

**Urban Agriculture: Critical Issues  
Of Land Administration for Expansion of the Farming  
Of Vegetables in Dar es Salaam**

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***Abstract***

Tanzanian cities, particularly Dar es Salaam, have urban agriculture practiced poorly and at subsistence scale despite the activity in other cities of the world playing significant roles to urban populations. The engagement of the activity at large scale depends on many factors. It has been observed that land administration practices creates impediment to the expansion of urban agriculture in the city of Dar es Salaam. The paper deals with both theoretical and empirical issues of land administration in relation to vegetables growth in Dar es Salaam city.

**Introduction**

Cognizant of the contribution of urban agriculture (UA), a number of countries have successfully integrated the practice in their urban land use plans and development policies and legislations. The examples of Germany and China stand out as good cases in this regard. Germany, the local council authorities provided land and established water systems for urban farmers in their cities, and there were about 80,000 allotment gardens consisting of a piece of between 200 and 400 square meters each by 2001 (Drescher, 2001). Likewise, efforts have been taken by the government of China to reserve a certain amount of land for agricultural use in Beijing in order to maintain a sustainable urban ecological environment, and to provide vegetables and food locally (Liu et al, 2003). Lado (1990) further contends that Canada, Japan, Papua New Guinea, Philippines and the city states of Singapore and Hong Kong have also recognized the importance of UA, and the local authorities in these countries offer protection and encouragement to urban farmers in the form of land use regulations and tax concessions.

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While outside Africa there is a growing awareness about the role of UA in the context of food security and poverty alleviation for the urban populations, in most sub-Saharan African countries urban agriculture still largely remains an informal sector that is poorly performing. The poor performance of urban agriculture in most of African countries has largely been attributed to the lack of adequate access to land for the practice (Reuther & Dewar, 2005).

UA has been stipulated in various policies and is accepted in land use plans. For instance, section 4.3.7 of the Human Settlements Development Policy of 2002, which is currently being implemented, identifies UA as one of the important issues in urban development agenda. The policy recognizes the existence of the practice and its potentials in income, employment and a reliable supplementary source of food supply to urban dwellers at affordable prices. It states that, when the activity is well planned, it creates pleasant greenery scene. UA is also reflected in the Agricultural and Livestock Policy by the Ministry of Agriculture and Cooperatives (MoAC, 1997) and several laws like the Local Government Act (Section 80) of 1982, and the Town and Planning Ordinance (CAP 378, 1992). However, the implementation of the policies and laws is somewhat confusing for urban farmers in Tanzania. While farming in town is generally accepted and the national government pursues a generally favourable policy towards urban farming, and has even tried to encourage people to undertake it during periods of severe economic recession, no place has yet been designated or zoned for the practice, and by-laws at the local level pose many restrictions on the practice. Farmers appear not to know what is allowed and what is not (Mlozi, 1996).

The city of Dar es Salaam in Tanzania provides a good example. Despite the recognition of UA's economic and nutritional contributions to the city, there is a problem relating to allocating or retaining lands for expanding urban farming. Problems of insecurity to access land as an input plagues urban smallholder farmers almost everywhere in the city, where different forms of urban agriculture practice are conducted. A considerable amount is produced in open spaces without secure land rights. Farming occurs without agreement through illegal encroachment on public lands, including parks, nature reserves, and cemeteries (Magigi, 2008). While public land is generally farmed without official permission, the use of private land depends on a formal or informal agreement with the owner. Sometimes, only informal agreements exist between the owner and the user of the land. Farmers are often pushed out of their land, and it is taken for residential and commercial purposes (Jacobi et al, 2000).

Given the constraints on access to land and plots available for UA expansion at any location, production systems are very diverse in order to make the most and the best use of particular locations within the urban fabric. Areas used are of all sizes, from tiny home spaces (windowsills, containers, fences, rooftops, basements, walls); recreational grounds, utility and transportation rights-of-way (stream or roadsides); to suburban public or private estates (Mougeot, 2000). Farmers are largely dependent on holders of open space -- schools, institutions, and private actors -- for land. Several agreements with formal institutions have provided at least temporary land use for urban farmers. However, without exception, a majority of the farmers are acutely aware that they are at risk of being evicted at the whim of the institution controlling the land (McLees, 2011).

The competition over land has also spilled over into competition for other resources, especially water. Only 30% of the gardens in the city are irrigated with tap water (Dongus et al., 2009). Slightly more than half of the gardens are not irrigated, or rely on rainfall or open-wells for water. These gardens tend to be located in informal settlements (McLees, 2011). This paper, therefore, intends to examine the dynamics associated with access to land in Dar es Salaam, with the general objective of examining the conditions under which land for vegetables production expansion is accessed by its residents.

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The paper is organized into five sections. Following the introduction, section two dwells on the methodology used to study the conditions underpinning accessibility of land by the residents for the expansion of vegetables production. Section three examines the theoretical framework of urban agriculture. While the focus of section four discusses the findings of the study, section five concludes and makes recommendations of the paper.

### **Methodological Issues**

#### ***Sample Size and Selection of Wards and Respondents***

Four wards in Kinondoni municipality were selected for interviewing vegetables growers. These were Ubungo, Mabibo, Msasani and Kawe. the process of selecting these wards, the Kinondoni Municipal Agricultural Officer was consulted to list wards in which their residents are actively engaged in vegetable production. Therefore, the selection of the four wards under this study was done purposively based on the engagement in vegetable production. A sample size of 200 vegetable growers was selected, 50 from each ward. A non-random (availability) sampling method was used in the selection of vegetable growers since there was no sampling frame for vegetable growers that could facilitate the use of random sampling. Therefore, all vegetable cultivators who were found in their fields during the research and agreed to participate in this research became part of the sample.

Apart from vegetable producers, the sample size also included 27 local government officials, including: 1 municipal agricultural officer, 4 ward executive officers (WEO), 4 ward agricultural officers (extension officers), and 4 ward development committees (with a total number of 18 officials). These local government officials acted as key informants who provided important information concerning the accessibility of land for vegetable production. Purposive or judgmental sampling technique was used to select the officials who were familiar with the issue being studied.

#### ***Data Collection Methods***

##### ***Secondary Data Collection Methods***

Secondary data were collected through documentary review whereby a number of documents were reviewed, including government policy, plan documents, research reports, published and unpublished works obtained from the University of Dar es Salaam library and documentation centre at the Institute of Development Studies. Electronic data were also accessed and collected from different websites.

##### ***Primary Data Collection Methods***

###### ***(a) Interview and Questionnaire***

With the help of semi-structured questionnaires, interviews were conducted with vegetable cultivators in the selected wards. About 200 questionnaires were administered to vegetable cultivators on site. In-depth interviews with different local government officials were conducted with the help of an interview guide. The officials interviewed included the municipal agricultural officer, ward executive officers, and ward agricultural officers (extension officers).

###### ***(b) Observations***

In order to supplement the information collected during interviews, observations during each farm visited were done. The observations were on the ways farmers irrigate their vegetable crops, the type of water used to irrigate the vegetables, and the different types of vegetable crops grown. Growing techniques, such as planting and harvesting, were also observed at the farmer's plots.

##### ***Data Analysis***

The quantitative data were coded, entered and processed using the Statistical Package for Social Science (SPSS) programme, version 16.0. Analysis of the data was done through simple statistical methods such as tables, ratios and percentages. The qualitative data were analyzed through a

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thematic content analysis (TCA). This method involved reorganizing, reading, categorizing and coding the data so as to get themes ready for interpretation.

### **Theoretical Framework**

Von Thuneun's theory of development and land use was adopted by the study. It supports urban agriculture and sees the activity as having a great role of making large numbers of urban households survive the negative impacts of economic crisis and formal unemployment. The activity provides many with the opportunity to survive and improve livelihood (Mbiba, 1998). Based on these, Mbiba (1998) argues that the rejection of UA is unrealistic.

## **Findings and Discussion**

### ***The Status of Vegetable Growers***

The study found that the majority of vegetable growers are young people with aged between 15 and 50 years, which implies that energetic people are engaged in the vegetable production. This contrasts with the study done by Maswikaneng et al. (2002) who found that contemporary urban farmers in Atteridgeville in Pretoria were mainly middle-aged or old people, and that participation by the young in the sector was rare. A majority (38%) of vegetable growers with the age above 50 years were from Ubungo ward, followed by 24% from Mabibo ward. The presence of a big number of vegetable growers aged above 50 years in Ubungo and Mabibo wards can be explained by the fact that a majority farmers are retirees who were formerly employed in various sectors of the economy, and after their retirement decided to engage in this sector of vegetable production for sustenance. Vegetable growers from the Rwegalulila Water Development and Management Institute, whereby the majority are retirees from that institute, provide a good example of such kind of vegetable growers.

It was found that the percentage of involvement in the activity between male and female vegetable growers in Ubungo and Msasani is almost equal, which is 48% and 52% respectively. This situation can partly be explained by the presence of various initiatives, both at the municipal and ward levels, which encourage and mobilize people of both sexes to participate effectively in different economic activities to improve their living. For instance, through various programmes the Community Development Department of the Kinondoni Municipality is responsible for mobilizing the community to attain development by making use of the available local resources in respect to appropriate, adoptive and simple technology.

Though both males and females were involved in vegetable production, the findings revealed that in the two wards of Mabibo and Kawe there is a variation between the two sexes. There is inequality in vegetable production in Mabibo with male-female ratio of 3:1, and Kawe with male-female ratio of 1:5. The gender inequality in urban farming is also depicted in the studies carried out in Dhaka, Bangladesh by Remenyi (2000); in Kampala, Uganda by Maxwell et al (1998); in Hyderabad, India by Buechler and Devi (2003); and in Nairobi, Kenya by Lado (1990). All these studies show that women dominate urban farming (Dima & Ogunmokun, 2004; Kessier et al., 2004). On the other hand, Ashebir et al. (2007) in Mekelle (Ethiopia), and Ezedinma and Chukuezi (1999) in Nigeria, found a strong dominance of male farmers.

In the visited wards, vegetable production seemed to be dominated by those who have education ranging from informal to primary level. These constituted 81% of the 200 respondents (see Table 1). This finding confirms results from studies by Kekana (2006) in Soshanguve (South Africa), and Ashebir et al (2007) in Mekelle (Ethiopia), who concluded that urban farming is generally practiced by people with lower level of education. It is unfortunate that the level of involvement in the vegetable production sector by those with high level of education in the present era of '*Kilimo Kwanza*' initiative is very low. The main reason for minimal involvement is that most people with high level of education are employed in non-farming sectors of the economy, who spend more time in

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those sectors than in urban farming. However, those who participate in this sector largely use hired labourers to perform most of the farm works.

**Table 1: Respondents' Education Level by Wards**

Education Level	Ward								Total	
	Ubungo		Mabibo		Msasani		Kawe			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Informal Education	8	16	5	10	0	0	7	14	20	10
Primary	36	72	29	58	39	78	38	76	142	71
Secondary	3	6	12	24	6	12	4	8	25	12.5
High school	1	2	2	4	2	4	0	0	5	2.5
College/university	2	4	2	4	3	6	1	2	8	4
<b>Total</b>	<b>50</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>100</b>

Source: Field data, 2014

Regarding marital status, the activity is dominated by married people (70.5%). Only 29.5% were single, separated, widow/widower and divorced. Observation made during interviews found that married respondents had larger household size than those of other groups. The dominance of married vegetable growers in this sector therefore, is explained by the reality that the group highly demands an additional income to cover expenses like education, health, house and other expenses. Apart from additional income, this group also is in high demand of different varieties of vegetables to supplement the diets of their households. The dominance of married people in urban farming was also found by Kekana (2006) in the study carried out in Soshanguve (South Africa), whereby 52% of the participants were married. This is however less than that found in the studied wards.

One of the goals of this study was to find out if participants were solely depended on vegetable production for their livelihoods. Findings indicated that 52.5% of the respondents depended solely on it as their main source of employment; while 47.5% were employed in other sectors of the economy. This is also true with a study carried out by Maxwell and Zziwa (1998) in Kampala, where the people who were urban farmers relied on the vegetables production as their sole main source of employment. Msasani ward is the area with large percentage (60%) of respondents who were employed in other sectors of the economy, followed by a significant proportion of respondents in Kawe (48%), Ubungo (44%) and Mabibo (38%). The additional jobs or economic activities undertaken by vegetable growers were petty trade, tailoring, casual works and few are employees in the private and public sectors.

The period of involvement in the sector by the majority of respondents ranges from 1 to 10 years. The longest period of involvement in the sector (above 10 years) was found in Ubungo. The main reason is that the land occupied by most the farmers was accessed for a period of more than ten years. The land owned by the Rwegalulila Water Development and Management Institute makes a big portion of land accessed by the majority farmers from Ubungo ward because for a long time the institute has not implemented its plans of developing the area. This gave room to these vegetable growers (a majority of them being retirees from that institute) to stay on that land for many years. The situation is different to that of a majority of farmers from other wards who greatly depend on land owned by private individuals or companies.

The incomes earned from the activity are as follows: Vegetable farmers in Msasani earn comparatively higher average income of TZS295,200 per month, while those in Kawe earn an average monthly income of TZS252,600. Ubungo, farmers earn a monthly average TZS245,400, and those in Mabibo earn an average monthly income of TZS230,400. The incomes earned by the majority of vegetable growers do not meet their expenditure requirements. As a result most of them hardly meet their family basic requirements such as food, education, and health expenses. These findings are in line with the findings from South Africa where the majority poor households dominate the sector (Kekana, 2006).

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The main motivation for the people to practice the activity was to generate income. A small proportion of the vegetable growers reported to practice the activity in order to get vegetables for food in their families.

The market for vegetables grown depends greatly on the location of the farms. Some farmers sell their produce directly to passers-by, some sell entire vegetable bed(s) to retailers who come and buy vegetables from their gardens, and some prepare bundles of vegetables for the various markets in the city including Kariakoo, Tandale, Manzese, Shekilango, Mabibo, Buguruni and Makumbusho. From these markets people from different parts of the city come and buy vegetables for home consumption. The study also found that owners of lodges, hotels and even supermarkets are the main purchasers of vegetables, and they are willing to pay high prices for good quality products.

The market demand for vegetables varies depending on the production season. During the long rains season the market for vegetables is low as many urban dwellers produce their own vegetables for home consumption. In the dry season, vegetables produced by commercial farmers are often the only source of fresh leaves. The price for a bundle of vegetable ranges between TZS150 and 300, depending on the type of vegetable.

Different varieties of vegetable products are grown in the study area. Amaranth (*mchicha*) was the dominant vegetable grown during the dry seasons. Other types include pumpkin leaves (*majani ya maboga*), potato leaves (*matembele*), pea leaves (*majani ya kunde*), okra (*bamia*), and (*mnafu*). Collard greens (*sukumawiki*) is also popular, especially in Ubungo ward. Few vegetable growers reported growing of Chinese, cassava leaves (*kisamvu*), spinach, Swiss chard (*figiri*), egg-plant (*bilinganyi*) and *nyanyachungu*. The reasons for cultivating such kind of vegetables were market availability, relative ease to cultivate, availability of labour, financial resources and affordable inputs. Other respondents grow vegetable crops that are in favour with climatic or weather conditions, while others mentioned resistance to pests and short growth cycle as the reasons for growing those types of vegetables.

Cultivation takes place on parcels of land at different intervals, meaning that while on one parcel of land planting is taking place, on the other side harvest is taking place. Planting and harvesting do not take place at the same time in all parcels of land; instead there is a kind of rotation based on the type of vegetable. The interval from the period of planting and harvesting depends on the type of vegetable. For instance, it takes 21 to 28 days from the planting of amaranths to harvesting. The tools that farmers use for vegetable production include hand hoes, a bush knife (*panga*), pickaxes, spades, rakes and watering cans. Few farmers manage to own more advanced tools like water pumps for irrigation.

Production activities are labour intensive, and are largely performed by farmers themselves or using family labour. Only a few farmers use hired labourers to perform most of the farm works. In some cases farmers hire casual labourers to work in the garden, particularly in watering vegetables. This contrasts with farming practices in other cities and towns of Africa where hiring labour is widely practiced in urban farming. This was evident in Nugent's study (2005) carried out in Nairobi. Similar findings have been reported in Harare (Mbiba, 1995), and Kampala (Maxwell, 2005). Organic fertilizers, particularly chicken droppings and cow manure, are widely used by farmers in all four wards. However, chemical fertilizers are also applied by few farmers. To control pests and fungal diseases, chemical pesticides and fungicides are widely used, although observations from the study area show that some vegetable growers reduce the application rates partly as a strategy to save costs.

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The farming of vegetables consumes a lot of water. Though tap water is used by the majority of home vegetable growers, it is scarce, supply is unreliable, and low pressure is common. The main sources of water for vegetable cultivators in open spaces are rivers, deep wells as well as shallow wells. Where water is available, a majority of farmers irrigate their plots at least once per day. However, in all four wards farmers claimed that while watering using a can is time-consuming, irrigation equipments like pipes and water pumps are too expensive.

### ***Accessing Land for Vegetables Production Expansion***

The concept of land accessibility as stipulated by the National Land Policy of 1995, which is currently being practised in Tanzania, takes into account the ability of the person to utilize the resource accessed productively. It is argued that the determinant factors are also important part to consider for accessing land in order to utilize it. analysing land accessibility for vegetables production expansion, the following determinants were taken into account.

#### ***Size of Land Accessed and Ways of Accessing Land***

The study found there is a variation in the size of land accessed for vegetables production. While in Ubungo the predominant size of land ranges from 50m<sup>2</sup> to 200m<sup>2</sup>, in Mabibo and Msasani the land used by the majority farmers for vegetable production is less than 50m<sup>2</sup>. Kawe, 50% of the respondents accessed land of size below 50m<sup>2</sup>; 30% accessed land of a size ranging from 50m<sup>2</sup> to 100m<sup>2</sup>, 12% accessed land ranging from 101m<sup>2</sup> to 150m<sup>2</sup>, 4% had land ranging from 151m<sup>2</sup> to 200m<sup>2</sup>, and 4% accessed land size of more than 200m<sup>2</sup>. Vegetable farmers in Ubungo ward had comparatively bigger plots of land compared to those in Mabibo due to the presence of various institutions (e.g., the Rwegalulila Water Development and Management Institute) that hold big tracks of undeveloped land. The situation was different in Mabibo and Kawe where a majority farmers only access small plots, mainly from private individuals. A few who at least managed to access big plots in wards like Kawe are those who farm along river valleys, including River Mbezi.

In the four visited wards farmers accessed land for vegetable production through different channels depending on the type of person or institution holding that land. A majority (61%) in all four wards accessed land through renting/leasing and inheriting; or that is allocated to the by friends, neighbours or relatives who do not farm but have underutilized land. Kawe had the big percentage of farmers who accessed land through these channels. Most of such farmers said there were no formal or written contracts made between them and those who hold those lands. Another group (26%) directly requested for a permit to use the land from different institutions and companies such as the Water Development and Management Institute (WDMI), TANESCO, TANROAD and the police force. Likewise, there were no formal contracts made between farmers and such institutions or companies. The agreements were normally verbal.

Of the respondents, 7% accessed land through buying (mostly from private individuals). However, most farmers who claimed to buy plots had informal sale agreements, and had no evidence whatsoever to authenticate their ownership, except for 2% out of the 7% who hold official certificates of title or a letter of offer. About 6% of vegetable growers got the permit to use the land from the municipal council. Such farmers were given informal permit to use land for farming activities after making formal requests. However, there were also some who illegally farm open spaces without permission. Msasani ward had comparatively more farmers who showed interest in accessing and using open spaces from the municipal authority primarily due to the availability of water.

The study findings showed that a majority of the respondents are not aware of the official procedure requirements for getting land either for urban farming or other purposes. This is because they have little contact with government agencies. Besides, planning regulations, standards and administrative procedures are published in English, which is not accessible to the majority of landholders and tenants. 68% of the respondents who accessed land through different channels do not pay rent for the land they cultivate. Only 32% reported to pay rent for the land

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they cultivate in terms of cash. An average amount of TZS10,000-20,000 per month is paid to landholders.

The processes land access, land ownership transfers and use rights in most African cities are a dynamic mix of formal and informal transactions that occur under a mix of customary and statutory tenure regimes (MDP, 2001). However, in many countries, including Tanzania, the informal sector provides much more land to land seekers (including the majority of the poor) than the formal sector (Kironde, 1995).

In the formal land delivery system, the allocation and transfer of land is via procedures laid down by the government. Such land will, in the first place, be in the ownership or control of the government. urban areas, such land is usually planned and its legal status is expressly recognized by the government. Within formal access to farmland, farmer's rights to produce are protected under the law and forced evictions are deemed illegal. The state, NGOs, farmer's organizations, private landowners and customary land chiefs (Africa) are the main actors providing formal access to urban farmland (Velez-Guerra, 2004).

However, formal land delivery systems throughout developing countries have generally failed to keep up with the demand of rapidly increasing urban populations (McLees, 2011). Having formal access appears to be very difficult due to unclear or long procedures, or the reluctance of municipalities to issue long term leases. Kombe et al. (2000) and Adams et al. (2003) show that formal land access procedures are far from reaching community needs due to long bureaucratic processes in plan preparation, approval and subsequent engagement in cadastral and land registration. As a result, urban residents have had to rely on a variety of creative mechanisms and relationships to attain access to land for agriculture and other livelihood uses (McLees, 2011). Ghana, for instance, the complex nature of formal land transfers result to people opting for other arrangements that are less secure (Mubvami et al., 2003).

In the informal land delivery system, the allocation or transfer of land is outside the ambit of the procedures laid down by the government. Such land will usually be privately 'owned'; meaning that the land in question is in the control of people who, by virtue of, for example, earlier occupation or acquisition, or by virtue of customary tenure, command recognized authority over this land (irrespective of laws that may declare all land to be publicly owned). urban areas, such land is usually unplanned.

#### ***Utilization of Land Accesses for Vegetables Expansion***

Based on the production standards, as opposed to other food crops, vegetables have a considerable yield potential and can provide up to 50kg of fresh produce per square meter per year depending on the technology applied. Contrary to the above production standards, quantity of vegetables produced by the farmers in the four wards was generally low. A majority of the farmers produced between 1 and 200kg of vegetables per month.

The utilization of land accessed was found by obtaining the quantity of vegetables produced in kilograms from the size of land accessed by respondents. Table 2 shows the quantity of vegetable produced in kilograms per month per square meter of land.

**Table 2: Quantity of Vegetables Produced and the Size of Land Used**



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Source: Field

Quantity produced/month(kg)	Size of Land (m <sup>2</sup> )	Total												
		1-50		50-100		101-150		151-200		> 200				
		n	%	n	%	n	%	n	%	n	%			
While a the farmers (38%) between 200kg of per month that ranges and 100m <sup>2</sup> , quantity of using the of land is by 30% of in Kawe, farmers in and 8% of in Msasani. there was who produce 400kg of per month Mabibo of them more than land size of 200m <sup>2</sup> . the	Ubungo	1- 100	7	14	0	0	0	0	0	0	0	7	14	
		101 - 200	5	10	19	38	3	6	1	2	0	0	28	56
		201 - 300	2	4	4	8	4	8	3	6	0	0	13	26
		301 - 400	0	0	1	2	0	0	1	2	0	0	2	4
		401 - 500	0	0	0	0	0	0	0	0	0	0	0	0
		Above 500	0	0	0	0	0	0	0	0	0	0	0	0
	<b>Total</b>	<b>14</b>	<b>28</b>	<b>24</b>	<b>48</b>	<b>7</b>	<b>14</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>100</b>	
	Mabibo	1-100	16	32	0	0	0	0	0	0	0	0	16	32
		101 - 200	14	28	13	26	0	0	0	0	1	2	28	56
		201 - 300	2	4	0	0	0	0	0	0	2	4	4	8
		301- 400	0	0	0	0	0	0	0	0	1	2	1	2
		401 - 500	0	0	0	0	0	0	0	0	0	0	0	0
		Above 500	0	0	0	0	0	0	0	0	1	2	1	2
	<b>Total</b>	<b>32</b>	<b>64</b>	<b>13</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>10</b>	<b>50</b>	<b>100</b>	
	Msasani	1 - 100	9	18	0	0	0	0	0	0	0	0	9	18
		101 - 200	14	28	4	8	3	6	1	2	0	0	22	44
		201 - 300	1	2	4	8	5	10	0	0	0	0	10	20
		301 - 400	3	6	1	2	2	4	0	0	2	4	8	16
401 - 500		0	0	0	0	0	0	0	0	0	0	0	0	
Above 500		1	2	0	0	0	0	0	0	0	0	1	2	
<b>Total</b>	<b>28</b>	<b>56</b>	<b>9</b>	<b>18</b>	<b>10</b>	<b>20</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>50</b>	<b>100</b>		
Kawe	1 - 100	11	22	0	0	0	0	0	0	0	0	11	22	
	101 - 200	10	20	15	30	1	2	2	4	0	0	28	56	
	201 - 300	4	8	0	0	4	8	0	0	0	0	8	16	
	301 - 400	0	0	0	0	1	2	0	0	2	4	3	6	
	401 - 500	0	0	0	0	0	0	0	0	0	0	0	0	
	Above 500	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>25</b>	<b>50</b>	<b>15</b>	<b>30</b>	<b>6</b>	<b>12</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>50</b>	<b>100</b>		

Data, 2014

majority of in Ubungo produced 101 and vegetables on land size between 50 the same vegetables same size produced the farmers 26% of the Mabibo, the farmers all wards no farmer managed to more than vegetables except for where 2% produced 500kg on above Basing on production

standards, farmers in the study area were supposed to produce beyond what was produced on a given size of land accessed.

Given a relatively low level of production, respondents in the four wards listed a number of challenges that act as a barrier for full and optimal utilization of their small plots of land. The main concern is shortage of water, which was reported by 87% of the respondents. Since Dar es Salaam has distinct rainy and dry seasons, making sure vegetables receive an appropriate amount of water proves problematic. As a result, in many parts the use of wastewater for vegetable farming is a common practice as observed in Ubungo, Urafiki and Mabibo Bandari Kavuu. Both domestic and industrial wastewater is flowing in river channels, which is later used at different sections of vegetable production. The study observations also show that sellers wash their vegetables in heavily polluted water; and farmers who farm along Ubungo Kibangu river in Mabibo provide a good example. The use of untreated wastewater poses health threat to vegetable users.

Few vegetable farmers use pesticides to control pests. The low level of pesticide use in the study area was attributed to relatively high costs of pesticides as stated by 65% of the respondents. 35% of the respondents cited high costs of seeds, chemical fertilizers, and lack of farming implements like hoes, rakes, horse pipes, and water pumps as the major limiting factor in their farm operations. In addition, despite the magnitude of demand for fresh produce, access to different urban markets for their produce is a challenge to 23% of vegetable growers primarily due to the lack of reliable markets for vegetable products.

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The study also found that another critical challenge facing most vegetable farmers was limited skills in farming activities. Only about 22.5% of the vegetable growers obtained farming skills and knowledge either through training programmes, seminars or extension services. These growers, however, complained the skills they had were not enough to participate well in their farming activities. The rest (77.5%) did not have any farming skills. Few extension officers address the problems of farmers, whereby in some areas one extension officer serves two wards as it was observed in the study area, whereby one extension officer serves both Msasani and Mikocheni wards. Similarly, one farmer from Kawe reported:

*“There are no enough extension officers or they are not doing the right thing, so most of us do not perform well as we don’t get enough advice on the best techniques to be applied. Short, education on proper vegetable farming is hardly provided, which results in an increase in disease vulnerability.”*

With regard to conditions and terms for land use, findings showed that 69% of the vegetable growers used land on temporary basis, and were asked to be ready to move out any time when the land is needed by the owners. To prevent them from staying permanently, these farmers are prohibited from making permanent investments on the land. 65% of the respondents were asked to protect the area and to maintain cleanness as one of the conditions of using the plots for farming activities. About 12% of the respondents were asked not to grow permanent plants or tall crops. The prohibition of growing tall crops lies in the truth that tall crops form bushes in which thieves hide. They also make the town look dirty. These conditions are also spelt out in municipal by-laws, which clearly state that fruits and vegetables should not obstruct the sight of roadways. Furthermore, growing crops is not permitted within 14 metres of roads; and in river valleys crop cultivation is not allowed within 15 metres of riverbanks (although farming is permissible, and even encouraged, within river valleys in general).

Today, agriculture in urban areas suffers greater ecological and economic pressures than rural agriculture; and requires more intensive and better controlled production to stay competitive and safe (Mougeot, 1998). Without inputs or appropriate technology, farming on small urban spaces may simply not be economical or worthwhile (Quon, 1999). The inherent qualities of a plot of land, and the facilities and services available to it, determine whether parcels of land that are available and accessible can be productive. A plot’s biophysical characteristics (soil, hydrology or microclimate), or physical dimensions (size, shape, location) may make it unfit for agriculture. Services, such as water for irrigation, and market facilities, transportation infrastructure both for export and for farmers’ access are external factors that can determine a plot’s usability (Lourenco-Lindell 1995, Lee-Smith & Lamba 1991).

With the availability of all facilities needed, intensive farming can be practiced on small plots, making efficient use of limited land. Intensification is sought through the increase in productivity on the same area of land (like rooftop gardening), and by maximizing the use of available resources including water (Prain, 2006). For instance, starting with 1m<sup>2</sup> of space and 1-3 liters of potable water per day, a family can grow a broad range of vegetables; including leafy vegetables like cabbage, lettuce, jute, cut lettuce, amaranth, roselle, basil; as well as root and tuber vegetables like carrot, potato, red beet, onion, and fruit vegetables like tomato, hot and sweet pepper, and eggplant. The attention here should be on procurement of high quality seeds, application of other recommended agronomic practices such as land preparation, fertilizers, agro-chemicals and the use of trained labour force (FAO, 2005).

In confined urban spaces, many cultivators in urban areas use different methods and techniques in attempt to maximize their cultivable land to gain more produce. Some farmers grow food on their balconies and rooftops by using plastic containers and plastic bags that are filled with soil. Simple techniques like these are greatly used to ensure efficient and optimal utilization of the small available land. Asia has the most diverse and largest number of modern intensive farming systems. Urban farms

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in Asia provide vegetables, mushrooms, fish, seaweed, fruit, and medicinal herbs. Indeed, Latin America has some of the most improved uses of UA methods such as small-scale hydroponics (Smit et al., 2001). With limited access to land, in slum areas in the Colombian cities of Bogota and Medellin, local experts have taught hundreds of families how to produce their own vegetables right inside their homes in micro-gardens using a curious array of containers, including recycled water bottles, old tyres and trays. The techniques used are based on substrate growing or simplified hydroponics (in which water substitutes for soil), and recipients are positioned wherever there is enough space and light: on windowsills, in courtyards, and even on stairs. Every month, such family 'gardens' yields up to 25kg of produce per family (FAO, 2003).

Van Veenhuizen (2006) cautioned, however, profit-seeking through intensive farming techniques can result in over-application of fertiliser and, ultimately, degradation of the city's natural capital as farmers are forced to seek the highest available returns from their chosen land use. According to Vagneron (2007), this situation has occurred in Bangkok and Thailand where fertiliser leaching from UA plots has contaminated local water and soil resources.

### **Conclusion and Recommendations**

This study has identified the failure of the expansion of vegetable production by farmers as being due to the constraints of land accessibility, underutilization of the resources caused by the lack of enough farming skills, the lack of appropriate technology, and the shortage of water. Other constraints were insecure land rights (eviction), densification, distance, availability of information and access procedures.

Unorganized farming, encroachment of public spaces and loss of farming land are some common issues in the study areas. Farmers access land mostly through informal arrangements. The existing institutional procedures for accessing land in the city are somewhat bureaucratic, time consuming and complex. They intimidate urban farmers, who generally lack the knowledge, information and contacts to make an application for acquiring land.

Based on the study findings, the following recommendations are made to ensure the expansion of the production of vegetables and improvement of accessibility of land for UA in Dar es Salaam:

1. *Facilitate the use of modern technology.* While providing farmers with more and secure land is most important, there is also a need to empower them to utilize the small land they have at full capacity. Technologies should be devised for poor households to make more efficient use of the spaces they use for UA activities.
2. *Strengthen the implementation of land use plans and policies.* Local government institutions have to be strengthened to monitor the practice and viability of UA.
3. *Set aside special areas for farming activities within the city.* To make farming activities sustainable the relevant, municipal authorities have to make deliberate efforts in improving access to land by legally allocating specific areas for farming activities in the municipality, improving urban extension services, and reducing the price of agricultural inputs.

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