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Role of Urban Agriculture in Lukhanji Municipality (Eastern Cape), South Africa

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ABSTRACT The main objectives include the characterization of urban agriculture, and assessment of its role to the participants and the local economy. A quantitative and qualitative - based design characterised by stratified random sampling of 150 respondents from five urban sites and secondary data were used for data collection. The results revealed modest performance of the dominant small-scale subsistence urban gardening and animal husbandry in terms of income and employment generation, saving on the household food budget, and enhancement of household food security. The paper is concluded by recommending strategies for improving performance. The formalisation of urban agriculture is deemed one of the key strategies that can help in the transformation of the predominantly subsistence operations to a more profitable and sustainable activity.

INTRODUCTION

In the first quarter of 2017 the world population reached 7.5 billion from 6.9 billion in 2010. Of the current world population 54.7 percent lives in urban areas from 51.3 percent in 2010 (Worldometers 2017). In the same source it is also projected that by 2050, 65.2 percent of the world population will be living in urban areas and the largest increase in urbanization will take place in the developing regions of the world. For example currently the total population for Africa is 1.3 billion and 40.5 percent lives in urban areas. Urban population in Africa is projected to rise to 56 percent by 2050 (Gustafson 2016). The implication of the noted growth in the world population and expansion in urban population is the increasing pressure exerted on earth's resources (Hirsch et al. 2016; Smit 2016). Consequently, rapid urbanization in the developing regions has been accompanied by an array of development challenges. The key challenges include: rising levels of unemployment in urban areas, increasing urban poverty, growth and expansion of slum settlements, urban food insecurity and malnutrition (Nuwagaba 2003; Phuong and Phuong 2016; Smit 2016).

To achieve sustainable urban growth in the developing regions, among other things creative thinking is required to generate strategies that will ensure creation of more employment opportunities, alleviation of urban poverty and increase in food production, supply and accessibility to urban dwellers (Olivier 2016; Smit 2016). Concerning the need to increase food production to meet urban food requirements, a range of suggestions have been advanced. First, the need to expand on the land utilized for agriculture (Gustafson 2016; Smit 2016). Gustafson (2016) cautions that this approach may require the use of marginal land that is not suitable for agriculture. The disastrous outcomes of clearing marginal land to create more space for agriculture include desertification, and increase in emission of greenhouse gases. The second suggested approach calls for employment of intensive farming methods on land already under agricultural use (Gustafson 2016). This approach is expected to increase productivity of the agricultural land, and augment food production and supply to urban areas. However, incorrect application of and increased use of inorganic fertilizing agents, pesticides and insecticides could lead to increase in water and air pollution, increase in greenhouse gases emission and global warming (FAO 2017; Kasumba 2008). Further suggestion pertains to the promotion of urban agriculture (UA) as a development strategy in the developing countries. UA is viewed by international development agencies and many scholars as a viable avenue to alleviation of urban food insecurity and malnutrition in the developing countries (Olivier 2016; FAO 2017). Other socio-economic benefits claimed for UA in the developing

countries include, the creation employment opportunities for the urban poor, reduction of urban poverty, social integration, reduction in environmental management cost and attainment of sustainable urban development (Phuong and Phuong 2016; Schmidt 2011).

This paper focuses on the role of UA in the developing regions. The Food and Agriculture Organization (2017) defines UA as the growing of food crops and non-food plants, and the rearing of livestock within and on the outskirts of the city. The potential of UA to alleviate some of the challenges associated with rapid urbanization in the developing countries accounts for the popularity of UA as a research field. Abound is the literature on the role of UA in the developed and developing countries. Nonetheless, the research output on UA is dominated by works on large urban centres. That is, vigorous research efforts on UA by international development agencies and individual scholars have mainly targeted large urban centres and minimal attention has been given to small and intermediate urban centres where greater potential for UA seems to exist (Martellozzo 2014). The classification of urban areas into large, medium/intermediate and small centres varies from country to country due the variation in the criteria used (Satterthwaite 2016). Kilian et al. (2005) indicate that in South Africa, based on population size, the Urban Development Strategy and the White Paper on local Government 1998 identified six categories of urban settlements namely, the large metropolitan area (with population of over 2 million people), large city (with population range of 500 000 – 2 million people), large town (with population range of 100 000 – 500 000), medium sized town (urban centres with 50 000 – 100 000 people), and small town (with less than 50 000 people). Whereas the negative consequences of rapid urbanization in the developing countries are shared among urban centres of different categories, research effort on the role of UA has not been matched across these urban centre categories. The purpose of this paper is to bridge this gap. It reports on the results of an empirical investigation on the role of UA that was conducted in five small urban centres in Lukhanji municipality (Eastern Cape), South Africa. The aim being to, broaden the empirical data base on the role of UA in small urban centres in the developing countries.

Research Problem

The current literature on the role of UA in the developing regions is dominated by research works on large urban centres. Minimal research work has been conducted in intermediate and small urban centres by international development agencies and individual scholars. Consequently, scanty data is available on the role UA in the intermediate and small urban centres where greater potential for UA seems to exist. The main contribution of this paper is to narrow this gap. It reports on the results of an extensive empirical investigation on the role of UA that was conducted in five small urban centres in Lukhanji municipality (Eastern Cape), South Africa.

Purpose

The purpose of this study was to investigate the current status of urban agriculture and its role at the local level. Aspects covered in this research, among others, include the socio-economic characteristics of urban agriculture practitioners, the practice of on-plot cultivation and animal husbandry, inputs used, levels of output and the socio-economic gains derived from urban agriculture.

Objectives

The objectives of this paper were:

- To characterize UA in Lukhanji municipality.
- To assess the role of UA to the participants and the local economy.
- To provide recommendations for improved UA operation and performance.

Research Delimitation

Since the role of urban agriculture (in small urban centres) is the main focus of this paper, the entire research was confined to urban settlements within the Lukhanji Municipality where there was evidence of the practice of urban agriculture. These are: Ezibeleni and Mlungisi (Queenstown suburbs), Whittlesea-Dongwe, Sada, and Ilinge. The map in Figure 1 illustrates the location of the study area. Lukhanji local municipality covers an area of 4,231 km² and falls under the jurisdiction of the Chris Hani District Municipality (CHDM) in the Eastern Cape Province, which covers a total area of 36,561 km².

Because of its inland position (about 200 km from the South-East coast), Lukhanji municipality generally experiences extreme weather conditions with dry and cold winter while summer is wet and warm. Weather conditions here are conducive for both livestock and crop farming (Boleswa 1996, WSA 2006). Statistics South Africa (2012) indicates that by 2011, Lukhanji had a total population of 199 490. Black Africans constitute the majority of Lukhanji population (94.5%); other population groups are the Coloureds (2.7%), Whites (2.6%), and Asians (0.2%).

The Lukhanji Municipal Annual Report (2010) notes that 58 percent of the Lukhanji population live in urban areas, 21 percent live in rural areas, 16 percent in peri-urban areas, and 5 percent in the farm areas. There are nine sectors considered to be the main source of employment in the Lukhanji municipality namely: agriculture (4%), manufacturing (4.5%), electricity (0.5%), construction (6.7%), trade (19.4%), transport (5.1%), finance (4.2%), and community services (41.8%) and households (13.8%). The unemployment rate in the area is estimated at 78 percent (Umvoto Africa (Pty) Ltd 2011) and the same source indicates that poverty level is also high with 77.5 percent of all households earning less than R1600 per month. According to the above citation, Lukhanji Municipality offers conditions that augur well for urban agriculture which include: the favourable weather, increasing urban poverty, high unemployment level, to mention but a few. Figure 1 shows the location of Lukhanji Municipality in Chris Hani District (in the Eastern Cape), South Africa.

METHODOLOGY

The study adopted an intensive inquiry of UA in five small urban centres in Lukhanji Municipality. The study involved the stratified sampling of 150 respondents on the basis of urban centre and type of UA practised as well as detailed interviewing. Both structured and unstructured interviewing was employed. A questionnaire was used to guide the structured interviews which were conducted to elicit factual data. Unstructured interviews were carried out to capture attitudes and opinions of the respondents. Descriptive statistical techniques were applied to the primary data sets to analyse, interpret and present the findings.

RESULTS

The following section presents results of the study:

Urban Agriculture Participation Drivers

The respondents from the five urban centres investigated in Lukhanji Municipality were asked to provide the basic reasons for their involvement in urban agriculture. Responses to this question were considered important because they helped in establishing the basic socio-economic factors that have attracted some urban households to get involved in urban agriculture. The three basic socio-economic factors that were named by the respondents include: to get fresh food; to save on food expenses; and to sell farm products to get income. The results on these participation drivers are summarised in Table 1.

Table 1: Participation drivers

Site	*No. respondents*	*Participation drivers*	*Frequency*	*Percentage (%)*
Ezibeleni	40	A,B	35	87
		A,B,C	5	13
Ilinge	27	A,B	20	74
		A,B,C	7	26
Mlungisi	25	A,B	23	92
		A,B.C	2	8
Sada	30	A,B	21	70
		A,B,C	9	30
Whittlesea-Dongwe	28	A,B	24	85
		A,B,C	4	15

* A: Get fresh food, * B: Save on food expenses, * C: To get income

As illustrated in Table 1, the results from Ezibeleni, where 40 urban farmers were interviewed, show that 87 percent of the respondents indicated that they were involved in urban agriculture to get fresh food and to save on household food expenses. Only 13 percent of the respondents in Ezibeleni indicated that in addition to getting fresh food and saving on food expense, they wanted to get income by selling part of their produce. In Ilinge out of the sample of 27 respondents, 26 percent indicated that they were involved in urban agriculture for three basic reasons, namely to get income, get fresh food and save on food expenses. As is the case of the Ezibeleni, the majority of the Ilinge sample (74%)

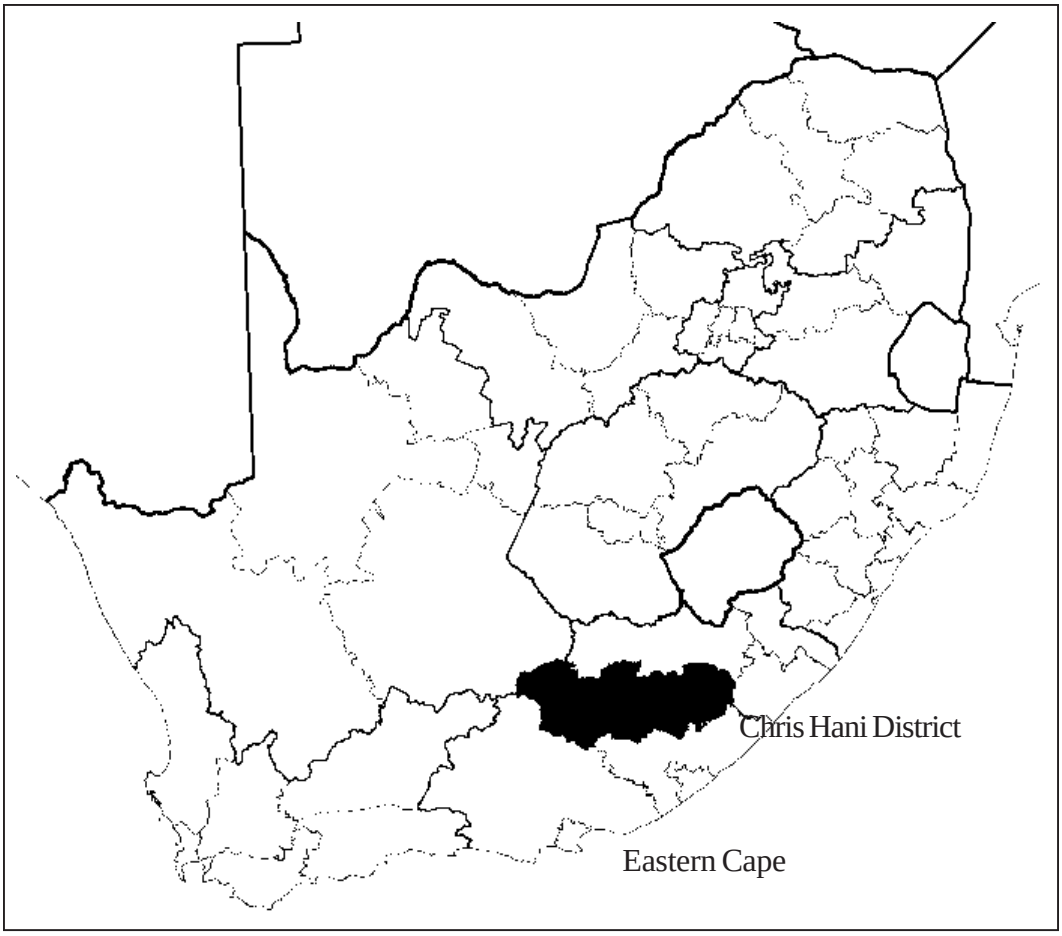

Fig. 1. Eastern Cape Province and CHD

was involved in urban agriculture for subsistence reasons, that is, to get fresh food and save on household food expenses. The responses gathered from the Mlungisi sample (25 respondents) also showed that 92 percent of the respondents participated in urban agriculture to get fresh food and to save on food expenses. It was only a small percentage of the respondents (8%) that was involved in urban agriculture for both subsistence and commercial reasons. The results drawn from the Sada sample (30 households) did not show great differences from what has been reported for other Lukhanji urban centres. Seventy per cent of the respondents here were involved in urban agriculture entirely for subsistence reasons and only 30 percent of the sample participated in urban agriculture to get income and for subsistence reasons. Again, as is in the case of other Lukhanji urban centres, a relatively small percentage of the respondents in Sada (30%) mentioned that they were involved in urban agriculture for subsistence and commercial gains. However, as illustrated in Table 1, the percentage of the respondents involved in urban agriculture to generate income in Sada is higher than in other Lukhanji urban centres. The factors contributing to this scenario are discussed in part 4 of this paper. Furthermore, the results obtained from the Whittlesea-Dongwe sample (28 households) are also to a great extent similar to what has been reported for other Lukhanji urban centres. Eight-five per cent of the respondents in Whittlesea-Dongwe indicated that they were involved in urban agriculture

to get fresh food and to save on food expenses. Again, only 15 percent of the households interviewed in Whittlesea-Dongwe indicated that they were lured to urban agriculture for economic reasons that is, to get income. Lastly, Table 1 also show that the combined results for the five Lukhanji urban centres follow the above pattern and support the results for individual Lukhanji urban centres reported above. Eighty-two percent of the entire Lukhanji Municipality sample was involved in urban agriculture for subsistence reasons, and only 18 percent of the combined Lukhanji sample was lured to urban agriculture to get fresh food, save on household food expenses and generate income.

Main Sources of Food Supply

As depicted in Table 2, the majority of the respondents from the five urban centres that were investigated in Lukhanji municipality, named supermarket as the main source of household food supply. In Ezibeleni, 92.5 percent of the sample (40 urban farmers) named supermarket as the main source of household food supply. Only 7.5 percent named general dealer and none of the farmers mentioned urban agriculture as the main source of household food supply. Similar to the situation in Ezibeleni, 92.6 percent of the Ilinge sample (27 urban farmers) indicated supermarket as the main source of household food supply. Only 7.4 percent of the respondents indicated general dealers, and none of the respondents named urban agriculture as the main source of household food supply. The above state of affair was also replicated in the remaining samples. In Mlungisi, 92 percent of the sample (25 urban farmers) named supermarket as the main source of food supply. Only 8 percent of the sample named general dealers as a main source of food supply and none included urban agriculture on the list of the main sources of household food supply. Shifting attention to Sada, 83 percent of the sample (30 urban farmers) indicated that they buy most of their food items from supermarkets, while 16.7 percent named general dealers as their main source of food supply.

Then also, none of the respondents in Sada named urban agriculture as the main source of household food supply. Lastly, in the Whittlesea-Dongwe, 75 percent of the urban farmers, indicated supermarket as the main source of household food supply, whereas 25 percent named general dealers and none of the respondents mentioned urban agriculture as the main source of household food supply. The lack of recognition of urban agriculture as a main source of household food supply across the five sites implies that urban farmers here do not consider urban agriculture to be a reliable source of food compared to other available sources such as supermarkets and general dealers that procure bulk supplies from rural-based agro-businesses.

Sources of Household Income

The respondents from the five Lukhanji urban centres were asked to provide information about their main sources of household income. This question was intended to elicit information that could help in weighing the relative impor-

Table 2: Main sources of food supply

Site	*No. of respondents*	*Main food source*	*Frequency*	*%*
Ezibeleni	40	Supermarket	37	92.5
		General dealer	3	7.5
		Urban agriculture	0	0
Ilinge	27	Supermarket	25	92.6
		General dealer	2	7.4
		Urban agriculture	0	0
Mlungisi	25	Supermarket	23	92
		General dealer	2	8
		Urban agriculture	0	0
Sada	30	Supermarket	25	83.3
		General dealer	5	16.7
		Urban agriculture	0	0
Whittlesea-Dongwe	28	Supermarket	21	75
		General dealer	7	25
		Urban agriculture	0	0

tance of urban agriculture with regard to household budget. The results on the main sources of household income for urban farmers from the five Lukhanji urban centres are summarised in Table 3.

Based on the data provided in Table 3, the main sources of household income for the Lukhanji respondents ranged from pensions, social security grants, salary from formal employment, wages earned from part-time jobs, remittance, to income from self-employment. The data provided in Table 3 also depicts that pension topped the list of the main source of household income in four out of the five urban centres that were investigated in Lukhanji municipality. Pension was named by 67 percent, 56 percent, 52 percent and 50 percent of the respondents in Sada, Ilinge, Mlungisi and Whittlesea-Dongwe respectively. In Ezibeleni social security grant topped the list of the main sources of household income, where it was named by 53 percent of the sample of urban farmers. Pension fell in position two on the list of the main sources of household income in Ezibeleni, named by 50 percent of the respondents.

As shown in Table 3, with the exception of Ezibeleni, in the rest of the four urban centres studied in Lukhanji municipality, social security grant fell in position two on the list of the main sources of household income and was named by 50 percent, 48 percent, 42 percent and 37 percent of the respondents in Sada, Mlungisi, Whittlesea-Dongwe, and Ilinge respectively.

Illustrated in Table 3, the position of salary among the main sources of household income varied from one urban centre to another. In Sada salary fell in the third position, named by 20 percent of the respondents. In Ezibeleni, Mlungisi and Whittlesea-Dongwe salary took the fourth position. It listed by 8 percent of the respondents in Ezibeleni and Mlungisi separately, while in Whittlesea-Dongwe, salary was named by only 7 percent of the respondents. In Ilinge salary ranked fifth among the main sources of household income and was named by only 4 percent of the respondents.

The rank of part-time jobs on the list of the main sources of household income also varied from one research site to another as the data in

Table 3: Main sources of income

Site	*No. respondents*	*Main income source*	*Frequency*	*%*
Ezibeleni	40	Pension	20	50
		Grant	21	53
		Salary	3	8
		Part time jobs	5	13
		Remittance	3	8
		Self-employment	1	3
Ilinge	27	Pension	15	56
		Grant	10	37
		Salary	1	4
		Part-time jobs	4	15
		Remittance	5	19
		Self-employment	0	0
Mlungisi	25	Pension	13	52
		Grant	12	48
		Salary	2	8
		Part-time jobs	1	4
		Remittance	2	8
		Self-employment	3	12
Sada	30	Pension	20	67
		Grant	15	50
		Salary	6	20
		Part-time jobs	2	7
		Remittance	0	0
		Self-employment	0	0
Whittlesea-Dongwe	28	Pension	14	50
		Grant	12	42
		Salary	2	7
		Part-time jobs	6	21
		Remittance	2	7
		Self-employment	3	11

Table 3 indicates. In Whittlesea-Dongwe and Ezibeleni, wages from part-time work (causal employment) held position three among the main sources of household income and was named by 21 percent and 13 percent respectively. In Ilinge and Sada part-time work ranked fourth and was listed by 15 percent and 7 percent respectively. In Mlungisi wage from part-time work occupy position 5 on the list of the main sources of household income, and was named by 4 percent of the respondents.

The position of remittance among the key sources of household income also follow the pattern reported above that is, it varied from one urban centre to another. In Ilinge remittance ranked third and was listed by 19 percent of the respondents. Remittance occupied the fourth position in Ezibeleni and Mlungisi, where it was named by 8 percent of the respondents separately. In Whittlesea-Dongwe remittance fell in the fifth position and was listed by only 7 percent of the respondents as a key source of household income. Furthermore, as illustrated in Table 3, Sada stands out as the only urban centre in Lukhanji municipality where none of the respondents listed remittance as one of the main sources of household income. This scenario requires deeper analysis which is done in the forthcoming discussion section.

Turning attention to self-employment as a main source of household income, its status also varied among the five urban centres investigated in Lukhanji municipality. Table 3 shows that in Mlungisi and Whittlesea-Dongwe self-employment occupied third and fourth position respectively. It was named by 12 percent of the respondents in Mlungisi and by 11 percent of the respondents in Whittlesea-Dongwe. The status of self-employment drops to sixth position on the list of the main sources of household income in Ezibeleni. Here self-employment was named by only one household (or 3 percent of the respondents). Furthermore, none of the respondents in Ilinge and Sada mentioned self-employment as one of the key sources of household income. A similar state of affair applies to urban agriculture. None of the respondents in all the five urban centres investigated in Lukhanji municipality mentioned urban agriculture as one of the main sources of household income. This finding has depressive implication with regard to the role of urban agriculture to the participants.

The Annual Output Value

Meaningful assessment of the role of urban agriculture to the participants and the local economy cannot be achieved before one takes into consideration the annual gross output value and the net output value. On the side of crop cultivation, the gross output value was calculated by multiplying the quantity of each crop produced by the household by the current market price. The values obtained for all the crops produced by the household were then added together to get the gross annual household crop output value. The net crop output value was obtained by subtracting the total household annual expenditure on cultivation inputs from the gross household crop output value.

Turning attention to the gross and net annual output value for urban livestock farmers, the following aspects were considered to enable fair computation. Firstly, because most of livestock farmers that were interviewed indicated that they kept livestock for subsistence purposes and could not provide accurate data on the products (such as milk, eggs, meat, wool and hides) they produced, the computation of the gross and net output values were based on the monetary values of the number of livestock that each urban farmer had during the field survey period. To calculate the gross livestock value, the number of livestock reared by the household was multiplied by the local market price. The net livestock value was then calculated by subtracting the total annual household expenditure on livestock inputs from the gross value of the livestock kept. The results on the gross and net output values obtained from the five Lukhanji urban centres are summarised in Tables 4 and 5 respectively.

Table 4: The gross farm output value

Ranges of gross farm output value (in Rand)	*Frequency*	*Percentage (%)*
< 1000	68	45
1001-2000	59	39
2001-4000	12	8
4001-8000	0	0
8001-16 000	4	2.7
16 001 +	8	5.3
Total	150	100

Based on the data summary in Table 4, a sizeable percentage (45%) of the urban farmers in

Lukhanji received annual gross output value of less than R1000 and 47 percent of the urban farmers obtained gross annual output value in ranges R1001- R2000 and R2001 - R4000. Table 4 also indicates a great decrease in percentage of urban farmers (8%) in the higher annual gross output ranges of R8001 – R16 000 and R16001 and above. Detailed findings indicated that it was only the livestock-keeping households that received annual gross output value in the ranges R8001-R16000 and R16001 and above. This means that all crop cultivating households (92% of the sample) received annual gross output value of less than R4000. Further findings show that the annual gross output value for the five Lukhanji urban centres varied among households and ranged from R89 to R55000. The lowest gross annual output value was recorded from a crop cultivating household in Sada while the highest gross annual output value was obtained from a livestock-keeping household in Ezibeleni. The overall average annual gross output value was R3426.5 (or R285.54 per month). The low but rather promising overall average annual gross output value can be attributed to the relatively high average gross livestock value (R30329.27) which was 28 times greater than the average gross crop output value (R1095.21) that was recorded from the crop cultivating households. Based on the data reported, one can notice that the performance of urban farmers in terms of annual gross output value was weak especially on the side of the cultivating households.

Table 5 provides a summary of the annual net output value for the Lukhanji urban farmers. The computation of this variable is important because it represents the actual money value of the products produced by urban farmers. The results show that the computed annual net output value varied from one household to another. Table 5, show that the biggest per cent of the sample of urban farmers in Lukhanji (44%), received annual net output value of less than R100. Detailed results indicate that the majority of this group of urban farmers (85%) obtained negative net output value. This means that their annual expenditure on farming input was greater than the gross value of the output they produced. One of the examples to illustrate this state of affair was captured from Ezibeleni where a cultivating household produced crops with a gross annual output value of R960. The same household had incurred a total annual expenditure on gardening inputs of R2224. This left the farmer with a net output value of –R1264. The second example was obtained from Sada where a cultivating household received a gross output value of R549 and spent a total of R2350 on farming inputs. This left that household with a net output value of –R1801. Furthermore, as in the case of annual gross output value, the percentages of urban farmers decrease in higher annual net output ranges. Only 12 percent of sample received annual net output value in range R3 201 and above. This means that urban agriculture performance in terms of net output value was weak.

Table 5: The annual net farm output value

Ranges of gross farm output value (in Rand)	*Frequency*	*Percentage (%)*
< 100	66	44
101-200	12	8
201-400	27	18
401-800	19	12.7
801-1 600	8	5.3
1 601-3 200	6	4
3 201 +	12	8
Total	150	100

Further detailed findings support the above observation. At household level, annual net output value ranged from –R2810 to R50910. Moreover, as in the case of gross output value, the lowest performance was recorded from the crop cultivating household in Whittlesea-Dongwe, while the highest was recorded from the livestock farmer in Ezibeleni. For all the five urban centres investigated the combined annual net output value was R330040 with an average of R2200 (or R183.3 per month). The relatively high average annual net output value for Lukhanji can be attributed to the higher annual net livestock output value (R318615) which was 28 times bigger than the average annual net output value (R11425) computed for the sample of crop cultivating households.

Contribution to Household Income

A meaningful assessment of the role of urban agriculture at the local area level cannot be satisfactorily achieved without taking into consideration the contribution of the activity to household income. Thus respondents in the five Lukhanji urban centres were asked to indicate

the quantities of urban agriculture items they sold and the prices they charged. This information was used to calculate the total annual income received from urban agriculture by the practitioners that sold part of their output. The results are important in assessing one of the popular gains claimed for urban agriculture that is, a source of income (primary or supplementary) for the participants in the developing countries. A summary of the findings from the five Lukhanji urban centres is given in Table 6.

Table 6: The contribution of urban agriculture to household income

Ranges of gross farm output value (in Rand)	*Frequency*	*Percentage (%)*
0-10	127	84.7
11-100	7	4.7
101-200	1	0.7
201-400	5	3.3
401-800	2	1.3
801-1 600	5	3.3
1 601-3 200	1	0.7
3 201 +	2	1.3
Total	150	100

As illustrated in Table 5, the biggest percentage of the sample of respondents from Lukhanji urban centres (84.7%) earned annual income in the range of R0 – R10 from urban agriculture. The reason for this scenario being that the majority of the respondents (84.7%) indicated that they produced for home consumption. Only 15.3 percent of the sample indicated that they sold part of their output to get income. The majority of this group (87%) generated minimal annual income from urban agriculture in the range of R11 – R1600. Only a small percentage (13%) of this group generated income in ranges R1601 – 3 200 and R 3201 and above. Detailed findings indicate that the income earned by this group of urban farmers ranged from R25 - R6 000. The lowest income was captured from a crop cultivating household, while the highest income was recorded from a livestock-keeping household. The average annual income from output sales for Lukhanji municipality urban farmers was R890.17 (or R74.18 per month). The performance presented here indicates minimal contribution of urban agriculture to household income.

Duration of Garden Output Consumption

The duration of urban agriculture output consumption is a significant aspect that can be used to measure the contribution of urban agriculture towards improvement of food security in urban areas. Because it was not possible to get accurate information about the products produced by the livestock farmers, the findings on duration of urban agriculture output consumption is confined to crop output generated by on-plot cultivators. To access the information on the duration of garden output consumption, each crop cultivating household was asked to provide information concerning the duration of consumption for each crop harvested from the home garden. This data was used to calculate the average consumption duration for individual crops grown and the overall average consumption duration for all crops grown in home gardens across the five Lukhanji urban centres that were part of the study. The average consumption duration of individual crops that were grown by the respondents in the five Lukhanji urban centres is described in a couple of paragraphs below.

Spinach (a leafy green vegetable) had the highest average consumption duration of six months, because it can grow both in summer and winter, it has a long harvesting period annually. Onion and potato had an average consumption period of four months. This is because the two crops can be planted twice a year and can be kept for some time after harvest. Cabbage, pumpkin and fruit had average consumption duration of three months each. The three months (average) consumption duration for cabbage is attributed to the fact that it is planted and harvested (in small quantities) two to three times in a year. Pumpkin is a popular summer crop in the area and can be kept for some time after harvest. Fruits grown in the area including, apple, apricot, pears, plums, and peach are harvested in summer from December to March.

Beetroot, maize and tomato had average consumption duration of two months. Beetroot can be planted two to three times in a year, but most of the urban farmers here prefer to plant beetroot in summer to avoid watering that is required for the crop during the dry winter season. Maize is a summer crop, planted in limited quantities thus had a short average consumption period. Tomato was grown only in summer and cannot be kept for a long time after harvest. Lastly, carrot and beans had the shortest average consumption duration of only one month each. The short consumption duration period for beans is be-

cause they are a summer crop and planted in limited quantities. Carrot can be planted two to three times annually, but most respondents indicated they prefer to plant carrot in summer only to avoid watering required in the relatively dry winter season. This accounts for the short consumption duration for carrot in this area. The overall average consumption duration of garden output across the five Lukhanji urban centres was 2.8 (or 3) months. These results indicate modest contribution of urban agriculture to household food security in the area. The main concern that emerges from this scenario is the question of what can be done to enhance the contribution of urban agriculture in this area. Part five of this paper provides constructive recommendations that planners and policy-makers might find useful in transforming urban agriculture into a more profitable and viable activity.

DISCUSSION

In this section the discussion of the results would be confined to socio-economic participation drivers, main sources of food, sources of household income, the annual output value, contribution of UA to household income, and the duration of garden output consumption.

With regard to the results on the basic socio-economic participation drivers, 82 percent of urban farmers were involved in urban agriculture for subsistence reasons namely, to get fresh food and to save on household food expenses. Only 18 percent indicated that they were involved in urban agriculture both for subsistence and commercial gains. The dominance of subsistence urban agriculture operations here can be attributed to the following factors: firstly, the availability of other sources of food products in the area such as supermarkets, retailers and general dealers makes the participants less enthusiastic in taking on urban agriculture on extensive scale. Secondly, the majority of the participants in urban agriculture here consisted of pensioners (57%) and urban dwellers that depended on social security grants (47%) as the main source of household income. The fact that these two dominant groups have a constant source of income for survival, seemingly contributes to their not being zealous to take urban agriculture for commercial gains.

Added to this, some old age pensioners in Lukhanji urban centres indicated that they were engaged in urban agriculture mainly to keep themselves busy and physically fit and not as an activity they look up to for economic gains. Furthermore, with the exception of Sada, relatively small residential plots in Mlungisi, some parts of Ezibeleni, Whittlesea-Dongwe, and in Ilinge Township limit the scale of on-plot urban agriculture operations. For example, residential plots in Mlungisi ranged from 250 to 600 square metres. Such small residential plots have limited un-built-up spaces to allow sizeable on-plot urban agriculture operations. For this reason relatively small vegetable gardens were recorded for Mlungisi, Ezibeleni, and Whittlesea-Dongwe where the average garden sizes were 69m², 128m² and 136m² respectively. Thus it is partly because of the limited on-plot space that some urban farmers in Lukhanji were engaged in small-scale urban agriculture operations mainly for subsistence gains. In such urban context, one would expect open-space urban agriculture operations to be a common practice in Lukhanji as is the case in other Sub-Saharan African countries (Mireri 2013). Findings from Ezibeleni (Kasumba 2007) indicate that municipal regulations here restrict urban dwellers from using public open spaces without official permission.

It would be unfair to end the discussion on the factors that have attracted some dwellers in Lukhanji to engage in urban agriculture without commenting on why the percentage of the respondents (30%) involved in urban agriculture for commercial gains in Sada is higher than in other Lukhanji urban centres. This can be attributed to the prevalence of conditions more conducive to urban agriculture in Sada than in the other Lukhanji urban centres. These favourable conditions among others things include the availability of sizeable un-built up on-plot spaces ideal for urban agriculture. This is majorly because of the large residential plots common in this urban centre that range from 500m² to 1500m². For this reason large vegetable garden were recorded in Sada ranging from 120m² to 800m², and the average garden size was 360m². In general the findings on the factors attracting participation in urban agriculture across the five Lukhanji urban centres, suggest that urban dwellers in Lukhanji are involved in urban agriculture mainly for subsistence reasons. This observation is not uncommon. It reinforces several works on UA that have noted this characteristic in other parts of South Africa and the

rest of the developing countries. Examples include first, the investigation conducted on the Cape Flats by Olivier (2016). She indicates that the majority of the urban farmers here were women who were involved in UA to produce for domestic consumption. Legesse et al (2016) in their work on urban agriculture in Mekelle (Ethopia) indicate that although the majority of the urban farmers sold part of their produce to get income, the primary consideration for participation in UA was quick and fresh access to foodstuffs. Rezai et al (2016), also note that in Malaysia UA is dominated by farmers that produce to improve availability and accessibility of fresh and nutritious food which results in individuals' food security. Furthermore, the above observation signals an encompassing similarity across the different urban centre categories. That is, in the developing countries, across all urban centre categories the majority of the urban farmers are mainly involved in UA to satisfy subsistence needs.

With regard to the results on the main sources of household food supply, none of the households in the Lukhanji urban centres considered the urban agriculture to be among the main sources. The implication of this state of affair is that individual practitioners are not in the position to supply food from their urban agriculture ventures on constant basis because of the limited scale of production. On the contrary, supermarkets, and general dealers supply food items on a more constant basis, thus were considered to be the main sources of food supply by the Lukhanji respondents. Nonetheless Minten (2008), Riley and Legwegon (2014) and Smit (2016) are concerned about the steady erosion of the informal food traders that have been a cheaper source of food supply for the urban poor and the growing dominance of supermarkets in the food retail industry in Africa. In spite of the good food quality, supermarkets are notorious for their higher and inflexible prices (Minten 2008) which sometimes are beyond the reach of the low-income urban households. Thus the noted dominance of supermarkets among the main food supply sources for the Lukhanji respondents represent a direct threat to food security for the low-income residents.

Considering the results on the main sources of household income, pension was recorded as the dominant source of household income for the urban farmers in Lukhanji. This can be attributed to the fact that old people (60 years and above) constituted the biggest percentage (47%) of the urban farmers in Lukhanji. The low percentage of the respondents that named self-employment as a main source of household income in the Lukhanji urban areas indicates that very few urban farmers in Lukhanji have taken up private ventures to generate household income. Urban agriculture provides the opportunity for self-employment to become a main source of household income. However, none of the respondents in the five Lukhanji urban centres listed urban agriculture as a main source of household income. The possible reason is that urban agriculture is operated on subsistence scale by most participants in Lukhanji, thus it does not form a key source of household income. The results provided here contrast greatly with the findings from most of the other developing regions where UA is reported as contributing significantly to household income. For example, in Dar es Salaam a sizeable proportion of urban farmers work full-time in their UA ventures, sell part of the output and get sufficient income to support themselves and their families (Schmidt 2011). The same source also asserts that incomes obtained by urban farmers are sustainable and sometime better than those of government employees. Legesse et al (2016) notes that urban farmers in Mekelle (Ethiopia) sell a large proportion of their home garden output get income. The Food and Agriculture Organisation (2013) reported that in Havana (Cuba), sales of UA products by co-operatives and individual farmers to the public amounted to 58 000 tonnes in 2013 and the processed UA products amounted to 3 500 tonnes. These examples indicate that if UA is properly implemented it can be turned into an income generating venture for the participants in Lukhanji municipality.

The findings reported on the gross annual and net urban agriculture output value, revealed that the overall performance both in terms of gross annual and net output value was weak. Eighty four percent of the respondents registered gross annual output value of not more than R2000. The performance of the crop cultivating households was weaker than their livestock counterparts, with the average gross annual output value for the latter 28 times greater than that of the former. The overall average gross output was only R3426.5 (or R285.54 per month) for all the five Lukhanji urban centres. A more depressed

performance was registered in terms of the net annual output value. The average net annual output value for both livestock and crop farming was R2 200 (or R183.3 per month). Furthermore, a sizeable percentage (44%) of urban agriculture practitioners registered negative net annual output value. This means that their annual expenditure on farming inputs was greater than the value of their output. A number of reasons account for the low gross and net output for urban farmers in Lukhanji which include: firstly, most cultivators (59%) indicated that they cultivate mainly in summer when the weather conditions are more favourable for crop growing. Winter season is cold and relatively dry thus most gardens lie fallow. Secondly, there is limited use of intensive cultivation techniques such irrigation, application of fertilizers and pesticides that increase crop yield per unit area cultivated. Thirdly, for most urban farmers there is limited on-plot space for urban agriculture purpose. For example in Mlungisi Township where residential plots are generally small, the average garden size was only 69m², which partly account for the low gross and net annual garden output. Furthermore, lack of commercialization of urban agriculture in the sampled urban centres is also a major contributory factor. Evidence from Dar es Salaam Schmidt (2011), Havana Ergas (2013), FAO (2013), Koont (2009) and Rosario IDRC (2006), Louise (2009), Thornett (2016) provide a genuine lesson that transforming UA from subsistence to commercial operation generate income for the participants which in turn motive production expansion.

Regarding the results reported on contribution of urban agriculture to household income, 84.7 percent of the urban farmers earned no income because they produced for home use. Only 15.3 percent of the respondents sold part of their urban agriculture output to get income. Out of this group, 87 percent earned minimal annual income in the range of R11 - R1600 and this group consisted of cultivating households. Only 13 percent received income in the range of R3200 and above and this group consisted of 1 crop farmer and 8 livestock keeping farmers. The average annual income from urban agriculture for Lukhanji was R890.17 (or R74.18 per month). These results represent minimal contribution of urban agriculture to household income. This scenario can be attributed to the dominance of subsistence urban agriculture operations in Lukhanji and provides explanation as to why UA was not named by the respondents as part of the main sources of household income.

Lastly, this paper has used the average annual duration of garden output consumption to assess the contribution of urban agriculture to household food security. Food security at household level is attained when members of the household at all times have physical and economic access to adequate, safe and nutritious food to meet their dietary needs and food preferences for a vibrant and health life (Aiga and Dhur 2006). Based on this definition, members of a household can be declared food secure if they have access to sufficient nutritious food at all times. Most scholars that extol the contribution of urban agriculture to household food security have a tendency of overlooking the duration of garden output consumption. The average annual duration of garden output consumption constitutes an important measure of the contribution of urban agriculture to household food security. As reported above, the average annual duration of garden output consumption computed for Lukhanji was only 3 months. These results seem to indicate a weak contribution of urban agriculture to household food security in Lukhanji. However, Angelo (2016) asserts that the role of UA in modern cities is not to supply all the food required (self-sufficiency), but to produce some of the total urban food requirements, termed as self-reliance. Indeed given the space constraint in urban areas, urban farmers can only work towards achieving food self-reliance and not self-sufficiency. Nonetheless, there are a number of possible strategies that can be adopted in the study area to improve on the current production levels, thus augment the contribution of UA to food security in Lukhanji municipality. These strategies are discussed in the recommendations section below.

CONCLUSION

The paper concludes that results revealed modest performance of the dominant small-scale subsistence urban gardening and animal husbandry in terms of income and employment generation, saving on the household food budget, and enhancement of household food security. The authors are rather opportunistic that the adoption of the recommendations discussed in the section below can transform urban agricul-

ture from a predominantly subsistence to a more viable status that can contribute immensely to urban well-being in developing countries.

RECOMMENDATIONS

The following recommendations were made based on the findings:

Formalization of urban agriculture is one of the possible strategies that can be adopted in Lukhanji municipality given the high poverty and unemployment levels in this part of South Africa. Inclusion of urban agriculture in land-use planning: for instance zoning of land for urban agriculture in peri-urban area; subdividing the zoned area into sizeable plots; provision of basic farming infrastructure and allocation of plots to individual practitioners or groups to improve food security and alleviation of poverty. With bigger plots of 500 – 1000 square metres, allotment gardens can be used as market gardens for generating income for the participants. Provision of agricultural extension services to empower urban farmers with operational intensive farming and marketing skills to enable transformation of what is predominately subsistence urban agriculture practices to more viable commercial urban agriculture ventures which can contribute to employment and income generation. Creation of farmers' associations or co-operatives: to facilitate the marketing of farm products enabling urban farmers to sell their produce collectively in formal and informal local vegetable markets. Processing of surplus farm products: to avoid perishing of food and promote the production of agricultural products of higher market value.

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