

The Role of Urban Agriculture on Livelihood in Bariadi Township Simuyu Region Tanzania

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Abstract: *This paper examined the role of urban agriculture as a livelihood option in Bariadi township of Simiyu region in Tanzania. The paper addresses four specific objectives one being identification of types of agricultural produce produced in the township, two, identification of markets for such agricultural produce and three, examination of the role of urban agriculture on livelihood in the township; and four, identification of challenges facing urban agriculture in the township. The study is descriptive in nature. Data was collected using questionnaire administration, in-depth interview with key informants and non-participant observation techniques. Numerical data were analyzed using simple descriptive statistics. Qualitative data on the other hand was analyzed thematically. Findings show that horticultural produces are more produced in the township followed by produces from livestock keeping. Local buyers from within the township as well as buyers from neighboring regions make markets for the produce. Urban agriculture contributes up to 25% of households' income in the township. The major challenges facing urban agriculture in the township include poor market for the produce, water shortage, land shortage, seeds unavailability, lack of capital, unavailability of inputs, crude working tools, lack of government support, lack of water pumping machines, lack of man power, poor storage facilities and lack of agriculture extension services. The study concludes that urban agriculture plays a significant role in income generation in the study area. The paper recommends that the government should support urban agriculture through improving markets and provision of agricultural extension services. The study further recommends proper land use plans in small but growing towns in the country to accommodate urban agriculture.*

Key words: *Urban agriculture, households income, horticulture, livestock keeping, Simiyu.*

Introduction

Studies on urban agriculture have mostly focused on the contribution of the sector on food security in urban areas, household income, poverty reduction and environmental conservation (Bishoge and Suntu 2018).

Most studies are in congruency with the observation that urban agriculture contribute significantly to urban food security and household income generation (Dongus *et al.*, 2000; Foeken *et al.*, 2004; Shimbe, 2008; Mntambo 2012; Bishoge *et al.*, 2017; and Bishoge and Suntu 2018). However, urban agriculture performance relies on many aspects including availability of such resources as good climate, water, land, fertile soils, manpower, and agricultural extension services. Markets availability and food culture are other factors that may have impact on the sector's performance (McDougall *et al.*, 2019 and Hallett *et al.*, 2017). These factors hugely determine types of produces to be produced in given localities. For example, under certain climatic conditions livestock performs better than in other climatic conditions. Likewise some crops grow better in certain climatic conditions than in others (Hallett *et al.*, 2017). Winter (2018) defines food culture as "the practices, attitudes, and beliefs as well as the networks and institutions surrounding the production, distribution, and consumption of food" (Pg 6).

According to Winter (2018), food culture determine to a large extent the type of crops that one may decide to grow. The argument by Winter (2018) is supported by studies by Labuschagne (2017); Sumari (2017) and Bishoge and Suntu (2018) who all make an argument since urban agriculture is practiced partly for household food security most farmers prefer to grow food that they can also consume. Market availability, however, may complement production of certain produces regardless of the producer's consumption/non-consumption of the given produce (Pedzisai *et al.*, 2014). Important to note is the fact that most of these resources are geographical location dependent; the extent of availability of such resources as water, soils, good climate and the cultural aspects may differ from one geographical location to the other. Hence, to understand the different aspects of urban agriculture such as its contribution to household income, specific geographical location studies are important.

In Tanzania, however, studies on urban agriculture are geographically skewed, most studies refer to the coastal zone covering regions of Dar es Salaam (Dongus 2001; Foeken *et al.*, 2004; Jacobi *et al.*, <https://www.ruaf.org> as of 2/11/2018; and Mhache 2015; Bishoge *et al.*, 2017 and Bishoge and Suntu 2018); Morogoro (Foeken *et al.*, 2004; Shimbe 2008; Mkwela 2013 and Mhache 2015); and Coast (Foeken *et al.*, 2004). Foeken *et al.*, (2004) and Mkwela (2013) discusses issues of sustainability under urban agriculture providing cases from Morogoro and Mbeya regions as well as Dar es Salaam region respectively. While Mkwela (2013) discusses issues of lack of secure land tenure and its many

implications in the urban agriculture, Foeken *et al.*, (2004) on the other hand points out that although urban agriculture is a common undertaking in most Tanzanian townships including Morogora and coast regions and that it is undertaken for both subsistence and commercial purposes, issues of land tenure and market availability remains to be major problems hindering performance in the sector. Mkwela (2013) noted that as far as urban agriculture is concerned the issue of land rights is one aspect why more female engage in urban agriculture. However both Mkwela (2013) and Foeken *et al.*, (2004) are of the opinion that urban agriculture in Tanzania plays a significant role in terms of urban livelihood; noting that urban agriculture is even more important source of income for low income households and for female-headed households in particular. The argument is also supported by Mntambo 2012; Mhache 2015 and Bishoge and Suntu 2018). Urban agriculture in Tanzania takes a form of crops cultivation and animal keeping (Shimbe, 2008; Mntambo 2012; Mkwela 2013; Mhache 2015 and Bishoge and Suntu 2018). The common crops cultivated being maize, cassava, legumes, vegetables and fruits. Livestock kept include dairy cattle, chickens, goats and pigs (Mkwela 2013).

Floriculture is another form of urban agriculture in Tanzania which is mainly undertaken for income generation (Bishoge *et al.*, 2017). Bishoge *et al.*, (2017) discusses the challenges facing the growth of floriculture in Tanzania with reference to the city of Dar es salaam. The study identifies some of the driving force towards people's engagement in floriculture as the need to improve household income. The other factor is availability of road reserves which entices people to utilize the space, floriculture is found to be the most appropriate way of utilizing such open spaces; however, shortage of other employment opportunities in the city also contribute to the growth of floriculture in the city. High demand of floriculture produces and the need to conserve the environment are other driving forces driving forces behind floriculture development in Dar e es Salaam (ibid). On the other hand, markets, shortage of water supply services, informality, pests and diseases and shortage of working tools are the major challenges facing the sub sector (ibid). The study by Bishoge *et al.*, (2017) is of the opinion that if the government invests in supporting floriculture, the sub sector is likely to contribute significantly in income poverty reduction among the city dwellers. The literature, is however too scant regarding floriculture in the country.

Labuschagne (2017) presents an account of urban agriculture in Tanzania focusing vegetable cultivation. The study pins downs issues of market,

and land use for urban agriculture where it centrally notices that there is no formal markets for vegetables in most parts of the country particularly in Dar es Salaam and Arusha rather markets are everywhere in open spaces. This observation is supported by Dongus (2001) who notes that urban agriculture in Dar es Salaam is practiced in public open spaces such as railway reserves or under main power lines (it is just tolerated by the authorities). The study by Dongus (2001) also provides an inventory of agricultural activities taking place in the region's public open spaces including location and size. Population increase in the city of Dar es Salaam exerts pressure on land and hence a decrease of urban agricultural land over time (Dongus 2001 and Kiduwanga and Shomari 2014). However, despite the pressure on land, Dongus (2001) also noted that while old areas used for vegetable cultivation vanished yet new areas emerged for the period 1990'-2000's proving the importance of urban agriculture in the city. The literature by Dongus (2001) however is too gray to be relied upon but unfortunately there is no any updated literature on the same.

Kiduwanga and Shomari (2014) takes a vantage point of land administration in the wake of expansion of vegetables cultivation in the city of Dar es Salaam and concludes that a number of issues surrounds the unpromising expansion of vegetable production in the city one being lack of access to land and insecure land rights (also supported by Foeken *et al.*, 2004), lack of farming skills, poor technology, and the shortage of water. Jacobi *et al.*, (<https://www.ruaf.org> as of 2/11/2018) concludes that in Dar es Salaam, urban agriculture is an important livelihood option especially for the poor. The sub-sector is important for food security, income and employment among the city dwellers. The sub-sector also provides fresh food to the residents of the city. Jacobi *et al.*, (<https://www.ruaf.org> as of 2/11/2018) further comments that urban agriculture should be considered as a tool to safeguard urban areas for future development.

Shimbe (2008) evaluates the contribution of urban agriculture to household poverty alleviation with reference to Morogoro municipality and concludes that the subsector contributes up to 13% of total household income which ranked third behind salaries/wages (44%) and business, transfer payments and other sources which contributed about 27%. Mhache (2015) also notes that, still urban agriculture plays an important role in the welfare of societies in Tanzanian urban areas especially the poor. The study by Mhache also based on case studies from the eastern part of the country just as the case was for Dongus (2001), Foeken *et al.*, (2004), Shimbe (2008), Mntambo (2012), Kiduwanga

and Shomari (2014), Bishoge *et al.*, (2017) and Bishoge and Suntu (2018); this confirms the high rate of the literature skewing towards the eastern zone. The common challenges for urban agriculture identified by the existing literature include issues of land rights and access to land, water shortage, markets instability, lack of capital, lack of agricultural extension services and low technology (Shimbe 2008; Jacobi *et al.*, <https://www.ruaf.org/sites/default/files/DaresSalaam> as of 2/11/2018; Kiduwanga and Shomari 2014, Foeken *et al.*, 2004 and Dongus 2001 and Mhache 2015). In line with the challenges, past studies commonly argue the government to provide the necessary support to urban agriculture including the issue of mainstreaming research on urban agriculture in national agricultural research (Foeken *et al.*, 2004; Kiduwanga and Shomari 2014, Bishoge *et al.*, 2017 and Bishoge and Suntu 2018), financial assistance, provision of extension services (Shimbe 2008 and Mhache 2015), dealing with land rights and land tenure especially for the marginalized groups (Foeken *et al.*, 2004 and Shimbe 2008) as well as assisting farmers with issues of markets.

Evidently, therefore, so far almost all studies on urban agriculture in Tanzania confirm the observations that urban agriculture is an important livelihood option in Tanzanian urban areas. However, from the reviewed literature it is evident that the literature on urban agriculture for Tanzania suffers from being grey and of scant spatial coverage; most literature is old and its spatial coverage is skewed to few regions in the country as mentioned earlier. The old literature denies access to the current status-quo of the matter under investigation given the fact that human societies are always dynamic hence it is expected that there are significant changes that are yet to be uncovered. While Tanzania has over thirty regions and seven agro-ecological zones namely coast, arid lands, semi-arid lands, plateaux, southern and western highlands, southern highlands and alluvial plains (URT 2007), studies on Urban agriculture so far presents findings based on case studies from Dar es Salaam, Morogoro, and Mbeya.

Now, since urban agriculture performance is dependent on factors which most of them are geographically specific determined, it is still important to conduct more location specific studies to address spatial coverage on knowledge pertaining the importance of urban agriculture in the country. Bishoge and Suntu (2018) as well as Foeken *et al.*, (2004), for example, makes strong observations regarding urban agriculture in Tanzania, the observations are embedded with strong recommendations for both practitioners and policy makers; however, findings based from

only Morogoro and Mbeya regions case studies may not suffice generalizations for Tanzania as far as urban agriculture is concerned due to agro-ecological differences between the two regions and most of the remaining parts of the country. Climate, topography, soils and water resources are all different from one agro ecological zone to the other. Not only that but also the two (Morogoro and Mbeya regions) are currently categorized as cities vs. small emerging townships in the country including the Bariadi township. The two categories are contrasted in terms of population size and growth - which has implications on levels of competition over land between the many land use requirements such as settlement and infrastructural developments vs. urban agriculture. Peoples' culture is another aspect that may contrast regions which has been so far referred to in the existing literature i.e. Dar es Salaam, Morogoro and Mbeya from the rest of the regions in the country especially regions in the northern, western, and central parts of the country. Food preferences is one cultural aspect that may differentiate preferences on urban produce that one may be interested to produce from one cultural orientation to the other; all these calls for site specific study to ascertain the importance of urban agriculture in the country.

Taking into account issues of spatial coverage, this study notes that there is almost no single study which has so far been conducted to assess the importance of urban agriculture in western parts of Tanzania which covers such regions as Shinyanga, Tabora, Kigoma and Simiyu regions. The study picks Simiyu region which is of arid and semi-arid agro-ecological characteristics as opposed to the coastal agro ecological zone (covering Dar es Salaam) as well as plateaux, southern and western highlands; southern highlands and alluvial plains (covering most parts of Morogoro and Mbeya). Specifically, Simiyu suffers from less rainfall (500-800mm) and water resources compared to such regions as Dar es Salaam, Morogoro and Mbeya with rainfall ranging between 750-1300mm and a handful sources of water resources. This study, therefore, examines the role of urban agriculture in household income generation among urban dwellers in the Bariadi township. The study has four specific objectives which are to identify types of produce farmed in the Bariadi township; to identify markets for urban produces in the township; to examine the impact of urban farming on household income; and finally, to identify challenges facing urban farmers in the township.

Conceptual Framework

Through literature review, the researcher agrees with the description by Pedzisai *et al.*, (2014) on the functionality of urban agriculture. Ideally,

urban agriculture is a function of many issues as presented by Pedzisai *et al.*, (2014). Focused in this study are spatial dimensions, environmental and health issues, production and consumption; as well as household economy and income dimensions. Land use plan and urban development influence urban agriculture especially in terms of land availability for agriculture in respective urban centers. People living in high density settlements are likely to fall victims of land shortage for agriculture hence less production. In such areas urban agriculture is likely to be observed in open public lands conducted mostly illegally. This goes hand in hand with the spatial dimension which refers to the 'where and how much' land is available for agriculture. However the where and how much land is available for agriculture goes beyond land use plans and urban development; it is about geographical location of the area in question. In larger cities where usually population density is high urban agriculture tend to suffer severely from land shortage as opposed to small emerging urban centres where population density tend to be less than in their counter parts. The spatial dimension also refers to issues of geographical characteristics for the respective urban centre, to what extent does the climate, soil, water resources and topography support agricultural activity is key in urban agriculture. The issue of environment and health refers to the ways in which urban agriculture keeps the environment safe from degradation and supportive for human health.

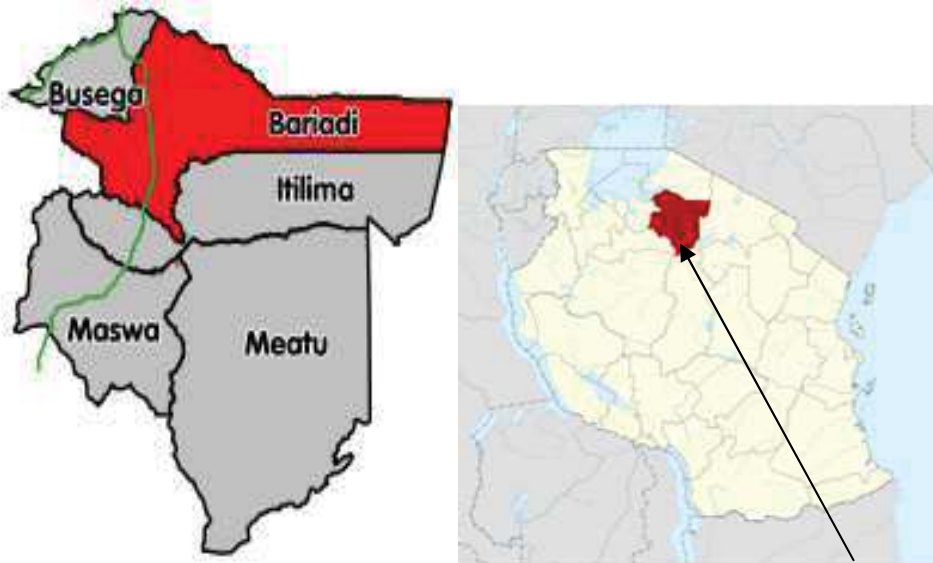
The urban economy is concerned with such issues as other sources of livelihoods available in the urban area in question and how they support urban agriculture. Where chances for diversification are large chances for growth in urban agriculture also tend to be large. Household economy and income issues in urban agriculture refers to the extent to which urban agriculture contributes to income generation in given households and how that improves the social welfare of such households. Not only that but also how urban agriculture offers capital for the households in question to invest in other economic activities and eventually transforming economic status of the households in question. Activity groups dimension scrutinizes the social strata of those who are involved in urban agriculture and how they benefit from the same. Women and children are usually perceived to be more involved in the activity although how they benefit from it is still a topic for discussion. Rural urban linkages is another dimension of urban agriculture. Those involved in urban agriculture tend to send remittances in rural areas (as it is mostly assumed that those engaged in urban agriculture are immigrants from among the rural poor). Who produces what and who consumes what is another concern in urban agriculture. In most cases

urban agriculture is considered to be the producer and supplier of fresh food in urban centres. Also urban agriculture serves as a means that sustains food security among households involved in the activity. Legal and administration issues has always been surrounding urban agriculture. In most cases urban agriculture has been condemned of been practiced illegally especially use of public open lands as well as squatters. So encroachment is an issue of concern in urban agriculture.

Methodology

The Study Area

The study was conducted in Bariadi District of Simiyu region. The District is located between Latitudes 2015' and 3010' South of the Equator and Longitude 33040' to 350 10' East of Green which. The District is bordered by Kwimba and Magu Districts (Mwanza Region) in the West, Bunda and Serengeti Districts (Mara Region) in the North, Ngorongoro District (Arusha Region) in the East, Maswa and Meatu Districts (Shinyanga Region) in the South. The District covers a total area of 9,445.7 Sq. kms (944.570 ha) of which 4591.7 Sqkms (459,170 ha) is covered with an arable land suitable for both agriculture and livestock keeping, 790 Sq kms (79,000 ha) is covered by the Maswa Game reserve and 3,950 Sq.kms (395000 ha) covered by the Serengeti National Park. The remaining area of 114 Sq. km (11,400ha) is covered by water bodies, forest and hilly area. By the year 2012 the district had a population of 422,916 people. Table 1 presents population dynamics in the region and it suggests and increasing trend over time. Most people in the district are farmers and cattle keepers.



Simiyu Region

Map1: Bariadi District's location within Simiyu Region and Simiyu Region within Tanzania

Source: https://en.wikipedia.org/wiki/Simiyu_Region

Table 1: Population development in Simiyu

Name	Status	Population Census 1988-08-27	Population Census 2002-08-01	Population Census 2012-08-26
Simiyu	Region	...	1,317,879	1,584,157
Bariadi	District	422,916
Busega	District	203,597
Itilima	District	313,900
Maswa	District	220,432	304,402	344,125
Meatu	District	159,272	248,214	299,619

Source: Tanzania National Bureau of Statistics (<http://www.nbs.go.tz> as of 21/10/2018)

Methods

The study adopted an exploratory research design since not much exists in the literature regarding urban agriculture in Bariadi district. Using exploratory research design, the study was able to collect necessary baseline information using related data collection approaches and tools. Two wards were selected from the district for the study namely Malambo and kibinda of Ntuzu division. These were selected basing on the fact that they are the wards that make the township of Bariadi hence, since the study intended to assess urban agriculture for the newly developing urban centers, the wards were deemed appropriate for the study as they are typical urban centres for the newly developing urban areas in the district. The study involved 40 respondents who responded to a semi structured questionnaire; these were selected using simple random sampling technique. Five key informants responded to in-depth interviews; the criterion for selection of these respondents was their involvement in urban agriculture. Qualitative data were analyzed thematically where as numerical data were analyzed using simple descriptive statistical analysis with the help of Statistical Package for Social Sciences (SPSS) computer soft ware.

Findings

Respondents Characteristics

As pointed in the previous section a total of 40 respondents were involved in responding to the semi structured questionnaire of whom 50% were male and the remaining 50% were female. Figure 2 shows

respondents age groups. Majority of the respondents were aged between 25 -30 years; age group 45-50 years composed the least age group of respondents (Figure 2). This contrasts findings by Kiduanga and Shomari (2014) who found that in Dar es Salaam most urban farmers were aged 50years. While Kiduanga and Shomari concluded that urban agriculture is practiced mainly by retiree who after working from different sectors opted urban agriculture as a livelihood strategy after retirement.

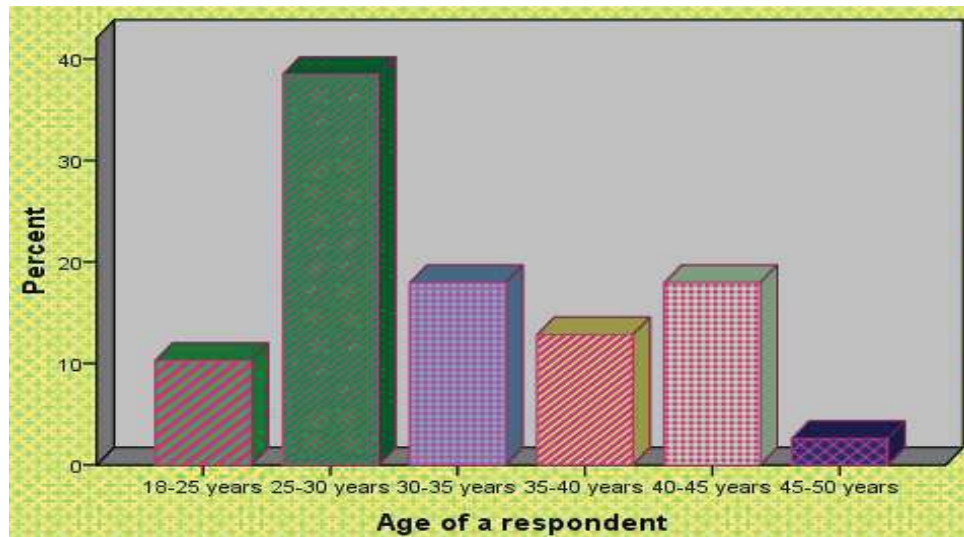


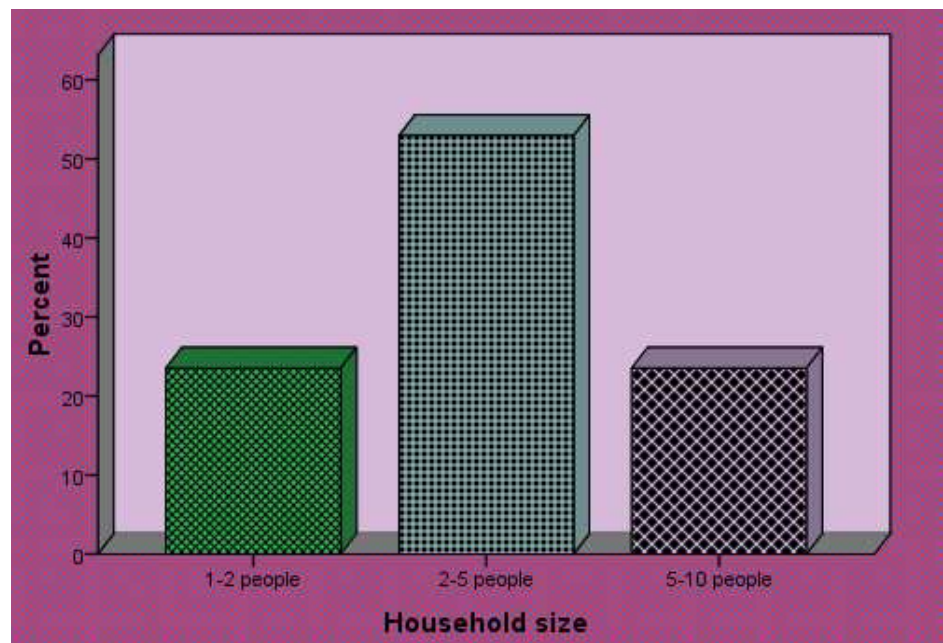
Figure 2: Age of Respondents

Urban agriculture is characterized by cultivation of crops in unauthorized areas. There is no any piece of land officially designated for urban agriculture in the township. Most farms are of less than an acre (48%); very few farms were of between 1-2 acres (21.2) (Table 2). These findings are not different from the findings by Kiduanga and Shomari (2014) who noted that in Dar es Salaam farms for vegetable growers ranged from less than 50m² to over 100m². It is surprising though that farm sizes for the two regions with two different characteristics i.e. one being a city with over 5million population (Dar es Salaam) and the other (Simiyu region) being a newly growing township with population size of less than 1million people. Otherwise, one would expect that farmers in Bariadi (Simiyu region) has larger farm sizes than those in Ubungo, Mabibo, Msasani and Kawe in Dar es Salaam given the high population density in the city of Dar es Salaam. This sends negative connotation on land use planning in the country as reported by Dongus (2001).

Table 2: Land size used for urban farming

Land size	Frequency	Percent
>0.5 acre	16	40.0
0.5-1 acre	10	25.0
1-2 acres	7	17.5
Total	33	82.5
Missing value	7	17.5
Total	40	100.0

Figure 3 shows household size. Most households bear between 2-5 (52.9%) people followed by households of between 1-2(23.5%) and 5-10 people (23.5%) (Figure 3).

**Figure 3: Household size**

Characterizing urban agriculture in Bariadi Township

Urban agriculture in the township is dominated by such activities as crop production, animal keeping and poultry (Table 3), this is similar to past findings for urban agricultural activities in Tanzania and Africa in general; David *et al.*, (2010) for example came up with similar findings for Uganda. Likewise Dongmo *et al.*, (2010) came up with similar findings for Cameroon where it is reported that agriculture in Younde and Douala cities are characterized by the cultivation of crops and livestock keeping. Studies by Kiduwanga and Shomari (2014), Foeken *et al.*, (2004) Dongus (2001) and and Mhache (2015) report similar findings for Tanzania urban agriculture. Foeken *et al.*, (2004), for example reported

that, "in Tanzania's towns, urban agriculture is very common and involves the raising of livestock (dairy cattle, chickens, goats, pigs, etc.) and the cultivation of crops (maize, cassava, legumes, vegetables, fruits, etc.)" Pg 6. This means urban agriculture in newly growing urban centers as Bariadi is taking similar form of activities practiced elsewhere in the country as well as in Africa generally.

Table 3: Common urban agricultural activities in Bariadi township

Urban agricultural activities	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Crop production	22 (55.0%)	15 (37.5%)	2 (5.0%)	1 (2.5%)	0 (0.00%)	40 (100%)
Animal keeping	18 (45.0%)	18 (45.0%)	4 (10.0%)	0 (0.00%)	0 (0.00%)	40 (100%)
Poultry	8 (20.5%)	16 (41.0%)	15 (38.5%)	0 (0.00%)	0 (0.00%)	39 (100%)

Table 4 displays crops produced in the township ranking them from the top most to the least grown crop. From the table it can be noted that according to the majority of the respondents (92%) were of the opinion that vegetables is the most crop category grown in the township. Other crops category grown in the township include cereals (ranking second), legumes (ranking third) and fruits (ranking fourth). Figure 4 displays some of the vegetables grown in the Bariadi township including onions, okra, and elephant tomatoes. The figure also show urban farmers nearby a vegetable nursery bed.

Table 4: Ranking crops cultivated

Most grown crop	Rank	Respondents	%
Vegetables	1	37	92
Cereals	2	36	90
Legumes	3	36	90
Fruits	4	38	95



Figure 4: Some of the vegetables grown in Bariadi township

Livestock kept in the Bariadi township include cattle, goats, sheep, chicken, ducks, and pigeons (Table 5). These findings are similar to findings by Mhache (2015) who conducted a similar study in Dar es Salaam.

Table 5: Livestock kept in Bariadi Township

Livestock	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Cattle	25 (64.1%)	11 (28.2%)	3 (7.7%)	0 (0.00%)	0 (0.00%)	39 (100%)
Goats	23 (57.5%)	12 (30.0%)	5 (12.5%)	0 (0.00%)	0 (0.00%)	40 (100%)
Sheep	16 (40.0%)	14 (35.0%)	7 (17.5%)	3 (7.5%)	0 (0.00%)	40 (100%)
Chicken	20 (50.0%)	17 (42.5%)	3 (7.5%)	0 (0.00%)	0 (0.00%)	40 (100%)

Ducks	4 (10.0%)	20 (50.0%)	13 (32.5%)	3 (7.5%)	0 (0.00%)	40 (100%)
Pigeons	1 (2.8%)	5 (13.9%)	18 (50.0%)	9 (25.0%)	3 (8.3%)	36 (100%)

Markets

Produce from urban agriculture are sold both within the Bariadi township as well as outside the township. The major buyers for the produce include individuals who buy on retail mainly for household consumptions; hotel owners, whole sellers from within Bariadi township who thereafter sell the produce on retail in the market places; also whole sellers from outside Bariadi township who later on sell the produce on retail in townships other than Bariadi. Whole sellers from outside Bariadi township are mainly from nearby townships including Mwanza, Bunda, and Shinyanga towns (Table 6).

Table 6: Buyers of urban agriculture produce

Buyers	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Individuals	32 (86.5%)	4 (10.8%)	1 (2.7%)	0 (0.0%)	0 (0.0%)	37 (100%)
Hotel owners	13 (36.1%)	14 (38.9%)	7 (19.4%)	2 (5.6%)	0 (0.0%)	36 (100%)
Whole sellers from within Bariadi township	13 (33.3%)	20 (51.3%)	1 (2.6%)	4 (10.3%)	1 (2.6%)	39 (100%)
Whole sellers from outside Bariadi township	4 (12.5%)	5 (15.6%)	4 (12.5%)	11 (34.4%)	8 (25.0%)	32 (100%)

Of all urban produce vegetables were ranked as the most marketable urban agricultural produce in the township (67.5%) in descending order followed by cattle (55.3%), goats (45.9%), cereals (36.8%), sheep (28.6%) and fruits (15.2%) (Table 7).

Table 7: Most Marketable Urban Agricultural Produce in Bariadi Township

Produce	Frequency	%
Vegetables	27	67.5
Cereals	14	36.8
Cattle	21	55.3
Goats	17	45.9
Sheep	10	28.6
Fruits	5	12.5

Urban Agriculture and Livelihood in Bariadi Township

Urban agriculture in the Bariadi township benefits the township in many ways including improving household food security (92%) and household nutrition (90%); improving household income (85%) and increasing food supply in the township (77.5%) (Table 8). These findings indicate that food security and nutrition is the primary goal among urban farmers over income generation as it would otherwise be thought of as most literature indicates, see for example Kiduanga and Shomari (2014) who reported that for the majority, the motivation behind practicing urban agriculture in Dar es Salaam was to generate income very few reported to practice the activity in order to get vegetables for food in their families. Dongus (2001) also reported that in most cases vegetable production in Dar es Salaam is for income generation and it often tend to be the only source of income for the farmers involved. The differences in the findings between the current study and the existing literature from elsewhere in the country signifies studies for specific spatial coverage. Again the findings provides a new dimension for the urban agriculture provided earlier in Figure 1. Households which are involved in urban agriculture earn between Tsh. 50,000 and over 10,000,000 annually. (Figure 5). However, majority of such urban farmers earn between Tsh. 5001,000 and 10,000,000 (Figure 5) followed by those who earn between Tsh. 501,000 and 1000,000. Very few farmers earn over 10million Tsh a year. from urban agriculture(Figure 5).

Table 8: Benefits of Urban Agriculture in Bariadi Township

Benefit	Frequency	%
Improve income	34	85
Increase household food security	37	92
Increase food supply in my town	31	77.5
Improve family nutrition	36	90

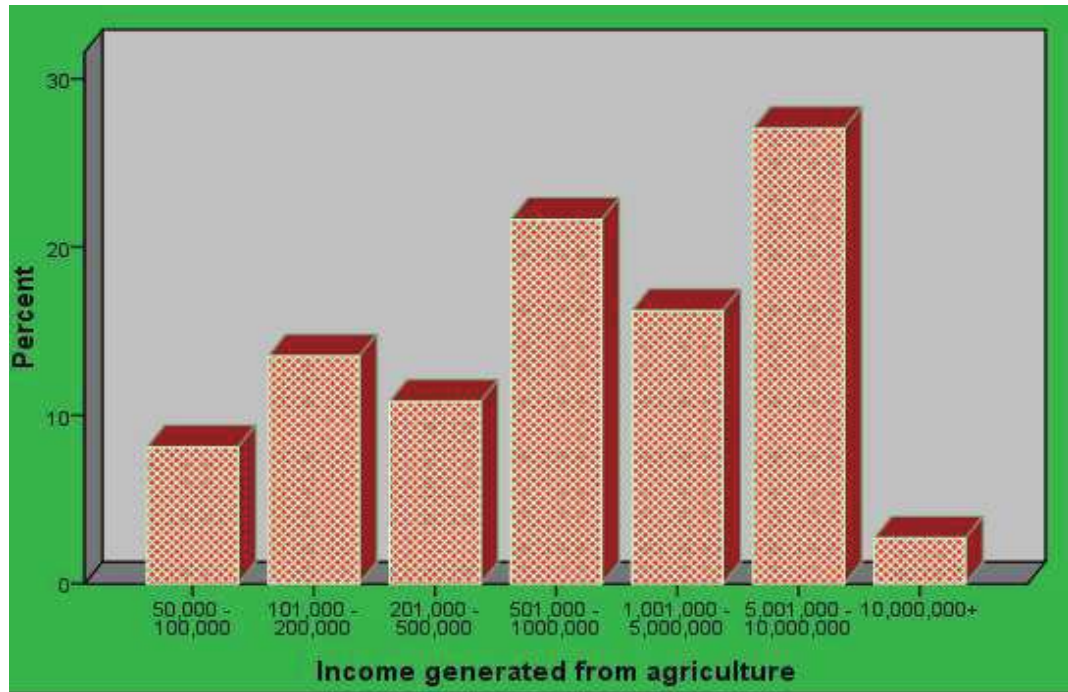


Figure 5: Income Generated from Urban Agriculture

Cattle was rated as the major generator of the highest income among urban agricultural produces in the township followed by vegetables, goats, cereals, sheep and fruits in descending order (Table 9). It is understandable for that cattle to take lead in income generation since Simiyu region is within the rangelands of Tanzania. However, it is not very clear why vegetables are ahead of goats and sheep in term of income generation.

Table 9: Income generation from urban agriculture

Responses	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Vegetables	18 (45.0%)	11 (27.5%)	3 (7.5%)	4 (10.0%)	4 (10.0%)	40 (100%)
Cereals	13 (34.2%)	13 (34.2%)	8 (21.1%)	3 (7.9%)	1 (2.6%)	38 (100%)
Cattle	18 (46.2%)	16 (41.0%)	3 (7.7%)	2 (5.1%)	0 (0.0%)	39 (100%)
Goats	15 (38.5%)	14 (35.9%)	6 (15.4%)	3 (7.7%)	1 (2.6%)	39 (100%)
Sheep	7 (18.4%)	11 (28.9%)	8 (21.1%)	4 (10.5%)	8 (21.1%)	38 (100%)
Fruits	3 (7.9%)	5 (13.2%)	8 (21.5%)	9 (23.7%)	13 (34.2%)	38 (100%)

Income from urban agriculture among urban farmers is spent mainly for basic needs as paying for school fees, health facilities, housing, clothing and improving nutrition through buying food that is not available in store (Table 10); this implies that majority of the urban farmers in the township are poor. This is in line with FAO (2012) which noted that poverty is of high prevalent in among urban residents in Sub-Sahara Africa where majority survive on less than US\$1 a day and poor housing is among the most glaring manifestation of such urban poverty in Africa.

Table 10: Ways in which Urban Agriculture Improve People's Life in Bariadi Township

Responses	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Paying schools fees	16 (41.0%)	18 (46.2%)	4 (10.3%)	1 (2.6%)	0 (0.0%)	39 (100%)
Paying for health facilities	18 (46.2%)	16 (41.0%)	4 (10.3%)	1 (2.6%)	0 (0.0%)	39 (100%)
Building house	9 (22.5%)	13 (32.5%)	11 (27.5%)	6 (15.0%)	1 (2.5%)	40 (100%)
Clothing	13 (32.5%)	21 (52.5%)	6 (15.0%)	0 (0.0%)	0 (0.0%)	40 (100%)
Improved nutrition	17 (42.5%)	18 (45.0%)	3 (7.5%)	2 (2.5%)	0 (0.0%)	40 (100%)

Challenges facing Urban Agriculture

Urban agriculture faces many challenges including poor markets, water shortage, land shortage, seeds unavailability, lack of capital, unavailability of inputs, crude working tools, lack of government support, lack of water pumping machines for irrigation, lack of man power, poor storage facilities, and lack of agricultural extension services (Table 11). Through focus group discussion, farmers pointed out a number of challenges facing them regarding markets including unreliable markets, low prices and price fluctuation. Vegetable growers remarked that during peak season prices usually go down significantly to the extent that they fail to break even. They also remarked that the problem of unreliable markets is compounded by low/poor technology whereby produces are sold raw since no processing is done to improve preservation due to low preservation technology among famers. Lack of capital exacerbates the problem since although farmers would like to process the crops for value addition and longer term preservation, yet most of them explained that they lack capital to meet their dreams. Lack of capital also limits farmers from buying farming machines and implements. Farmers at Malambo area for example explained that due to

lack of capital they could not afford water pumping machine to fetch water from a nearby river channel they a result farming becomes labor intensive which is less profitable. FAO (2012) noted similar findings it observed that in vegetable grown in Tanzania urban areas are highly perishable and that production is very low-tech based, and it is basically based on such simple farm tools as hand hoe and watering can.

Land is a problem to almost all farmers in Bariadi township (Table 11) since as presented earlier, majority of the respondents noted to have less than 0.5 acre for agricultural activities. This is contrary to the Town and Planning Ordinance of 1992 which recognizes urban agriculture as one of the country's developmental strategies and thence forth it sets a limit of 1.2 ha of land per urban farmer (FAO 2012). Seed is another challenge facing urban farmers in Bariadi township. Farmers reported that seeds for some vegetables are hardly available, such vegetables include chilly, elephant tomatoes, and *mnafu*. In some cases seeds sold perform poorly in terms of germination. Furthermore, farmers noted that extension services is poor; they hardly receive any agricultural officers who could otherwise assist them with relevant advice and ultimately improve production and productivity.

Table 11: Challenges facing Urban Agriculture in the Study Area

Challenge	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Poor market for the produce	14 (35.9%)	15 (38.5%)	1 (2.6%)	7 (18.0%)	2 (5.1%)	39 (100%)
Water shortage	21 (53.8%)	14 (35.9%)	1 (2.6%)	3 (7.7%)	0 (0.0%)	39 (100%)
Land shortage	10 (25.0%)	13 (32.5%)	6 (15.0%)	9 (22.5%)	2 (5.0%)	40 (100%)
Seeds unavailability	3 (8.8%)	7 (20.6%)	10 (29.4%)	12 (35.3%)	2 (5.9%)	34 (100%)
Lack of capital	14 (37.8%)	16 (43.2%)	6 (16.2%)	1 (2.7%)	0 (0.0%)	37 (100%)
Unavailability of inputs	9 (24.3%)	10 (27.0%)	14 (37.8%)	4 (10.8%)	0 (0.0%)	37 (100%)
Crude working tools	9 (25.7%)	13 (37.1%)	10 (28.6%)	3 (8.6%)	0 (0.0%)	35 (100%)
Lack of government support	13 (34.2%)	20 (52.6%)	4 (10.5%)	0 (0.0%)	1 (2.6%)	38 (100%)
Lack of water pumping machines for Irrigation	11 (28.2%)	18 (46.2%)	3 (7.7%)	4 (10.3%)	3 (7.7%)	39 (100%)

Lack of man power	4 (11.1%)	4 (11.1%)	5 (13.9%)	15 (41.7%)	8 (22.2%)	36 (100%)
Poor storage facilities for the produce	10 (25.6%)	15 (34.5%)	1 (2.6%)	9 (23.1%)	4 (10.3%)	39 (100%)
Lack of agricultural extension services	7 (17.9%)	26 (66.7%)	2 (5.1%)	4 (10.3%)	0 (0.0%)	39 (100%)

Conclusion and Recommendations

Evidently urban agriculture in the Bariadi township is characterized by common characteristics of urban agriculture in Africa. Despite the fact that the Bariadi township is a newly emerging urban centre yet urban agriculture is characterized by cultivation of crops in unauthorized areas. There is no any piece of land officially designated for urban agriculture. Not only that agriculture is practiced in small fragmented portions of land in the township just as what was reported in studies conducted elsewhere in the country as well as in Africa in general. This implies that there is less attention paid on experiences elsewhere in the country when it comes to urban agriculture.

Otherwise, given experiences in cities like Dar es Salaam and Morogoro where the literature is ample that is calling for proper land use plan to accommodate urban agriculture, one would expect that town plans in newly growing townships in the country would set aside land for agriculture as per relevant guidelines including the Town and Planning Ordinance of 1992, which is supported by the Tanzania National Agricultural and Livestock Policy of 1997 which recognizes that urban agriculture makes an important source of employment among town dwellers in the country as well as an important source of income among practitioners. The policy also appreciates the sector in terms of food supply in urban areas in the country. Likewise the issues of capital, technology, market and extension services had been reported in most past studies as reported earlier; it is surprising to find similar findings pointing out similar challenges facing urban agriculture in newly emerging townships. About six years ago, for example, Mashindano (2013) identified policy issues hindering sustainable markets for horticultural products to include failure to tap the export opportunities due to the weaknesses of the policy and institutional framework; huge mismatch between the available good policies and existing institutions against practice; and finally limited initiatives to promote a more promising business model (presented in Mashindano 2013) despite its satisfactory initial results.

This study concludes that although urban agriculture plays a significant role in income generation among its practitioners in the Bariadi township, yet the gains accrued by its practitioners are insignificant in the sense that farmers work on hand to mouth basis, this is not desirable for sustainable development. Poor preservation technology, unstable markets and low prices; none accommodative town plans, and lack of government support will all continue pulling farmers back as it has been doing for many years in other parts of the country if no actions taken to deliberately resolve such problems. This study therefore recommends that the government should monitor the implementation of its relevant policies such as the agricultural and livestock policy as well as other relevant guiding rules and regulations so as to ensure proper support to urban farmers. This is in recognition of the fact that towns and cities are currently subjected into receiving more people from rural areas due to the many challenges that rural people face from climate change (FAO 2012).

Governments should prepare cities and urban centres to receive rural immigrants in a manner that such immigrants will form an important labour for different developmental projects including agriculture. Designating pieces of land as specified in the Town and Planning Ordinance of 1992 will provide ample households with ample land for food production in urban areas which in turn will also solve issues of employment, income generation, food insecurity and the general associated poverty among town dwellers. Land ownership is among the determining factors that enables farmers to become preferred suppliers to the high-value markets (Sumari 2017). However use of technology including use of bags is another that that can help reduce the challenges associated with land shortage as proposed by Labuschagne (2017) who comments that " We cannot afford to ignore the benefits of bag farming for urban dwellers...It's time to get serious" (pg 23). Water supply is an important infrastructure for urban agriculture hence considerations should be made to ensure that urban farmers are provided with the necessary support for them to access water resources for agriculture. Furthermore, as FAO (2012) suggested, urban farmers need to be encouraged to form cooperatives which can help them to negotiate better prices. The government at local levels should also assist farmers in terms of access to loans with a focus to improve agro-processing units and small industries.

References

- Bishoge, O. K., Zhang L., and Suntu S. L. (2017), Factors influencing the growth of floriculture. A case study of Kinondoni Municipality, Dar es Salaam city in Tanzania, *Applied and Advanced Research* 2(6):356–363
- Bishoge, O.K., and Suntu S.L. (2018) Opportunities of Urban Horticulture for Poverty Alleviation in Dar es Salaam city, Tanzania: A Case study of Ubungo Municipality. *Food, Nutrition and Agriculture*, 2018: 1(1) 12-16 Doi.: 10.21839/jfna.2018.v1i1.123
- David, S., Lee-Smith D., Kyaligonza J, Mangeni W., Kimeze S., Aliguma L., Lubowa A., and Nasinyama G. W. Changing Trends in Urban Agriculture in Kampala in Prain G., Karanja N. and Lee-Smith D.(Editors) (2010) *African Urban Harvest: Agriculture in the Cities of Cameroon, Kenya and Uganda*. International Potato Center, New York
- Dongus, S. (2001): Urban Vegetable Production in Dar es Salaam (Tanzania) – GIS-supported Analysis of Spatial Changes from 1992 to 1999. In: APT-Reports 12, July 2001. S.100-144. Freiburg.
- Dongmo, T., Meffeja F., Fotso J. M., and Nolte C. (2010) Crop–Livestock Integration in the Urban Farming Systems of Yaoundé in Prain G., Karanja N. and Lee-Smith D.(Editors) (2010) *African Urban Harvest: Agriculture in the Cities of Cameroon, Kenya and Uganda*. International Potato Center, New York
- FAO, (2012). *Growing greener cities in Africa. First status report on urban and peri-urban horticulture in Africa*. Rome, Food and Agriculture Organization of the United Nations
- Foeken, D., Sofer M., and Mlozi M. (2004) Urban agriculture in Tanzania: Issues of sustainability. African Studies Centre. <http://asc.leidenuniv.nl> (as of 8/7/2018)
- Hallett, S., Hoagland, L., and Toner E. (2017) Urban Agriculture: Environmental, Economic, and Social Perspectives, *Horticultural Reviews*, 44: 65-120 https://www.researchgate.net/publication/308543504_Urban_Agriculture_Environmental_Economic_and_Social_Perspectives accessed 04.04.2019.
- Jacobi, P., Amend J. and Kiango S. Urban Agriculture In Dar Es Salaam: Providing An Indispensable Part of the Diet . files/DaresSalaam (as of 2/11/2018)
- Kiduanga, J., and Shomari A. (2017) Urban Agriculture: Critical Issues of Land Administration for Expansion of the Farming Of Vegetables in Dar es Salaam. *Geographical Association of Tanzania*, Vol. 36, No. 1: 115–134

- Labuschagne, L. (2017) It is Time to Get Serious About Urban Farming
http://www.icipe.org/sites/default/files/Taha_Mag_2016_3rd_Eco-Friendly_Nets.pdf accessed 02/03/2018
- Mashindano, O., Kazi V., Mashauri S., and Baregu S. (2013) Taping Export Opportunities for Horticulture Products in Tanzania: Do we have Supporting Policies and Institutional Frameworks? ESRF Policy Brief Policy Brief No. 2/2013.
http://esrf.or.tz/docs/horticulture_products_in_tanzania.pdf
- McDougall, R., Kristiansen P., and Rader R. (2019). Small-Scale Urban Agriculture Results in High Yields but Requires Judicious Management of Inputs to Achieve Sustainability, PNAS 116 (1) 129-134; <https://doi.org/10.1073/pnas.1809707115>
- Mkwela, H. S. (2013) Urban agriculture in Dar es Salaam: a dream or reality? *Transactions on Ecology and The Environment*, 173:162-172, doi:10.2495/SDP130141
- Mntambo, B. D. (2012) Women in Urban Agriculture: Are the Policies Supportive? The Case of Morogoro Municipality, Tanzania., *HURIA* 11:98-110
- Pedzisai, E., Kowe P., Matarira C. H., Katanha A., and Rutsvara R. (2014). Enhancing Food Security and Economic Welfare through Urban Agriculture in Zimbabwe. *Food Security*, Vol. 2(3), 79-86 Available online at <http://pubs.sciepub.com> DOI:10.12691/jfs-2-3-2
- Shimbe, S. P. L. (2008). The Contribution of Urban Agriculture To Household Poverty Reduction: The Case of Morogoro Municipality In Tanzania. A Dissertation Submitted In Partial Fulfilment of The Requirements for the Degree of Master of Science in Agricultural Economics of Sokoine University of Agriculture. Morogoro Tanzania.
- Sumari, G. S. (2017) Master Dissertation, Sokoine University of Agriculture. Tanzania National Bureau of Statistics (<http://www.nbs.go.tz> as of 21/10/2018).
- URT, (2007) National Adaptation Programme of Action (NAPA). Vice President's Office Division of Environment
- Winter, M. (2018) Changing Food Cultures: Challenges and Opportunities for UK Agriculture The Nuffield Farming Lecture Report 2018. https://www.exeter.ac.uk/media/universityofexeter/collegeofsocialsciencesandinternationalstudies/politics/research/crpr/2018_SIS_028_-Changing_Food_Cultures_Report.pdf accessed at 02.04.2018.