# *The extent of urban agriculture and its contribution to food security in low income areas: The case of Msunduzi Local Municipality in South Africa*

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**Abstract:** Urban agriculture has emerged as one of the opportunities for cushioning urban families from poverty and improving household food supply. Rural to urban migration accompanied by stagnating economies has seen people who moved to urban areas struggle to make end meet. The practice of urban agriculture is becoming widespread in South Africa as well as other parts of Africa. It is practiced for a number of reasons, chief among which is food security and income generation. This paper presents finding of a study conducted to understand the extent of the practice of urban agriculture and its relative contribution to the welfare of poor urban dwellers, with respect to household food security. A survey of a randomly selected sample of 300 urban households was conducted in Msunduzi Local Municipality, KwaZulu-Natal Province. The sample included 150 urban farmers and 150 non-practicing people who were purposively selected for the study. Msunduzi Local Municipality forms part of the city of Pietermaritzburg. The sample was only drawn from low income township households.

Data was analysed for descriptive statistics and relevant statistical tests were conducted to compare means and assess goodness of fit or association among variables. The results show that women largely dominate urban agriculture and the practice is emerging as a means to cushion households from lack of food and economic hardships. Investment in women will significantly enhance the food security status of urban households. Although much income is not realised from its practice, there is significant potential to enhance its contribution if it is supported through relevant policies that avail production resources, such as land and water. The study recommends some policy interventions to improve the role of urban agriculture and target women producers in a way acceptable to the urban population and women's lives.

**Keywords:** Urban agriculture, food security, income, poverty, policy, women

## Introduction

Meeting food demand for a growing population is already a formidable challenge for the agricultural sector. The challenge is further exacerbated by climate change and increasing urbanisation. Rising economic growth and income per capita, and increasing urbanisation are key emerging characteristics of Africa. Due to escalating population and urbanization, natural resources are gradually depleting, posing major challenges to poverty reduction in Africa.

Rsearch and international development activities during the last decade has illuminated the benefits of urban agriculture (UA) in sub-Saharan Africa (Page, 2002; Rogerson, 2001). However, in addition to natural population growth, South Africa's urban areas are absorbing migrants from the rural areas. These migrants seek employment and a better quality of life in the cities (Lynch, 1995; Rogerson, 2003 Rogerson (2001) argued that in relative terms, the incidence, depth and severity of urban poverty is greatest in South Africa's small towns, followed by the secondary

centres while in absolute terms, however, the largest numbers of the urban poor are found in South Africa's metropolitan areas. Poverty is one of the drivers of UA as it creates survival opportunities.

UA is commonly described as an activity practised by all income groups worldwide. However, in the developing world it is essentially a household survival strategy for the urban poor (Deelstra and Girardet, 2000; De Zeeuw *et al.,* 2000; Jacobi *et al.,* 2000; Hovorka, 2006). Urban and peri-urban agriculture is also described as the location of urban farming activities on the periphery of populated urban zones (Obosu-Mensah, 1999). In the broadest of terms, peri-urban agriculture can be understood as any agricultural activity occurring in built-up intra-urban areas and the peri-urban fringes of cities and towns. The concept of peri-urban is generally understood as the physical interface where complex rural–urban interactions take place (Lynch, 2005; McGregor *et al.,* 2006).

Hovorka (2006) pointed out that the promotion of UA is motivated by its contribution to household food supply, budgetary expenditures, and nutritional intake, particularly during times of hardship. It has been argued that urban agriculture contributes to increased food availability, stability and, to some extent, accessibility. For urban households, even if the proportion of total access to food from their own production is small, its importance is heightened at critical times such as when the household's income for food purchases is insufficient. Urban agriculture can make cheap fresh vegetables and other perishable crops available, lowering their price and increasing their availability, in addition to improving the nutrient content of the diets of the poor (Rogerson, 2003). Maxwell (2002) also pointed out that research shows that urban agriculture is viewed as significantly positively correlated with higher child nutritional status.

Nugent (2002) revealed that for the growing numbers of the urban poor and the informally employed in cities, UA is a vital means of earning income or meeting basic needs and food security. He also asserts that UA provides a good buffer against sectorial shocks or temporary emergencies from civil, climatic or macro-economic upheaval. Overall, UA has been seen as enhancing food security directly or through provision of income and employment for both poor and middle-income dwellers. Mougeot (2002) concurred that for several cities in the South, UA makes an important contribution to employment and income generation, thus contributing to food security and sustainable livelihoods.

Urban agriculture functions as a strategy for poverty alleviation and for the social integration of the urban poor, especially during periods of depressed economic economic activities. De Zeeuw (2002) argued that for disadvantaged and vulnerable groups such as female-headed households, young people without jobs, recent immigrants, the elderly and the disabled, UA helps integrate them more strongly into the urban network and provide them with a chance of a livelihood. . As a key coping strategy, UA facilitates women's ability to combine successfully their multiple roles in subsistence production, income generation and environmental management (Hovorka, 2006) women, who often face greater constraints than do men in urban areas. UA could be a major player on the environmental front.

De Zeeuw *et al.* (2000) states that UA contributes to an ecologically sound urban environment. Nugent (2002) suggested that UA could be a significant means in which the poor could contribute to the environmental sustainability of cities. In addition, UA could lower the cost of waste by allowing nutrient recycling of organic wastes from urban sources. UA is beneficial through the reduction of energy use by providing fresh food close to the city; increasing biodiversity, and reducing the carbon footprint of a city (Rogerson, 2003).

Regardless of UA's 'ancient' origins, its role in modern cities and urbanised areas as a livelihood and food security strategy remains open to debate (Frayne, 2005). The relatively recent interest

in urban and peri-urban agriculture as a potential development tool is not supported by relevant data. Literature since the early 1990s have been more qualitative than quantitative (Thornton, 2008). Additionally, there is little evidence of the identification and monitoring of the extent of urban agricultural activity, growth patterns, natural resource use and environmental impacts (Thornton, 2008)..

This focussed on the central issue of a lack of localised, in-depth empirical urban agriculture research, determine the contribution of UA to enhance survival or livelihoods and its impact in poor urban households who practice it (Mbaye & Moustier, 2000; Lynch *et al.,* 2001; Companioni *et al.,* 2002).

Generally, the research aimed to investigate the role of urban agriculture in enhancing food security in the Greater Edendale Area and Sobantu in Msinduzi Municipality in South Africa. This study sought to contribute to the body of knowledge that informs policy recommendations on improved food availability and household incomes of urban and peri-urban communities in KwaZulu-Natal.

## Research methodology

This section gives a brief description of the study areas, the sample selection procedure and the data collection tools used during the study.

### Description of the study area

The research was conducted in the Great Edendale Area and Sobantu Township of Msunduzi municipality. These two areas were selected due to the evidence of agricultural production in their environs. The Great Edendale Area (GEA) is situated south-west of the Msunduzi Municipality and lies 10km out of the city of Pietermaritzburg. Sobantu is considered as an urban area and GEA is classified as peri-urban. GEA is administrated by the traditional authority but the population lives an urban lifestyle. Both of the areas fall under the Msunduzi Municipality, which also includes the city of Pietermaritzburg.

Much of GEA is densely populated, with both formal and informal housing, supported by scattered ancillary land uses and facilities. The current population within GEA is about 340 000. GEA icomprises of four araes, of which three were purposively selected for this study The whole of Sobantu was included in the study.

### Data collection methods

Mixed methods approach, which uses both quantitative and qualitative techniques, were used for data collection to enhance the reliability of the research. Data collection tools were designed and tested before their use. Relevant stakeholders were briefed on the purpose of the research and the procedure to be followed. Data collection was conducted in two stages. In the first stage a survey was conducted using a structured questionnaire. The second stage involved focus group discussions to getin depth information on the practice of UA.

### Sample selection

A purposive sampling technique was used to draw the sample. Maxwell (1997) defined purposive sampling as a type of sampling in which, particular settings, persons, or events are deliberately selected as respondents who fit the criteria for the purpose of the research (Teddlie and Yu, 2007). Sampling was designed to include groups according to specific characteristics considered to be important for the specific study objectives (Teddlie and Yu, 2007). The purposiveness in this survey was to ensure that the sample had equal numbers of respondents involved in UA and those not involved in UA.

Some 300 households were selected for the study comprising those practicing and not practicing UA. Seventy five households involved in agriculture were selected from each area, while another 75 households not involved in UA were also selected from each area.

**Data collection tools and analysis methods**

In addition to a structured questionnaire used for data collection, focus group discussions (FGD) were used for collecting qualitative data. FGDs explored people's knowledge and perceptions concerning their participation and non-participation in UA, gender issues and their food security status. FGDs also generated data to complement the structured questionnaire. Qualitative assessments provide an understanding of stakeholders' perceptions, priorities, and the conditions and processes that affected livelihoods (Baker, 2000). Descriptive statistical analysis was use for analysing data. Content analysis was for analysing data from FGDs.

## Findings

**Key demographic characteristics**

Table 1 shows that gender composition of household heads among UA practitioners and non-practitioners. The results show that female-headed households are the main participants of UA in both study areas. These findings correspond with results from several African countries. Rogerson (2003) revealed across most of Africa, women are the dominant urban farmers. Women engage in UA partly in order to enhance the food available to their households (Rogerson, 2003).

FGDs revealed that women with low incomes benefit from UA as it allows them to combine their multiple roles of household maintenance with subsistence food production, while allowing them to work close to their households and fulfil the various tasks at the household. Women fulfil both domestic and child-care responsibilities These findings compliment Mougeot (2002) who argued that beyond the provision of produce for household sustenance, urban agriculture has the further advantage of allowing women to work close to their home.

Table 1 shows the demographic characteristics of the respondents. These results show that youths in both areas are less active in UA compared to the elderly. FGDs revealed that the youths shun agricultural activities and prefer to be educated and be employed in other industries. The youths' lack of interest in agriculture is a global phenomenon of the digital age. Innovative ways of drawing them back into agriculture may be needed.

A comparative analysis of both study areas shows that the majority of famers and non-farmers have at least secondary school qualifications. The education level of these farmers offer an opportunity for further training and development in UA.

Table 1: Demographic characteristics of the respondents

| Description | Category | GEA | | Sobantu | | Total | |
|---|---|---|---|---|---|---|---|
| | | Non-Farmers (n=75) % | Farmers (n=75) % | Non-Farmers (n=75) % | Farmers (n=75) % | Non-Farmers (n=150) % | Farmers (n=150) % |
| **Gender** | Male | 48.0 | 25.4 | 54.6 | 36.0 | 51.3 | 30.7 |
| | Female | 52 | 74.6 | 45.5 | 64.0 | 48.7 | 69.3 |
| **Age in years** | < 35 | 34.6 | 24.0 | 41.4 | 29.4 | 38.0 | 26.7 |
| | 36 - 60 | 36.0 | 41.4 | 42.6 | 40.0 | 39.3 | 40.7 |
| | > 60 | 29.4 | 34.6 | 16.0 | 30.6 | 22.7 | 32.7 |
| **Education level** | No formal education | 18.6 | 14.6 | 5.4 | 13.4 | 12.0 | 14.0 |
| | Primary | 10.6 | 17.4 | 13.4 | 16.0 | 12.0 | 16.7 |
| | Secondary | 53.4 | 57.4 | 33.6 | 46.6 | 60.0 | 52.0 |
| | Tertiary | 17.4 | 10.6 | 14.6 | 24.0 | 16.0 | 17.3 |

**Types of food crops produced and consumed**

Farmers in both Sobantu and GEA had a high proportion of households consuming tubers and exotic vegetables. FGDs with farmers revealed that they plant crops such as taro (*amadumbe)*, potatoes carrots, spinach, green pepper, onions, tomatoes, cabbages, butternut, and lettuce. A small proportion of households consumed traditional leafy vegetables. FGDs confirmed that the reasons for underutilization of traditional leafy vegetables in Sobantu and GEA was linked to perceptions and attitudes of households towards them. Sithole and Chitja (2011) wrote that traditional leafy vegetables are classified as the poor people's crops, such that they are stigmatized As a result, there is a decline in consumption of traditional vegetable. The introduction of exotic vegetables has worsened the decline in their production and consumption.

A high proportion of both households that participated in UA and did not participate, consumed cereals. People in these communities consume at least one of their day's meals consisting of their major staple food prepared from maize flour. Although some households indicated that they consumed diversified diets, the question of whether the food they consume is nutritious could not be ascertained.

**Nature and challenges in GEA and Sobantu of UA**

FGDs revealed that UA in both areas is primarily about household consumption to contribute to food self-sufficiency, social interaction, to assess healthy foods rather than only for income generation. Nevertheless, when households practicing UA sell agricultural produce, extra income allows them to buy additional food for household consumption. Some farmers give their surplus produce to the needy community members.

**Land size and ownership**

In terms of ownership of land, 71.3% of the participants in GEA own less than one hectare while 22.7% own between one hectare and two and half hectares of land and 6.0% own more than two and half hectares. A similar pattern exists in Sobantu where 79.1% of the participants own less than one hectare of land while only 17.6% own between one hectare and two and half hectares and 3.4% own greater than two and half hectares.

The majority of the farmers, who own less than a hectare of land, practice backyard UA on small pieces of land which is not even sufficient to produce surpluses. It possibly suggests that limited access to land is one of the factors limiting UA. With more land available, UA could become a tool for income and job creation. However, there is need to investigation the willingness of farmers to expand their UA practices beyond the small plots they currently have.

FGDs in both study areas revealed that soils have never been tested for their quality. However, community members assess soil quality through visual inspection and also by looking at the quality of the produce they got from a particular patch of land. Given that visual inspection of soils is not sufficient to quantify the nutritional quality of the soil, this points to the need to extension support for the UA farmers.

**Water sources**

The UA farmers use three types of water sources. Only 1.4% of farmers in GEA relied on rainwater harvesting while 26.0% relied on river water for irrigation and 72.6% on tap water. In Sobantu only 9.6% relied on rain water harvesting while 15.1% relied on river water and 75.3% relied on tape water for irrigation practices. Evidently, in both areas tap water plays a major role in urban farming. This suggests that extensive increases in UA could impose a severe strain on the water that is meant for domestic uses.

Discussions with farmers established that the main sources of water for agriculture are domestic water taps. Both communities revealed that the municipal water supply was unreliable since the municipalities are already constrained in their provision of the service. In addition, the tap water has to be paid for and tends to be costly. This reduces the viability of conducting UA. UA practitioners also revealed that some of their crops ado not mature due to lack of water. Improved reliability of municipal tap water supply could be helpful. Alternatively, there is a need for research to explore alternative cost effective water harvesting methods suitable for UA. Both areas have rivers running close to some of the community UA plots. Given that at least a quarter of the farmers use river water. However, use of river water could pose a health risk unless the water quality has been tested and proved to be compliant with the required water quality standards. Indeed, recent studies is South Africa suggest that the river water is often infested with bacteria such as salmonella. It is imperative that appropriate interventions are taken to ensure that the pollution of river water is minimized.

**Organisation of farmers in UA**

Five main ways in which farmers practicing UA organize themselves exist. Farmers either practice home garden farming behind their backyards, as a community, as cooperatives or individually in community owned gardens. In GEA, 32.0% of the farmers' farm individually in community owned gardens while 14.7% are in cooperative farming, 5.3% in community farming and 48.0% farm in their home gardens. In Sobantu, 28.0% of the farmers practice individual farming on community owned land while 13.3% are involved in cooperative farming, 10.7% are in community farming and 48.0% farm in their home gardens.

In both study areas, home gardening is the most common practice. Indeed, this corresponds to the high frequency of use of taps to draw water. FGDs revealed that home gardens are perceived as an extension of 'household kitchen' and the majority of those practicing home garden were women.

**Agricultural extension and access to markets**

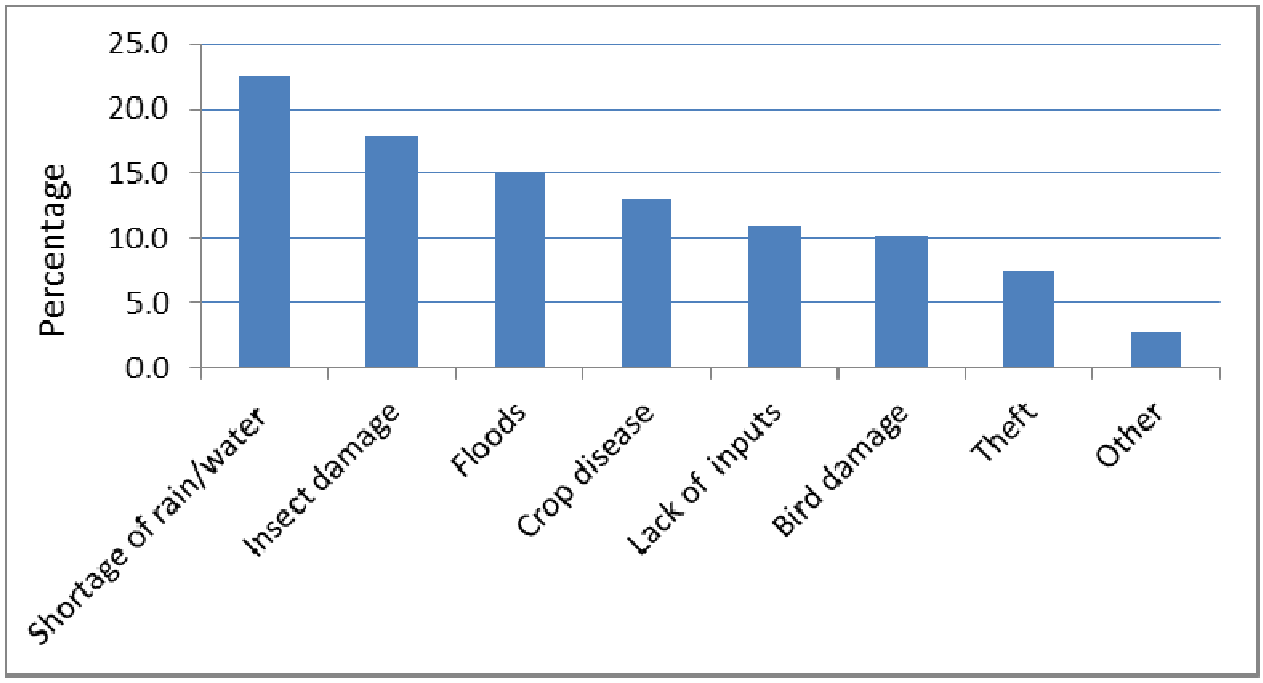
Participants in GEA revealed that agricultural extension services were poor. They noted the late availability of agricultural inputs for agricultural production, which led to delayed planting and poor yields. Inadequate extension services and poor availability distribution of inputs could compromise the potential of farmers to realise surpluses for the markets.

Non-farmer respondents from GEA noted that the limited knowledge and skills they had hindered their participation in UA. They further suggested that they need some form of training to acquire the desired skills in UA. However, in Sobantu participants in UA indicated that they do not practice UA partly due to lack of interest. The lack of knowledge in agriculture among the non-farmers in GEA could be addressed by enhancing the extension support available to farmers in the area. For Sobantu, the interest in agriculture for non- participants could be enhanced by making the community members aware of the ways in which UA could enhance food security and broaden their sustainable livelihood options. Pamphlets with guidelines on how to practice UA while conforming to by-laws could be a starting point.

**Challenges of UA in GEA and Sobantu**

The challenges to practicing UA noted during the study include shortage of water and unreliable water supply (tap water), floods, pests and diseases and limited access to inputs (Figure 1). The results show that water shortage was the major challenges, followed by pests and diseases, floods and limited access to farming inputs. FGDs indicated that 50% of the produce is lost before it is harvested due to a variety of impediments.

Figure 1: Challenges in urban agriculture




**Key opportunities in the study areas**

Regardless of a number of challenges related to UA in both GEA and Sobantu, some key opportunities were identified. Other than the shortages of water, other climatic conditions are conducive to UA as it allows several crops tobe grown consecutively throughout the year. Availability of markets could be supportive if the emergency of vibrant UA.

Sobantu has good access to markets as the township is relatively close to the central business district where a substantial demand for produce exists. The extension services that can provide relevant production information and encourage the community to engage in UA is already in place. The extension services need to be redirected to place priority on servicing UA practitioners.

**Food security and nutrition security**

The surveyed households were grouped into food insecurity categories depending on their responses to anxiety and uncertainty about food supply, and the frequency of employing different responses to deal with limited access to food. Following Coates *et al.,* (2006), respondents were placed into four categories depicting varying levels of food security, i.e., food secure, mildly food insecure, moderately food insecure and severely food insecure. In both GEA and Sobantu none of the households were food secure regardless of their involvement in UA. The surveyed households had low incomes which could be attributed to the food insecurity and anxiety about food supply and the frequent use of the coping behaviours.

Table 2 shows that in GEA has a higher incidence of severe food insecurity among household not participating in UA compared to their counterparts. In Sobantu, no clear pattern emerged regarding the level of food insecurity. Nevertheless, there is room for UA to enhance food security since a significant proportion of the population still experiences food insecurity. However, this is more urgent in GEA where a higher proportion of the non-farmers experience severe food insecurity.

Table 2: Food insecurity categories for GEA and Sobantu

| Area | Group | Percentage of households facing food security category | | |
|---|---|---|---|---|
| | | Mildly Food Insecure | Moderately Food Insecure | Severely Food Insecure |
| **GEA** | Farmers (n=75) | 16.0 | 64.0 | 20.0 |
| | Non-farmers (n=75) | 14.7 | 41.3 | 44.0 |
| | Total (n=150) | 15.3 | 52.7 | 32.0 |
| **Sobantu** | Farmers (n=75) | 11.0 | 57.0 | 32.0 |
| | Non-farmers (n=75) | 13.3 | 67.0 | 26.7 |
| | Total (n= 150) | 12.0 | 58.7 | 29.3 |

FGDs revealed that non-farmers in both Sobantu and GEA face difficulties in having enough food throughout the whole year. Non-farmers further pointed out that high food prices contributed to their inability to purchase food commodities especially during periods when local vegetable produce is not available from local UA farmers and have to depend on supermarkets. Non-farmers therefore end up depending on government grants and getting local loans, which tend to have exorbitant interest rates.

Farmers in both Sobantu and GEA only faced difficulties during June to July and classified this period as the "dry season" because is no rain is received at this time and hence lack water to irrigate their plots. However, farmers pointed out that the situation was better for those who have home gardens. Home gardens are small and their owners can rely on tap water for irrigation. The situation is worse for those farming in co-operatives who temd to have bigger plots, which require more water. Farmers also face food shortages between January to February, which is mainly is a result of over expenditure of money during the festive season. Therefore, UA should be supported with these challenges in mind.

**Perceptions towards urban agriculture**

The Likert scale ranging from 1 to 5 was used to solicit responses on perceptions, where 1 meant very good and 5 means very harmful for the health. Table 4 shows that overall, the respondents perceived urban agriculture to be important. The results also show that there was no significant difference between farmers and non-farmers, gender and study areas. However, educational level significantly influenced their perception ($p<0.05$) towards the agricultural factor. The more edu-

cated community members attached more importance to AU than their less educated counterparts. Indeed, this could be an indication of the better knowledge of the benefits of UA that comes along with education.

Table 3: Perceptions towards urban agriculture

| **Description** | **Category** | **Mean** | **Significance** |
|---|---|---|---|
| Area | Great Edendale | 3.76 | n.s. |
| | Sobantu | 3.86 | |
| Gender | Male | 3.88 | n.s. |
| | Female | 3.76 | |
| Group | Farmers | 3.78 | n.s. |
| | Non-farmers | 3.84 | |
| Education level | No formal education | 3.68 | ** |
| | Primary | 3.38 | |
| | Secondary | 3.91 | |
| | Tertiary | 3.96 | |

Note: n.s. = Not significant; ** = $p<0.05$. Scale of 1 to 5, where 1 means not at all important and 5 means extremely important

Respondents in both Sobantu and GEA highlighted the importance of the UA in their lives. Many reported that "they took fresh vegetables for their families". However, participants from Sobantu expressed that they were able to produce food that could cover only a portion of their dietary requirements. Non-UA participants from Sobantu perceived that agriculture is more time consuming and could not earn them enough money to sustain their livelihoods as the available resources are limited.

Table 4: Perceptions towards the use of pesticides and chemical fertilisers

| Description | Category | Mean | Significance |
|---|---|---|---|
| Area | GEA | 3.18 | ** |
| | Sobantu | 2.79 | |
| Education level | No formal education | 2.89 | ** |
| | Primary | 2.61 | |
| | Secondary | 2.95 | |
| | Tertiary | 3.50 | |
| Group | Non-farmers | 3.00 | n.s. |
| | Farmers | 2.97 | |

Note: n.s. = Not significant; ** = $p<0.05$. On a scale of 1-5, 1 considered not harmful, while 5 considered very harmful.

Table 4 shows that a significant difference was found between respondents from GEA and Sobantu towards perception on the use of chemical fertilizers and pesticides in UA. Respondents from GEA perceive chemical fertilizers and pesticides to be harmful to the environment and hu-

man health. It could be interpreted that they are in favour of organic farming systems. In contrast respondents from Sobantu had a less negative attitude towards the use of chemical fertilizers and pesticides. There was also a significant difference between the varying educational categories of the respondents. Results of the present study also show that respondents who had tertiary education had a more negative perception to the use of pesticides and fertilisers compared to their counterparts. This reflects that education makes people aware of the health effects of the use of chemicals in farming. This was in concurrence with Dosman *et al.* (2001) who showed similar results.

## Conclusions

Women dominate UA production. Investment in women will significantly enhance the food security status of urban households. Findings from the study shows that youth are not actively involved in UA as it was dominated by the elderly population. The findings of the research show that the majority of the respondents had a positive attitude towards urban agriculture. However, they had a negative attitude towards the use of chemical fertilizers and pesticides. Despite their worry on the negative effects of agricultural inputs on the environment, most of the respondents preferred to use available land for UA. The findings show that urban agriculture does enhance the ability of households to access food and it also enhances their ability to diversify diets. However, as much as diets are diversified, in the absence of scientific evidence, it could not be concluded that the nutritional status of households improved. Moreover, as much as UA reduced household food shortages, households in both Sobantu and GEA were food insecure, which shows that more needs to be done if UA is to make a significant impact on the food security status of poor urban households. Indeed, other interventions are necessary.

High production yields and surplus create an opportunity to generate cash income and employment opportunities. However, the findings show that currently the UA farmers gain income in-kind as they mainly engage in UA for household consumption, reduce the food expenditure. Furthermore, the findings showed that UA plays a significant role in enhancing social relations as food is often provided to the needy and ill.

This study also points to the need for extension efforts to be directed on assisting the UA practicioners and potential practitioners. If the issue of access to water could be addressed, the next hurdle of access to land would then need to be addressed as well.

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