

Urban Agriculture in Low Income Households of Harare: An Adaptive Response to Economic Crisis

Susan Kutiwa¹, Emmanuel Boon^{2*} and Dimitri Devuyt³

Human Ecology Department, Vrije Universiteit Brussel, Belgium

¹Telephone: +32 2 477 49 25, E-mail: skutiwa@vub.ac.be ^{2*}Telephone: +32 2 477 42 81,

Fax: +32 2 477 49 64, E-mail: eboon@vub.ac.be ³Telephone: +32 2 477 49 34,

Fax: +32 2 477 49 64, E-mail: Dimitri.Devuyt@vub.ac.be

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ABSTRACT Urban farming has for years served as a vital input in the livelihood strategies of urban households in Zimbabwe. In general, urban dwellers rely on the market for food but with the tremendous surge in food prices beyond the reach of the majority of the population, the poor urbanites in Zimbabwe have resorted to intensifying urban agriculture as a coping strategy to meet their immediate food requirements. This paper discusses the contribution of urban agriculture to reducing food poverty in the context of sustainable urban development. The elements of urban agricultural production and food insecurity, alleviation of urban poverty and the state of the environment are analysed holistically. The findings of the paper are derived from qualitative and quantitative data collected from 59 low income urban farming households, field observations and key informant interviews conducted in Harare, Zimbabwe in July and August 2008. The results of the data analysis indicate that urban agriculture in low income households has rapidly become a significant source of fresh produce but shortage of agricultural resources, serious environmental health risks and policy gaps remain paramount obstacles to realizing the full potential of urban agricultural development. The results also show that active participation in urban agricultural activities is done predominantly by women. The research shows that urban agriculture contributes to household food supply and access but its potential in terms of food utilization, dietary diversity and poverty alleviation should not be overemphasised. Finally, a number of recommendations are suggested for improving urban agriculture from a human ecological perspective.

INTRODUCTION

Despite continued economic growth around the world, food insecurity remains a pressing problem in many parts of Africa. Cities in Sub-Saharan Africa (SSA) are growing at an exceptional rate of about 5% annually (Crush et al. 2006). The UN-HABITAT (2006) reports that the percentage of urban residents in SSA is expected to rise from 30 to 47 percent of the total population during the period lasting from 2005 to 2030. This will bring about new and critical challenges for urban development policy, especially in terms of ensuring household food security. It is acknowledged that as the world's urban population grows, so too does the population of the urban poor (Beall and Fox 2007). The overall cost of supplying, distributing and accessing food is also likely to increase as the number of urban households that are food insecure is growing. Unlike in rural areas where most households derive their food requirements from agricultural production, food security in urban areas is market dependant as most households procure their food from the market. Against this backdrop, urban agriculture or food production conducted in or around urban regions

seems to provide a realistic and pragmatic solution.

Poverty in urban areas is affected by a particular combination of factors which tend to produce a wide range of vulnerabilities. The most important vulnerability involves urban poor dwellers who are more immersed in the cash economy but earn incomes that are often erratic, unreliable and small (Smith 1998). The urban poor households, especially the female headed ones, are forced to prioritize their basic needs and food is normally one of them. Most of the urban poor receive incomes that are too low to purchase what they need for long-term survival and they spend most of their household budgets on food (Mitlin 2005). In 2008, the world food situation appeared to be in crisis, particularly in the developing world which is paralleled by high food prices and low food reserves. The FAO food price index of commodity prices surged 57 percent between March 2007 and March 2008 after a 9 percent increase in 2006. This has created negative implications for household food insecurity of vulnerable groups (FAO 2008). Food crisis and unstable socio-economic environment make the urban poor tend to suffer the most as they lack sufficient income and consumption, lack of access

to employment and food, inadequate services, including health and education (ZIMVAC 2004).

Agricultural production in urban areas is not a new phenomenon in Zimbabwe. The primary driving force behind the continuous increase in urban agriculture is a lethal combination of factors that include failure of the structural adjustment programmes (SAPs) and land reform, worsening poverty, market failures, economic decline and political upheavals that have caused a severe food crisis throughout Zimbabwe. Zimbabwe, the former bread basket of Africa, has become a net importer of food with grave consequences on both the economy and the overall food security of the country. High food prices have drastically reduced people's purchasing power and raised the spectre of food and income disequilibrium at the household level. As stated by FEWS NET (2009), a significant proportion of the low income urban households in Zimbabwe face serious difficulties in accessing adequate basic food stuffs, which are sold at prices beyond what consumers can afford. The crisis is further worsened by population shift from the rural to urban areas. Poor urban households are using coping strategies in order to meet household food entitlements by intensifying urban agriculture.

Despite the relatively large number of studies on urban agriculture in Zimbabwe, the information is largely qualitative. Principal studies that have been done on urban agriculture in country include: Mbiba (1994), *Urban Agriculture in Zimbabwe: Implication for Urban Management* and Smith et al. (1995), *Poverty and Urban poverty and urban agriculture: An overview of linkages in Harare*. The general purpose of this paper is to analyse quantitative information as regards the benefits of urban agriculture and to assess the contribution of the sub-sector to ensuring food security and the nutritional requirements of urban households. The paper's guiding hypothesis is that urban agriculture plays a significant role in reducing poverty and food insecurity in Zimbabwe.

CONCEPTUAL FRAMEWORK

For the poor urbanites in a cash intensive environment, low incomes, gender disparities, and lack of amenities is likely to propel them into food insecurity and poverty cycle. One way to escape the cycle is for such households to engage in urban agriculture which has potential

to address the three components of food security: adequate access, food availability and utilization as is illustrated in Figure 1. Regarding availability, urban agriculture has potential to ensure that supply to fresh food is consistently available to urban households. Urban farming households are able to produce their own food for household consumption and for sale. With income earned from the sale of urban agricultural produce, these households are able to mobilize resources to access appropriate foods for a nutritious diet. As regards food utilization, urban agriculture has the potential to ensure nutritional security through dietary diversity and intake of quality food.

POLICY AND LEGAL FRAMEWORK FOR URBAN AGRICULTURE IN ZIMBABWE

Agriculture is not classified as an urban activity in Zimbabwe. Hence, city planning system does not cater for urban agriculture. Urban agriculture is therefore to some extent viewed as illegal since it is not backed up by any statutory instrument (Marongwe 2003). There is no clearly laid down policy on urban agriculture. However, since 2002, local authorities support urban agriculture if it is organised in a systematic manner. The Nyanga Declaration on Urban Agriculture in Zimbabwe and the Harare Declaration by Ministers of Local Government in Eastern and Southern Africa acknowledged that urban agriculture contributes to urban food security, poverty reduction, local economic development and sustainable urban development (Hungwe 2006). The declaration also urged local authorities to develop appropriate incentives necessary for the growth of urban agriculture. Non-Governmental Organisations (NGOs) were also encouraged to support sustainable urban agriculture projects for the benefit of the poor.

This declaration paved the way for the formulation of policy and legal frameworks for urban agriculture. For example, pertinent policies such as the National Environmental Draft Policy that provides strategic directions include developing and publishing guidelines on urban agriculture, assisting local authorities to plan ways to integrate and co-ordinate support for urban agriculture, and establishing extension programmes to promote sustainable urban agriculture (Mushayavanhu 2003). Currently, local municipalities, in collabo-

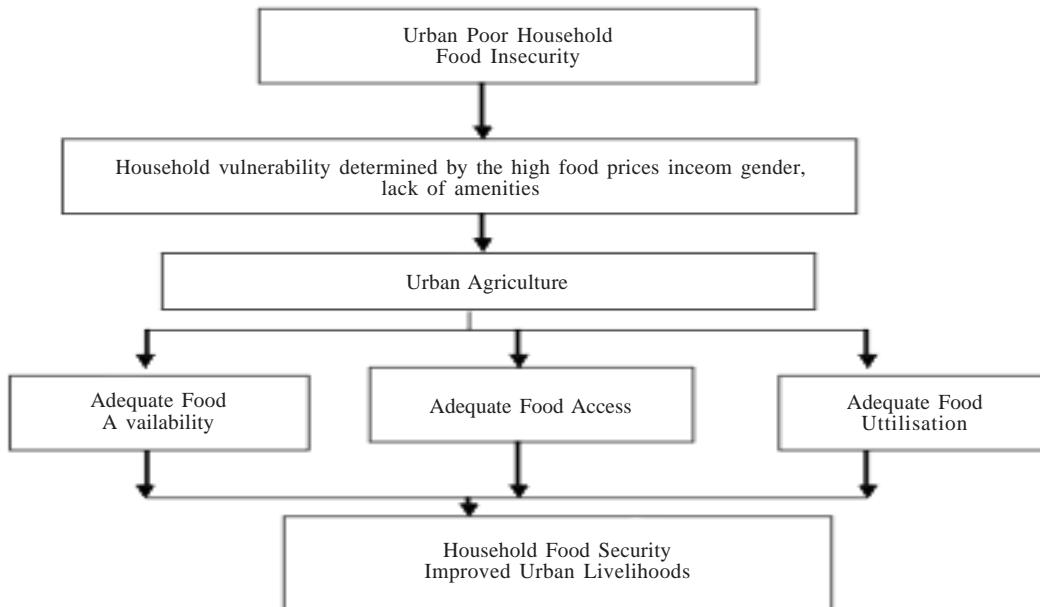


Fig. 1. Conceptual framework for urban agriculture as a tool for household food security

ration with the Department of Housing and Community Services, issue permits for cultivation but the majority of the public is not aware of this facility. Although city municipalities have acknowledged the importance of urban agriculture, the recognition of its current or potential importance has not yet been integrated in the legal and statutory provisions of Zimbabwe. Policies and laws specifically dedicated to enhancing and monitoring urban agricultural activities are glaringly absent.

MATERIALS AND METHODS

An integrated methodological approach was employed in conducting the research that resulted in this paper. A triangulation of both quantitative and qualitative methods was used in order to give the research statistical and conceptual significance. Primary data were collected from urban farming households in low income residential areas of Harare in July-August 2008. The investigation was confined to three areas: Mabvuku, Mufakose and Budiriro. Data collection involved a pilot study, structured household questionnaires administered to urban farming households, case studies,

field observations and key informant interviews. Information gathered included socio-economic characteristics, urban farming practices, agricultural output and sale of output, food sufficiency and the consumption patterns of food crops in the selected residential areas. Urban agriculture in the study areas was categorized into five farming systems on the basis of location, and used as the units of investigation: backyard or kitchen gardening; roadside cultivation; livestock farming; open space cultivation and urban fringe cultivation (peri-urban). The sampled households engaged in either one of the farming systems or in multi-urban agricultural systems. On the basis of this categorization, 3 low income (high density) residential areas were purposively selected for the survey. Urban agriculture is more pronounced in these areas. At the same time, they are facing serious environmental and social challenges. The sample of 59 households engaged in urban agriculture was randomly selected to participate in the survey. The households sampled per residential area were as follows: Mabvuku (23), Mufakose (16) and Budiriro (20). The Statistical Package for the Social Sciences (SPSS Version 14.3) was used to aid the analysis of primary data. Independent

samples t-tests were performed to explain variance in mean land sizes, agricultural production and household dietary diversity score. Simple regression analysis was used to explore the relationship between household income and urban agricultural income. With regard to qualitative data analysis, non-parametric tests (Pearson chi-square and Kruskal Wallis) were used to test for statistical significance and association so as to establish the relationship between the dependent and independent variables. Information on the quantities and monetary values of farm produce were obtained by asking respondents to estimate the amounts of produce they had harvested during the 2007 to 2008 agricultural season from the different crops they had grown. The monetary value of the different types of commodities and urban agricultural produce was based on the local prices that prevailed at the time of the survey. All reported incomes from urban agricultural production are sums of annual cash earned from the farming activities minus the production costs.

RESULTS AND DISCUSSION

1. The Extent and Typology of Urban Agriculture in Low Income Areas

Various farming systems take place in the study locations despite urban legislation which forbid certain farming activities. Urban agriculture in these locations was limited to the production of crops in home gardens, open urban spaces, urban fringes and on the roadsides. Backyard gardening takes place within and around homes while open space cultivation is done in vacant spaces, normally in undeveloped urban lands, stream banks and dump sites. Urban fringe (peri-urban cultivation) takes place on lands just outside the built-up area of the city. Backyard gardening was by far the most common type of urban farming in terms of the number of participants. A Kruskal-Wallis test ($H=4.376$, $df=2$, $p=0.112$) indicates that the responses were fairly uniform throughout the 3 surveyed locations. Backyard gardens were regarded as the major type in all the three areas. However, a Pearson chi square test revealed that the major type of urban agriculture practised by households varies with

the size of the household ($\chi^2=18,791$, $df=9$, $p=0.027$). The results show that the importance of backyard gardens decreases with an increase in household size; larger families tend to be more engaged in open space and urban fringe farming. The popularity of backyard gardens could be attributed to the fact that gardening can be done with virtually no economic resources, using locally available planting materials, green manures, and waste water. It is therefore a production system that can be afforded by the poor city dwellers.

These are similar to the findings by Schippers (2006), cited in Averbek (2007), which show that home gardens in the urban areas of African are useful sites for the collection of germ-plasm of indigenous vegetables, the majority of crops and vegetables grown in the study locations were indigenous, including vegetables like covo (*Brassica carinata*) and tsunga (*Brassica juncea*) and crops such as maize, sweet potatoes and yams to limited extent. These are purposely cultivated for personal consumption, although surpluses may be sold. Contrary to Mbiba's (1994) research findings which indicate that urban farming included goats, sheep, pigs, rabbits and poultry, this present study revealed that livestock production is insignificant, with only about 12% of the sampled farming households engaged in chicken production. This could be a result of statutory laws in Zimbabwe that forbid livestock rearing in high density urban areas following the urban clean up programme of 2005. This was a government initiative which involved the destruction of illegal vending sites, informal business premises and homes and other structures not built according to planning laws that guide development in the country (Gandure and Marongwe 2006).

2. Contribution of Urban Agriculture to Food Security

Nugent (2000) asserts that urban agriculture improves both access and food intake of fresh foods, especially among populations suffering from food insecurity, either through their own self provisioning which reduces market expenditure. Urban agriculture is therefore one of the survival strategies poor urban residents adopt to reduce poverty and improve their food security (Averbek 2007). The contribution of

urban agriculture to food security in Zimbabwe is briefly discussed in the next sub-sections.

2.1. Urban Agricultural Food Production and Consumption

Food security entails that the population has enough supply and access to staple foods. In Zimbabwe, as in the rest of southern Africa, the importance of maize is epitomized by the Malawian adage that "maize is life" (Muzhingi et al. 2008). Being the staple food for Zimbabwe, maize is one crop which is associated with food security levels at both the national and household level. In this study, maize was therefore used for analysis of household food production and consumption. The results of the present study show that the majority of households (96.6%) used maize for consumption purposes and did not store maize for future use. Urban farmers produce maize as part of their survival strategy and their farming activities are not large-scale. Analysis of maize production and consumption was done to determine direct entitlements of harvests from urban farms. This figure was then compared with the country's recommendation that everyone should consume 153 kg of cereal each year as a typical food budget. The results however show that per capita cereal consumption was 91.2 kg per year. This implies that, on average, the households surveyed could not support themselves entirely on the maize they produced on urban agricultural plots. Clearly, several livelihoods strategies are being employed to satisfy their food needs. The results also show a statistically significant impact of education on cereal production [$F(3,55)=5.525, p=0.002$]. There is considerable variation between groups, with the more educated households consistently obtaining larger harvests than the less educated households. For example, the mean cereal production for households with no formal education was 110kg compared to 209kg in households with post secondary education.

2.2. Household Food Sufficiency from Own Production

The period of time during which the produce of urban agriculture is sufficient for a household is an indication of its food or consumption gap. Observations during the fieldwork show that the majority of the respondents (62%) depended on harvested crops from urban agricultural farms for a period of 1 to 3 months. The results of a Pearson chi square test show an insignificant correlation between gender and food sufficiency from own production ($\chi^2=2.453, df=3, p=0.484$). In other words, the number of months a household can depend on urban farming production was not influenced by gender. However, food sufficiency from own production was significantly associated with household size ($\chi^2=18.559, df=9, p=0.029$). Subsequently, a cross tabulation analysis revealed that sufficiency from own production decreases with increase in household size as shown in table 1.

2.3. Impact of Urban Agriculture on Food Access

Because urban dwellers must buy most of their food, urban food security depends mostly on whether the household has adequate effective purchasing power given the prevailing prices and incomes (Garrett 2000). According to Engel's law on the relationship between income and the amount allocated to food (Duly 2003), as income increases, the proportion of spending devoted to food decreases. Contrary to this law, the analysis of household monthly income and food expenditure within the sampled households revealed that food expenditure soared with an increase in household income. A simple linear regression model indicated that monthly household income had a significant effect on household food expenditure [$F(1,57)=111.618, (p=0.000)$]. In general, the findings from literature show that the urban poor spend between 60-80% of their income on food (Baudoin and Virik

Table 1: Cross tabulation analysis of household size and sufficiency from urban agriculture produce

		Sufficiency from urban agriculture produce				Total
		1-3 months	4-6 months	7-9 months	10-12	
Household size	5 and Below	20	0	6	4	30
	6-8	12	5	2	3	22
	9-12	4	0	0	0	4
	12+	1	2	0	0	3
Total		37	7	8	7	59

2001). The present research also revealed that virtually all the households spent their monthly income on food.

The economic situation in Zimbabwe during the time of the survey was such that there were shortages of basic food commodities on the formal market. However, basic commodities were available on the parallel market but were generally sold in foreign currency, which very few people in the country earn. Even the street vendors selling vegetable and re-packaged smaller quantities of basic food stuffs in the poor high density urban areas, were selling their goods in foreign currency. As stated by FEWS NET (2008), not only is the food crisis in Zimbabwe's urban areas a food availability crisis, it has become an access crisis as well. The Mbare market in Harare is where a very large percentage of the most vulnerable households procure their basic commodities. Maize flour and cooking oil represent the most important food commodities consumed by poor households. In July 2008, the prices of these commodities at the said market were USD18 for a 10kg pack of maize flour and USD 8 for 0.75 litre bottle of cooking oil.

When respondents were asked why they had engaged in urban agriculture, the results show that the most important reason for practising urban farming was improvement of family access to food (49.2%) as shown in Figure 2. The other reasons cited by the respondents included farming to improve household food supply and nutrition (28.8%), to supplement income (20.3%) and to comply with cultural values (1.7%).

The most commonly expressed primary motivation for urban agriculture was the need to

avert hunger for the urban farmers and their families by producing staple crops. However, other scholars interpret the primary motivation for people's involvement in urban agriculture as the failure of families' monthly per capita incomes to keep pace with rising food prices (Flynn 2001). However, it is important to note that there is a close inter-relationship between these two aspects. For example, if people produce their own food, they can spend less income on food and the money earned from the sales of urban agricultural produce is normally used for other household food needs (Mougeot 2005).

2.4. Urban Agriculture and Household Dietary Diversity

The extent to which urban agriculture was contributing to dietary diversity in urban farming households was also investigated. The results show that urban farmers in the study locations engaged in diversified crop and vegetable production. Only about 12% of the farming households were practising mixed farming, which mainly involved poultry and crop production. To find out the level of dietary diversity within the farming households, the respondents were asked to specify which food groups they had consumed in their household during the last week. The household dietary diversity score (HDDS) was the tool used to understand if and how diets are diversified within the given population. Households were classified as follows: ≥ 7 food groups is an indication of high HDDS; 4 to 6 food groups indicate medium HDDS and ≤ 3 food groups indicate low HDDS. The

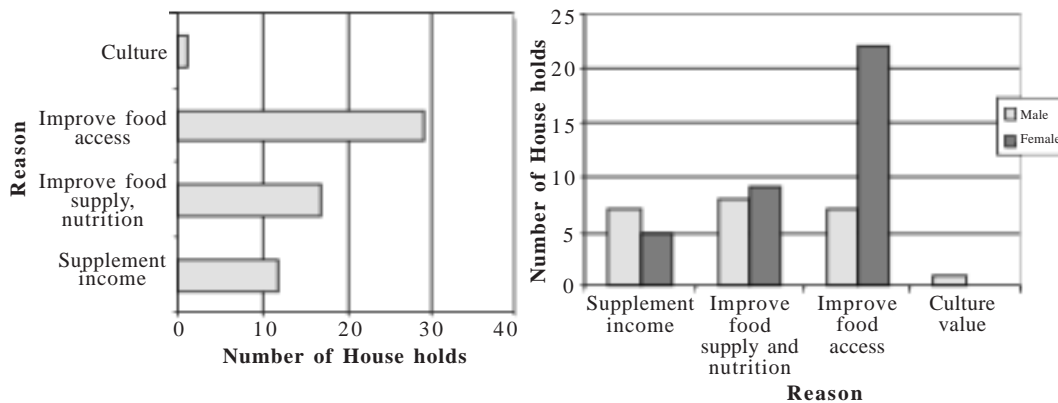


Fig. 2. Reasons for engaging in urban agriculture
Source : Field data 2008

Table 2: Regression coefficients for dietary diversity and urban agriculture systems

Variable	B	SE B	β	t	P-value
Backyard gardening	1.074	0.823	0.173	1.305	0.198
Open space cultivation	0.478	0.387	0.167	1.236	0.222
Small livestock rearing	1.641	0.537	0.388	3.055	0.004
Urban fringe	0.429	0.517	0.107	.829	0.411
Roadside cultivation	0.354	0.425	0.107	.832	0.409

household dietary diversity score for the study area was 5.1, thereby indicating fairly diverse diets. A linear regression was performed on the data to assess the effect of different types of urban agricultural systems on dietary diversity (HDDS). As shown in table 2, a positive and significant correlation exists between livestock rearing and household dietary diversity [F (5,53)=2.463, p=0.044, R²=.189].

Compared to other farming types (open space crop cultivation, backyard gardening, urban fringe and roadside cultivation), the results of the regression analysis indicate that only chicken rearing has a significant effect on household dietary diversity (p<0.05). There are two plausible reasons for this result. Firstly, as argued by Pretty et al. (2003), an increase in agricultural diversity translates into increased diversity of food consumed by the household. For example, a household engaged in chicken and vegetable production has a readily available source of meat and eggs from chicken together with fruits and vegetables from home gardens. Secondly, an increase in dietary diversity is associated with household socio-economic status (Ruel 2003). Chicken production in the study locations was mainly market oriented. The income earned from chicken production was very high, implying that these households could afford to purchase a variety of foods from the open market. It is however important to note that even though urban agriculture makes up an important component of diversified diets and improves dietary quality, food from urban farming is not the major source of food for households (Maxwell et al. 1998).

3. Level of Dependence on Income Generated from Urban Agriculture

Literature shows that urban agriculture contributes to household income and which includes fungible income through the sale of urban agricultural produce and savings by not purchasing foods they already produce (Maxwell 2000). Economic benefits of urban agriculture include the total income earned from urban agricultural production and how the households used the income. All reported incomes are sums of annual cash earned from farming activities minus the production costs. Despite the prohibitive legislation and insignificant number of farmers involved in livestock production, the study revealed that poultry rearing is a major income source for farming households. Urban agriculture constitutes a form of semi-proletarianism, as the producers rely on both subsistence and cash income. Household per capita income and per capita farm income was regressed to further explore the relationship between household income of urban agriculturalists to give an indication of the contribution of urban agricultural income to total household income. Using a simple linear regression model, the results show that total farm income has no significant effect on household income [F (1, 57)=0.838, p=0.364] as shown in table 3.

Despite the prohibitive legislation on the rearing of animals in urban areas, the results indicate that this activity is a major income generator for farming households. As stated earlier, only 12% of the households engaged in

Table 3: Simple regression of household per capita income and per capita farm income

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1155.733	207.236		5.577	.000
Per capita agric income	-.002	.002	-.120	-.916	.364

Dependent variable: Per capita household income

poultry rearing and a total of USD 4,600 was earned from this activity. Conversely, it is important to note that unlike rural and commercial farming, the sampled urban farming households consume most of their produce and only a small portion is sold at the open market. A significant number of respondents (66.1%) indicated that they farmed purposely for home consumption, while 33.9% farmed for both sale and consumption. A substantial number (50%) of the farming households used farm income to purchase food, 30% attested to using the money to supplement household income; 10% for school fees and another 10% for procuring medicine.

4. Gender and Urban Agriculture

According to Pretty et al. (2003), if food poverty is to be reduced, then it is important to ask who produces the food, who has access to the technology and knowledge to produce it, and who has the purchasing power to acquire it? Many surveys indicate that women predominate in urban agriculture. This conveniently enables women to earn income, improve household diets, perform household chores, and exert greater control over household resources, budgets, and decision-making (Mougeot 2000). Binns and Lynch (1998) concur to this view by stressing that there is a strong propensity among poor urban women to grow food crops to feed their families in the face of escalating market prices. This paper reveals that urban agricultural labour in Harare is founded on a gender based division of labour, reminiscent of what is found throughout Zimbabwe, wherein the middle-aged and elderly women are actively involved in farming activities than their male counterparts. This situation can be explained by three main reasons. First, urban agriculture is relatively more easily fitted into women's daily chores. With the plots situated relatively close to their residences, the female household members can easily take care of their farms if and when they have a break from other duties. Second, results of various research from developing countries indicate that men generally do not regard urban agriculture as a business, but only as a marginal activity (Bryld 2003). Third, as stated by Obuobie et al. (2004), women in African cities dominate urban agricultural activities because they continue to bear primary responsibility for household sustenance and well being largely due to traditional or cultural values and societal expectations.

Per capita cereal production was slightly higher in female headed households (105.6kg), than in the male headed ones (85.8kg). Regarding the proportion of the harvests consumed directly by the households, the study found that female headed households consumed 87.5 % of the total harvest compared to 56.3% of the male headed households who consumed 56.3% of their total harvests ($p=0.024$). Despite the fact that women on average were poorer and less educated than their male counterparts, when they had access to large plots, they were slightly more efficient in terms of the harvest per m^2 as shown in Figure 3.

The mean land size used for urban agriculture purposes was $465m^2$. Land sizes were fairly uniform between male ($495.6m^2$) and female headed households ($452.4m^2$). To test if the differences in mean land sizes were significant, a t-test proved that there was no statistical difference in land sizes between men and women ($t=0.243$, $df=57$, $p=0.809$, 2 tailed). A similar study carried out in Ghana indicates that one's access to land has changed and now depends on one's ability to lobby (Obuobie et al. 2004).

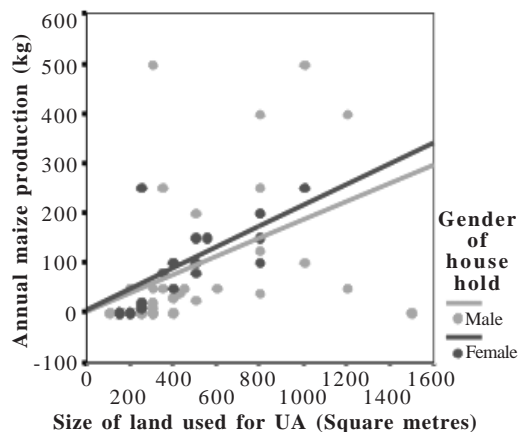


Fig. 3. Average cereal yield (kilograms per m^2) between female headed and male headed household

5. Challenges of Urban Agriculture

Like urban farmers everywhere, farmers in Harare encounter a number of challenges in their farming operations. Most respondents indicated that water (36%) and shortage of inputs (20%) are major challenges they encountered. Water supplies remain intermittent with cuts lasting for more than two weeks in most residential areas. Similarly, the severe shortage of maize seed has

lowered potential yields. At the time of the field survey, agricultural inputs were unavailable on the formal market and the prices on the parallel market were beyond the reach of most of the urban poor farmers. In July 2008, a 10kg of maize seeds and a 50kg bag of ammonium nitrate fertiliser were sold at 30USD and 50USD respectively. The majority of the respondents attested that they had resorted to using uncertified seeds and reduced the size of agricultural land, both of which contributed to reduced yields.

The marketing of farm produce, especially vegetables, was also reported as a major challenge facing farmers. There are profound fluctuations in prices resulting from supply and demand inequalities. Usually, households residing near the urban farms purchase the biggest share of the produce but in most cases at low prices which do not reflect the effort of the farmers. All the respondents reported that they had no access to formal markets to sell their produce. In addition, the poor state of the means of communication and police harassment are among the constraints confronting urban farmers and impeding the sale of their produce. This situation is further aggravated by competition from produce imported from rural and commercial farms. In addition, the registration procedures that the local authorities require urban farmers to satisfy are complex, burdensome and costly and thereby discourage the urban farmers who are not used to the bureaucratic system.

5.1. Limited Access to Urban Land for Agriculture

Severe pressure is exerted on land in Harare for agricultural purposes. This has been aggravated by poor physical planning in Harare. On the open market in Zimbabwe, potential urban farm land is viewed as a tradable commodity that competes with other land uses (Mawoneke and King 2003). Agricultural land in urban areas has the lowest value and is therefore considered uneconomic. Thus, little land is allocated for this purpose in urban areas. Most farmers who cultivate in open spaces, urban fringes and along roadsides in the city, inherited land from family and friends or had acquired the land by "first claim", the first person who found a vacant piece of land and started using it became the de facto owner. However, according to Toriro (2009), these farmers have limited security of tenure. The actual owners of the land (private

or public institutions) can decide to use it at any time. First possession of land and inheritance of land from family and friends is strongly associated with the number of years the household had resided in the area. Households that had resided in a particular area for more than 10 years were found to have acquired land by inheritance or first claim. Recent residents had mostly gained access to land through formal ownership, borrowing or government allocation.

Borrowing of land is a new phenomenon in Zimbabwe. Land that is let to urban farmers usually involves large pieces of unbuilt urban land that is held by private landlords, essentially for speculative purposes or as a hedge against the high inflation that has characterized the Zimbabwean economy. The general perception among farmers is that since they do not possess tenure rights to the land on which they farm, they were likely to lose their land at any moment and this discourages them from investing in agriculture. Given the economic meltdown and increased urban food insecurity, the government and city authorities are now recognizing the importance of urban agriculture. They are, therefore, encouraging the demarcation and allocation of farming plots to urban farmers. However, most urban farmers are unaware of the process as it has not been publicly announced.

5.2. Urban Agriculture and Human Health Concerns

Urban agriculture can cause long-term adverse impacts on environmental quality. Nearly half of the households lacked access to good drinking water. Good quality and drinking water and a safe healthy environment are essential prerequisites for food safety. Their absence will pose a serious health risk to the larger proportion of urban households. Even though urban agriculture has the potential to recycle wastewater and organic materials and thereby contribute to solving waste disposal problems in urban areas, the uncontrolled use of untreated waste water in backyard gardens can become a breeding ground for diarrhoeal diseases and increases income spent on medical expenses.

Excessive accumulation of heavy metals in agricultural soils may not only result in environmental contamination, but lead to elevated heavy metal uptake by crops, which may affect food quality and safety (Muchuweti 2006). The study also revealed that about 36% and 22% of the

urban farmers were respectively engaged in open space crop farming and roadside cultivation. However, owing to poor waste collection services in Harare, residents in low income areas have resorted to dumping waste in open spaces and along road sides. Uncollected refuse heaps continue to be part of the landscape used for agricultural purposes. There is therefore a high risk of soil contamination in the roadside farms which can lead to contamination of crops and eventually people consume the produce which poses human health risks. As stated by Almar (2000), food products constitute one form of human ingestion of toxic products. Zimbabwe still uses leaded fuel and road transport is the most common means of mobility in Harare. A study carried out in the city in 2004 revealed that maize and tsunga were heavily contaminated with cadmium, lead, copper and zinc. Of the edible portions of tsunga, cadmium levels were 18 times more than the permissible level (Muchuweti et al. 2005). However, most urban farmers are not aware of the existing environment and food contamination, and the accompanying human health risks, mostly because the effects of heavy metal contamination are mainly carcinogenic and normally felt in the long-term.

As Mougeot (2005) points out, the challenge for urban agriculture is for it to become an environmental benefit rather than a liability. The role of urban agriculture in ensuring food security goes beyond supply and access arguments; the environmental context in which it is practised is very important. Similarly, Pretty et al. (2003) argue that even though adequate and appropriate food supply is a necessary condition for eliminating hunger, increased food supply does not automatically mean increased food security. In order to assure sustainable urban food production, key environmental elements like fresh water, arable land and other resources should be available in sufficient quantity and quality in a renewable manner. If these problems are not addressed, it will be very difficult for urban agriculture to address the food utilization component of food security.

RECOMMENDATIONS

To ensure that the full potential of urban agriculture in reducing food poverty is realized in Harare, the following recommendations are proposed:

- Integrating urban agriculture into city

development plans by re-zoning the city and incorporating agro-residential planning in city development plans. Local authorities should devise policies for community gardens or allotments. The Havana example in Cuba should inform the Zimbabwean case.

- Urban agricultural diversification which promotes production of high-valued speciality foods such as mushrooms, that require little space for production but provide good monetary returns should be encouraged. Urban farmers should be capacitated to produce protein rich pulses such as soya beans in their gardens to improve the dietary quality of their households.
- Enhancing low input household gardens (LIG) that can create integrated humane, environmentally and economically viable agriculture systems in which maximum reliance is placed on locally renewable resources and management of ecological and biological processes.
- Environmental health education and awareness through dissemination of good practices in urban agriculture to farmers to enable them to generate both environmental and socio-economic benefits.
- Adopting multi-storey gardens (MSGs) which have been successfully implemented in Kenya and Ethiopia. These gardens involve growing vegetables in empty cereal bags and empty cans rather than growing them directly in the ground. These gardens use minimum land space and are water efficient and ideal for areas with contaminated and/or poor soil quality.

CONCLUSION

In conclusion, this paper argues that urban agriculture can simultaneously be operated as an economic, environmental, social and political system. Urban agriculture in Harare acts as a safety net for low income households and helps to absorb some of the negative impacts on the unstable socio-economic environment in Zimbabwe. The major crops grown throughout the study locations revealed the effect of harsh economic environment since most farmers grew staple crops. These included maize, sweet potatoes, yams, and vegetables like covo (*Brassica carinata*) and tsunga (*Brassica juncea*). As regards dietary diversity, the study reveals

that of all the farming systems, chicken production is the only farming system which has a significant effect on HDDS ($p=0.004$). In this study, women were found to be more involved in urban agricultural activities than men, mostly because of their central and cultural role in household food delivery. The study revealed that there were no gender disparities in terms of land ownership. There was no statistical difference in land sizes between men and women ($p=0.809$).

Despite the fact that urban agriculture has the proven capacity to contribute to food security and income generation, it faces a large number of constraints that impede the achievement of these goals. The environmental and human health challenges associated with urban agriculture show that at the current level of practice, the sustainability of urban agriculture is highly compromised. Food security does not only involve the amount and type of food available but also the element of food quality and safety. The study also shows that urban farmers are in a permanent state of insecurity because of non-availability of agricultural resources such as land, water and inputs. There is inadequate farmland since most farmers depend mostly on backyard gardens and illegal open spaces. On the other hand, the production-nutrition systems tended to be influenced by the lack of both capital and crop intensity. The research revealed that most urban farmers farmed on small pieces of land and did not invest much in terms of applying fertilizers to the land and use of certified seeds. This resulted in poor yields, a vicious cycle of low productivity and food poverty.

Even though urban farming in Zimbabwe is limited due to non-availability of agricultural resources and the socio-economic crisis, this paper argues that the role of urban agriculture in reducing food poverty is not marginal and should therefore be accorded more attention in urban development policies and planning process. Although local authorities in Zimbabwe in recent times recognise the role of urban farming as an important survival component for the urban poor, it is necessary to translate this awareness into by-laws and ordinances. While specific statistical findings in this study cannot be generalized beyond Harare, some important points should be considered in other low income urban households. The first is the importance and growing reliance on urban farming for household food consumption. The second is the need to

understand that urban food security goes beyond just food supply and access to include the environmental context in which the food is obtained. The paper therefore concludes that although sustainable urban agriculture is not a panacea to economic decline or poverty alleviation, it is a positive and appropriate way of improving urban livelihoods. The success and expansion of urban agriculture will therefore depend on the ability of policy makers, administrators and urban farmers to use integrated social, economic and environmental strategies that effectively address food security and urban poverty.

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