50 are categorized as large.

Among those households engaged in UA, we determine the extent to which frequency of household UA engagement as a food source is correlated with scores on the HFIAS, HDDS and MAHFP. Household frequency of engagement in UA as a food source is ranked according to whether a household has obtained food from UA five times per week, once per week, once per month, once every 6 months or less than once per year. The quality and strength of the relationship between food security and household UA engagement frequency is evaluated using Spearman's Rho. This correlation statistic can test correlational strength using both ordinal and continuous variables. The Spearman's Rho does not require the measured variables to be normally distributed and is sensitive to non-linear relationships (Corder and Foreman 2009). The strength of the Spearman's Rho correlation is calculated using the following framework:

(a) Rho values less than 0.15 are categorized as very weak;
(b) Rho values between 0.15 and 0.25 are categorized as weak;
(c) Rho values between 0.25 and 0.40 are categorized as moderate;
(d) Rho values between 0.40 and 0.75 are categorized as strong; and
(e) Rho values greater than 0.75 are categorized as very strong.

2.3 Rates of Urban Agriculture Engagement in Different Urban Contexts

There are significant contextual differences between Southern African cities with regards to the practice of UA. As Fig. 2.1 demonstrates, the rates of household UA engagement among the surveyed population vary from less than 6 % in Windhoek to over 60 % in Blantyre.

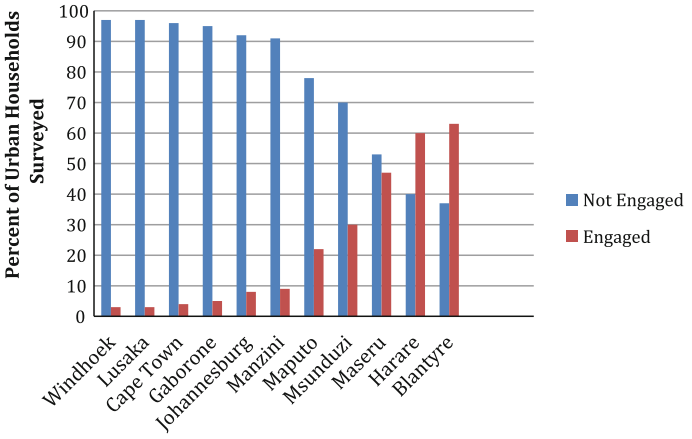

Fig. 2.1 Urban household engagement in urban agriculture in Southern African cities

A chi-square analysis further reveals that these differences in household UA engagement between cities are very significant and not random ($x^2(10, N = 6222) = 1665.865$, $p < 0.001$). While this statistic should be interpreted with care, given the large sample size, the chi square value demonstrates the importance of urban context as an influence in the rates of household UA engagement among Southern African cities. Given this finding, it is evident that UA engagement should be examined in the context in which it occurs.

The high rates of UA engagement in Malawi (Blantyre), Zimbabwe (Harare) and Lesotho (Maseru) may result from increasing economic hardships in these countries (Kutiwa et al. 2010; Crush et al. 2011; Tawodzera 2012). All three countries show persistent high levels of socio-economic fragility. Blantyre, which has the highest household UA engagement rates (about 65 %), also struggles with high rates of urban poverty (at 24 %) and high food prices (Kwambisi et al. 2011). The country's average annual Gross Domestic Product (GDP) per capita is among the lowest in the region, at USD 305 in 2008 when the ASFUN research was conducted. In comparison, in Botswana (another small nation in the region), the GDP per capita was $6877 in 2008, a sixfold increase from the mid-1980s.

Malawi's socio-economic fragility can be explained by the broader political economy of Sub-Saharan Africa from the late 1960s when many countries experienced worsening terms of trade for their primary goods on global markets, which reduced their export to import ratio. Pressed by fiscal deficits, the country sought financial assistance from the International Monetary Fund and the World Bank to address its balance of payment problems. Malawi instituted Structural Adjustment Programmes (SAPs) in 1981, which were designed to promote market competition through financial sector reforms and the removal of government subsidies. A lasting impact of the SAPs was a significant decline in total formal sector employment and increased poverty and food insecurity in urban areas.

Economic trends alone do not explain the high levels of UA engagement in Malawi. During British rule, the administration fenced off forest reserves and crown lands, which remained undeveloped long after independence. Founding President Kamuzu Banda retained the colonial concept of "garden city", where woodland and green spaces featured prominently within cities. This changed at the height of the SAPs, when forest reserves lost state protection and people started to deforest and utilize the land, including for UA cultivation. In Blantyre, the City Assembly introduced policies that granted farm plots to urban residents in return for tree planting in the mid-1990s. Many low-income residents in the vicinity of the Ndirande forest reserve took up this opportunity; today, a significant number benefit from UA as a source of both food and income (Riley 2012). Thus, the combination of economic hardships and extensive open spaces made UA a viable livelihood means in Blantyre and other urban areas in Malawi.

Harare (Zimbabwe) has the second highest rates of UA in the region. Starting in the mid-1980s, Zimbabwe experienced declining economic performance, which reduced the standard of living and forced urban dwellers to engage in farming activities (Kutiwa et al. 2010; Tawodzera 2012). Like Malawi, Zimbabwe undertook SAPs in order to address its fiscal deficit problem. At first, the government

implemented "voluntary" SAPs in an attempt to avoid the World Bank's stringent demands but perceived internal mismanagement eventually forced the country to adhere to conventional SAP standards. Unemployment rates rose as the formal sector retrenched jobs. Meanwhile, the country saw rapid rural-urban migration, previously tightly controlled under the British rule. In response to increased poverty, some urban residents took up UA to supplement their household food supply (Mbiba 2000). Growers utilized the city's open spaces, primarily vleis (poor drainage soil systems) land that was unsuitable for development.

Since 2000, problems associated with land reforms and political unrest have further impoverished urban populations and food shortages have become widespread. Tawodzera (2012, p. 59) notes that the disruption of large-scale commercial farms and recurring droughts in the country have turned the country from "being the bread basket of the region to a basket case perennially banking on humanitarian aid for the survival of the population." GDP per capita rates declined from USD 916 in 1980 to USD 534 in 2000 and to a low of USD 354 by 2008. These conditions compelled large segments of Harare's residents, including middle and upper income households, to grow food to mitigate their declining standard of living (Tawodzera 2012).

Maseru in Lesotho is another city with relatively high levels of UA—about 47 % of the households sampled by ASFUN. The country struggles with poverty rates of about 50 % and an unemployment rate over 30 %. Historically, Lesotho's economy has been supported by a large share of remittances sent by Basotho migrant workers in South Africa. Until the 1980s, remittances made up 60 % of the country's GDP, and contributed as much as 70 % of average household income. Demand for migrant labourers in South Africa has since declined, and remittances fell significantly, contributing about 20 % of the GDP by 2005. Lesotho's agricultural sector has also been in decline due to periodic droughts and excessive soil erosion—bringing about chronic food shortages. As a result, the country imports a large volume of food but low incomes and high cost restrict many households from accessing it. According to the AFSUN sample, 60 % of the surveyed population in Maseru are severely food insecure, 25 % moderately food insecure and about 10 % mildly food insecure. With high levels of food insecurity, many urban dwellers have resorted to UA as one coping strategy among many.

Maputo (Mozambique) and Lusaka (Zambia) need further explanation, because the AFSUN survey found surprisingly low UA rates in these two cities. Maputo has a strong history of urban and peri-urban gardening (Sheldon 1999). Shortly after independence, the country's civil war (1977–1992) disrupted rural production and forced millions of people to flee the countryside. With a large number of refugees and a high unemployment rate, Maputo faced a serious food shortage. The government encouraged UA—offering seeds and tools as incentives (Sheldon 1999, p. 128). Residents formed cooperatives to cultivate designated "green zones" and sell their produce to markets. As many as 70 % of economically active women were engaged in UA and 40 % of Maputo households had livestock in the city. With structural adjustment policies in the 1990s, the government reduced its support to the green zones. Market liberalization policies also resulted in cheap imports that displaced the city's cooperatives products.

Like Maputo, Lusaka had relatively higher levels of UA in the 1980s and 1990s. Simatele et al. (2012) note that UA is as old as the city itself. The city was designed around the model of a "garden city" with plenty of open space, which made it possible to practice UA. From the mid-1970s, the country experienced serious economic decline, particularly after the collapse of its nationalized copper industry. This forced the government to turn to international lending institutions for fiscal assistance and to the adoption of SAPs. By the mid-1980s, Zambia's formal employment sector had decreased by over 50 % while GDP per capita fell from USD 614 in 1974 to USD 237 in 1986. With widespread urban poverty, households turned to UA to meet their food requirements. In the 1980s and 1990s, UA accounted for about 30 % of the food supply in low-income neighbourhoods (Simatele and Binns 2008).

The ASFUN survey found very low levels of UA in Lusaka (at 4 % of households). Simatele and Binns (2008), by contrast, found relatively high levels of UA activities—at 41 %—in three areas of Lusaka: Garden Compound, Chilenje and Seven Miles. In these areas, 41 % of the households practiced UA for home consumption, while 13 % also grew food for sale (Simatele and Binns 2008, p. 9). Crush et al. (2011) explain the mismatch between these figures by pointing out that UA varies across the city and is hardly practised at all in high-density, low-income areas. The AFSUN survey was conducted in Chipata Compound where "food production is extremely limited, and most households do not have access to the land to grow anything" (Crush et al. 2011, p. 297).

This history of UA in Southern African cities tends to show that it is more common in times of acute hardship but tends to decline when the economic situation improves. It also tends to be limited in cities with strong economies as opportunities to earn cash are better, allowing the population to purchase their food. Half of the cities surveyed by AFSUN—Windhoek (Namibia), Gaborone (Botswana), Manzini (Swaziland), Cape Town and Johannesburg (South Africa) — had less than 10 % of the sampled households engaged in UA.

In Cape Town, Battersby (2011) demonstrates that most urban dwellers are highly dependent on the cash economy to secure food. Half of the households surveyed by AFSUN were exclusively dependent on wage income to access food. 31 % also relied on a single other income source. Income from state social grants was the most significant of these (for 42 % of the surveyed households). Like Cape Town, Johannesburg's population indicated that most households rely on income to access food (Rudolph et al. 2012). Household incomes were primarily derived from wage work (47 %), followed by social grants (19 %) and casual work (8 %).

As in the South African cities, Windhoek's population relies on income to secure food. Pendleton et al. (2012) show that 84 % of the surveyed households rely on wage work to purchase food, 17 % on casual work, 16 % on remittances and 13 % on informal business (Pendleton et al. 2012). Informal rural-urban food transfers are an additional food source for many city dwellers (Frayne 2004; Pendleton et al. 2012).

Household purchasing power parity, often determined by income flows, tends to be the most significant determining factor in food security (Crush et al. 2014). However, households are under economic stress in most cities. Urban economies

are unable to expand fast enough to absorb the escalating rates of urban population growth, largely driven by rural-urban migration. As economic opportunities dwindle, unemployment and urban poverty rise and households become vulnerable to food insecurity.

2.4 Effectiveness of UA as a Food Security Strategy

The AFSUN data set shows considerable variation in UA rates between and across cities. However, it can also be used to shed light on the question of whether UA is an effective food security or poverty-reducing strategy for poor urban households. Statistical analysis shows that, in the majority of comparisons, there are no significant differences in food security scores between surveyed households engaged in UA as a food source and surveyed households which were not engaged in the practice (Table 2.2). There were marginal exceptions with four cities. In Maseru, there was a significant but weak difference in HFIAS scores ($z = -3.250$, $p = 0.001$, Effect Size = 0.115) and HDDS scores ($z = -3.269$, $p = 0.001$, Effect Size = 0.118) between households engaged and not engaged in UA. Households engaged in UA had slightly better food access and dietary diversity than other households sampled in this city.

Similarly, households engaged in UA in Lusaka had significant but marginally lower HFIAS scores ($z = -2.177$, $p = 0.030$, Effect Size = 0.115) and MAHFP scores ($z = -2.721$, $p = 0.007$, Effect Size = 0.143). This suggests that these households had slightly better food access, but lower adequate household provisioning than other households. Surveyed households in Cape Town showed similar trends; households engaged in UA demonstrated significant but marginally higher HDDS scores ($z = -0.611$, $p = 0.009$, Effect Size = 0.082), demonstrating that these households had slightly more dietary diversity. Households in Johannesburg engaged in UA also had significant but marginally higher HDDS scores ($z = -5.245$, $p < 0.001$, Effect Size = 0.172), indicating slightly better dietary diversity. All other comparisons demonstrated no significant difference in food security scores between households engaged in UA as a food source and households which were not.

The correlations between frequency of household engagement in UA as a food source and household food security scores reveal a similar picture (Table 2.3). There were no significant correlations observed for the majority of these associations. The Maseru households indicated a significant, weak and positive correlation between the frequency of household UA engagement and MAHFP scores (Rho (367) = 0.184, $p < 0.001$), indicating that these households had slightly better household food provisioning associated with more frequent UA engagement.

The other significant correlations indicate a negative relationship between frequency of household UA engagement and household food security scores.

Table 2.2 Comparison of household food security scores by UA engagement and city

City	Variable	z-value	Effect size ($z/\sqrt{n}$)	n (p-value)	Mean rank (UA engaged)	Mean rank (Not engaged in UA)
Windhoek	HFIAS	−0.571	NA	427 (0.568)	234.00	213.42
	HDDS	−1.697	NA	418 (0.090)	145.90	211.06
	MAHFP	−0.131	NA	428 (0.896)	210.04	214.63
Gaborone	HFIAS	−0.458	NA	386 (0.647)	182.08	194.09
	HDDS	−0.544	NA	366 (0.586)	196.64	182.82
	MAHFP	−0.173	NA	398 (0.862)	201.24	196.78
Maseru	HFIAS	−3.250**	0.115	794 (0.001)	369.13	422.13
	HDDS	−3.269**	0.118	767 (0.001)	411.51	360.42
	MAHFP	−1.450	NA	784 (0.147)	404.90	381.59
Manzini	HFIAS	−0.501	NA	487 (0.616)	253.77	242.96
	HDDS	−0.855	NA	476 (0.392)	255.36	236.83
	MAHFP	−0.492	NA	478 (0.622)	249.03	238.53
Maputo	HFIAS	−0.985	NA	244 (0.325)	130.74	120.10
	HDDS	−0.081	NA	245 (0.936)	122.34	123.20
	MAHFP	−0.255	NA	245 (0.798)	120.86	123.60
Blantyre	HFIAS	−0.251	NA	430 (0.802)	216.64	213.59
	HDDS	−0.916	NA	419 (0.360)	214.15	203.08
	MAHFP	−0.593	NA	431 (0.553)	218.65	211.65
Lusaka	HFIAS	−2.177*	0.115	356 (0.030)	115.04	180.71
	HDDS	−1.319	NA	354 (0.187)	217.14	176.23
	MAHFP	−2.721**	0.143	363 (0.007)	261.54	179.28
Harare	HFIAS	−0.416	NA	453 (0.677)	229.08	223.85
	HDDS	−0.533	NA	453 (0.594)	224.35	230.95
	MAHFP	−0.847	NA	438 (0.397)	223.70	213.31
Cape Town	HFIAS	−1.081	NA	1023 (0.280)	467.57	514.24
	HDDS	−2.611**	0.082	1006 (0.009)	615.94	498.48
	MAHFP	−1.171	NA	1040 (0.242)	568.63	518.12
Msunduzi	HFIAS	−0.821	NA	542 (0.411)	279.99	267.91
	HDDS	−1.771	NA	534 (0.077)	285.31	259.81
	MAHFP	−0.475	NA	525 (0.634)	258.32	265.03
Johannesburg	HFIAS	−0.371	NA	967 (0.710)	473.73	485.00
	HDDS	−5.245**	0.172	931 (<0.001)	611.81	451.54
	MAHFP	−0.888	NA	964 (0.375)	460.67	484.58

**$p < 0.01$
*$p < 0.05$

In Blantyre, there was a significant but weak negative correlation between frequency of household engagement in UA and HDDS scores (Rho (262) = −0.170, $p = 0.006$). This indicates that the more often a household relies on UA as a food source, the lower the dietary diversity of that household. Households in Harare

Table 2.3 Correlations of household food security scores with frequency of household UA engagement by city

City	HFIAS	HDDS	MAHFP
	Rho (n, *p*-value)	Rho (n, *p*-value)	Rho (n, *p*-value)
Windhoek	−0.382 (12, 0.221)	−0.070 (10, 0.847)	0.025 (12, 0.938)
Gaborone	−0.374 (19, 0.115)	0.098 (18, 0.699)	0.091 (19, 0.710)
Maseru	−0.093 (369, 0.074)	−0.015 (354, 0.782)	0.184** (367, <0.001)
Manzini	−0.245 (47, 0.098)	−0.133 (43, 0.394)	0.129 (44, 0.404)
Maputo	0.166 (55, 0.227)	0.027 (56, 0.843)	0.155 (54, 0.263)
Blantyre	0.034 (269, 0.575)	−0.170** (262, 0.006)	−0.021 (269, 0.736)
Lusaka	0.092 (12, 0.776)	0.338 (11, 0.309)	−0.379 (12, 0.224)
Harare	0.153* (273, 0.012)	0.005 (271, 0.931)	−0.049 (261, 0.426)
Cape Town	−0.042 (49, 0.776)	−0.078 (43, 0.619)	0.084 (49, 0.568)
Msunduzi	−0.041 (161, 0.606)	−0.024 (161, 0.765)	−0.059 (159, 0.461)
Johannesburg	0.391** (86, < 0.001)	−0.341** (84, 0.002)	−0.482** (84, <0.001)

**$p < 0.01$
* $p < 0.05$

demonstrated significant but weak positive relationships between UA frequency and HFIAS scores (Rho (273) = 0.153, $p = 0.012$), indicating that UA engagement frequency was associated with worse household food access in this city. Households in Johannesburg demonstrated a significant, moderate and positive correlation between household UA engagement frequency and HFIAS scores (Rho (86) = 0.391, $p < 0.001$) and negative correlations between household UA engagement frequency and HDDS scores (Rho (84) = −0.341, $p = 0.002$). These results indicate that the frequency of household engagement in UA was associated with moderately lower household food access and moderately lower dietary diversity. The households in Johannesburg also demonstrated a significant, strong and negative correlation between household UA engagement frequency and MAHFP scores (Rho (84) = −0.482, $p < 0.001$), indicating that frequent engagement in UA was strongly associated with low household food provisioning.

These results indicate that there are few direct relationships between engagement in UA as a food source and household food security or between frequency of engagement in UA as a food source and household food security. In the few cities which demonstrate a relationship between household UA engagement and food security, the results are mixed. Some cities demonstrate that households engaged in UA have significantly higher food security scores but these cities also demonstrate a negative relationship between frequency of UA engagement and food security. In general, it appears that household UA engagement as a food source is not an effective strategy for maintaining or increasing household food security, although there is variation in its effectiveness between urban contexts.

2.5 Households Earning and Landholdings as Predictors of UA Effectiveness

The AFSUN survey focused primarily on poor urban households. However, the effectiveness of UA as a food security intervention may be mediated by household socio-economic and demographic factors. For example, several scholars have found that UA participation is correlated with wealth/education and landholdings (Crush et al. 2011; Kwambisi et al. 2011). This is consistent with the AFSUN data. In Malawi, higher-income, better-educated, and (often) male-headed households reaped higher yields and consumed more UA produce than low-income, less-educated and (often) female-headed households. According to Kwambisi et al. (2011), high-income households harvested an average of 306 kg/capita compared to about 68 kg/capita cultivated by lower-income households. High-income households also consumed 75 % of what they grew, whereas low-income homes consumed only 34 %. Land ownership is a significant contributing factor to higher crop yields, with leased land yielding 1116 kg/ha, rented land about 940 kg/ha and public land only 450 kg/ha. These discrepancies occur because higher-income households have better access to agricultural inputs and extension services and can afford to hire extra labour. In contrast, poor households engage in UA in order to earn extra income rather than for direct consumption.

Similarly, in Botswana, Hovorka (2004) demonstrates that the scale of and economic benefits from UA are primarily captured by high-income, often male-headed households. Hovorka examined commercial poultry enterprise, which had an equal participation of males and females as well as high and low-income farmers. However, males, and in particular those in a higher income bracket, not only sold more poultry but also generated more income from the enterprise than their female counterparts. The author explains that there are social and gender differences that disproportionally accrue land leases and bigger farm plots to men, allowing them to have larger-scale and more diversified operations. In contrast, women farmers who were on average more efficient and effective at poultry production, tend to operate on public lands or out of their homes, and therefore at a much smaller scale. Hence, they earned much less income from participation.

The correlation of wealth/education and landholdings with UA productivity is also evident in Harare. Kutiwa et al. (2010) found significant statistical differences in crop yields between better-educated urban households who harvest an average of 209 kg per plot, compared to less-educated households who yielded about 110 kg. Crush et al. (2011, p. 289) cite Byerley (1996) to explain that middle-income city dwellers "choose to cultivate in order to attempt to preserve their standards of living during inflationary times of crises and also to reduce their vulnerability to the possible breakdown of formal food channels." UA studies from other regions similarly reveal that wealth, land holdings and education are important determining factors for food security net gains, as well as a source of additional income from the sector (Lee-Smith 2010, 2013).

2.6 Conclusion

Based on the findings presented in this chapter, the actual benefits of UA as a broad urban development and food security strategy are unclear. Our analysis lends support to the second position evident in the literature—that UA has limited poverty alleviation benefits under current modes of practice and regulation. As highlighted in this study, urban contexts tend to influence the key factors that either promote or hinder UA activity and scale. Thus, further comparative and more fine-grained research is required in order to understand specific factors within cities, and possibly identify coherent UA policy measures geared towards the livelihood needs of the urban poor.

This chapter draws three significant conclusions related to household engagement in UA as a food source. First, the urban context (i.e., economic, political and historical circumstances) tends to play a major role in determining the rate of household engagement in UA. In general, cities experiencing economic decline, with limited income opportunities for households, tend to have higher rates of UA participation than cities with economic growth. Second, this investigation found little evidence to suggest that UA is an effective household food security strategy. The majority of analyses in this investigation demonstrated no significant relationship between UA and food security. Where there was a significant relationship, we found that households engaged in UA had higher food security scores than other households, frequency of engagement in UA as a food source was associated with worsened household food security. And finally, UA participation is determined by each household's level of income as well as landholdings, with wealthier households more likely to participate and benefit than poorer households.

The major implication is that UA, like any form of agriculture, requires a complex set of preconditions, inputs, extension services, credit/financial access, production and marketing infrastructure, and knowledge for the urban farmer to succeed. Yet the literature usually considers UA a pro-poor, often self-help, process and strategy. Abdicating the responsibility for pro-poor urban development by placing the burden on the shoulders of the urban poor is simply not good development practice. If UA is indeed to become the pervasive food and nutrition strategy of the urban poor that so much of the literature claims it is or has the potential to be, this cannot be done without significant and ongoing investment in, and support for this sector. After all, the commercial agricultural sector is supported at all stages of the production chain, and yet the poorest of the poor, often living in informal and overcrowded conditions and marginal circumstances, are expected to show entrepreneurial spirit by growing themselves and their families out of poverty. The major research and policy challenge is therefore to understand what conditions are necessary to promote UA as a successful pro-poor development strategy and on that basis to develop meaningful and workable support programmes for the urban poor who wish to participate in growing and selling food in the city.

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