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Access of urban farmers to land, water and inputs for urban agriculture in Dodoma municipality, Tanzania

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This paper examines the access of urban farmers to land, water and inputs for urban agriculture (UA) towards household food security, employment creation and income generation in Dodoma municipality. A cross-sectional survey was employed involving 300 urban farmers from both squatter and non-squatter settlements. Structured questionnaires, focus group discussions, key informants, observations and documentary review were used to collect data relevant for the study. Based on the analysis of this study, urban farmers are constrained by land tenure insecurity, erratic water access and inadequate inputs for optimizing plot productivity and ambivalent application of urban legislative frameworks. The study found that no support has been given to urban farmers to enable them to have access to land, water and inputs in order to practice UA. The apparent lack of political will necessary to promote access to land, water and inputs for UA is reflected in weak or absent policy frameworks, resulting in an enormous capacity deficit. Policy makers and planners need information for planning and managing access of urban farmers to land, water and inputs for UA.

Key words: Urban agriculture, urban farmers, access, land, water, inputs.

INTRODUCTION

Mougeot (2006) defines Urban Agriculture (UA) as the production of food and non-food plant, tree crops and animal husbandry both within (intra) and fringing (peri) built urban areas for households' consumption as well as for sale to the rapidly growing urban population. It is a dynamic concept that comprises a variety of livelihood systems ranging from subsistence production and processing at household level to fully commercialized agriculture. It takes place in different locations and occurs under varying socio-political conditions and policy regimes. This diversity of UA is one of its main attributes, as it can be adapted to a wide range of urban situations and to the needs of a diverse range of stakeholders. According to Oludare and Ademiluyi (2009), UA in varying forms and types is currently a common activity in most urban areas globally as it is found both in the developing

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and developed countries. UA is increasingly considered as a means to poverty alleviation in order to improve food security, to provide employment, food and income to urban dwellers (Foeken, 2013). UA is in reality and in many cases a response to crisis and a coping strategy of the urban poor (Jacobi et al., 2000).

UA in Tanzania is practiced in a generally favourable political and legal context. During the 1970s and 1980s, the national government, faced with a poor economy, issued policies encouraging people to undertake UA. Policies behind this included *Siasa in Kilimo* (Politics is Agriculture) in 1972 and *Kilimo cha Umwagiliaji* (Irrigated Agriculture) in 1974, *Kilimo cha Kufa na Kupona* (Agriculture for Life and Death) campaign launched by the national government in 1974-75, with the aim of increasing food supplies by promoting agri-cultural production in both urban and rural areas and *Mvua za Kwanza ni Zakupandia* (First Rains are for Planting) in 1974/75 (Mlozi, 2001; Foeken et al., 2004; Mlozi et al., 2004). Others were the National Economic Survival Programme (NESP) of 1981/82, the National Food Strategy in 1982, the 1983 National Livestock Policy (NLP), the National Agricultural Policy (NAP) in 1983, and the National Economic Recovery Programme (ERP) of 1986-1990, Agriculture and Livestock Policy of 1997, National Human Settlements Development Policy of 2000, The Land Use Planning Act, 2007, and The Urban Planning Act of 2007, Urban Farming Regulations of 1992 Tanzania Development Vision (2025), National Strategy for Growth and Poverty Reduction of 2005/2010, Kilimo Kwanza strategy (Agriculture First) of 2008, Town and Country Planning Act of 1956 revised in 1961 (Cap 378) and many other legislative frameworks (Namwata, 2013; Mlozi, 2003; Foeken et al., 2004; Mlozi et al., 2004; Magigi, 2008). Although the importance of UA in urban economies is increasingly gaining recognition from local and international agencies, urban land use planning and development policies at the local level have failed to tap adequately into UA as a viable strategy to poverty reduction among urban dwellers. Surprisingly, local governments planning processes have looked upon UA as incompatible with urban development and as a relict from rural-urban migration that dwindles as cities and urban economies grow. UA has not been given any planning attention, other than restricting it as much as possible or permitting it only as a temporal use of the sites concerned until urban functions took over its use (Namwata, 2013; Arku, 2009; Castillo, 2003; Obuobie et al., 2003). In order to promote UA in urban areas and Dodoma municipality in that particular, efforts are needed in order to plan for land, water, inputs and other services to support UA as a profitable and sustainable undertaking (Namwata, 2013). However, lack of information on land, water, inputs and other services for UA is a common omission by many Local Government Authorities (LGAs) in Tanzania. This information will help motivate LGAs to make the right decisions on accessing land, water and inputs to urban farmers for UA in Dodoma municipality.

THE STUDY AREA AND METHODOLOGY

Dodoma municipality is traced back to 1973 when it was declared the National Capital under Presidential Decree No. 320 of 1973. Since then, series of successful events have followed. In 1980 Dodoma municipality was established. In 1995 the Government shifted Parliamentary activities to Dodoma and has recently been declared by the Government to be a Centre of Education (DMC, 2011). Dodoma municipality covers an area of 2,769 square kilometers of which 625 square kilometers are urbanized. Based on the 2012 National Population and Housing Census, the population of Dodoma municipality was 410,956 people of whom 199,487 are males and 211,469 are females. The estimated total number of households is 107,000 with an average household size of 4.4 people (URT, 2013).

Dodoma municipality is administratively divided into one parliamentary constituency, 4 divisions, 37 wards, 100 *mitaa*[1], 39 villages, and 222 hamlets (*vitongoji*[2]). The four divisions are Dodoma urban (22 wards), Hombolo (6 wards), Kikombo (3 wards) and Zuzu (6 wards). Dodoma municipality is situated in an economically depressed area. On average, Dodoma receives 570 mm of rainfall per annum with temperatures ranging from 16 to 36^{O}C with mean temperatures of 29^{O}C (DMC, 2011). Although it has rich agricultural land, it is affected by harsh semi-arid climatic conditions. In the urban areas the main activities of the residents are commerce, urban farming and civil service employment while in the rural areas; farming and livestock keeping are the prime means of existence (DMC, 2011).

A cross-sectional approach was adopted in this study. According to Bailey (1994), the design allowed data to be collected at a single point in time to capture important aspects of this study. The sample size for this study was calculated using the formula for large samples as modified from Poate and Daplyn (1993):

$$n = \frac{Z^2 C^2}{X^2}$$

Where n is the minimum sample size required; Z is 1.96, the value of Z at the 95 percent confidence interval; C is the variation within the population of urban farmers, which has been assumed to be 50 percent since no previous studies were found; and X is the expected level of accuracy, which has been estimated at 5 percent. The sample size was calculated as:

$$\frac{(1.96)^2 (50)^2}{(5)^2} = 384.16 \approx 384$$

The estimated size of the sample as per the formula is 384 respondents. However, it was decided on a representative sample of 300 respondents based on the limited available resources (financial, human and time) as shown in Table 1. A four multi-stage sampling process was used to select a representative sample for the study. Stage one, a list of four (4) divisions in the municipality was proposed as a sampling frame for this study.

[1] *Mtaa* (*Mitaa* in plural) is a Swahili word which is used to describe the lowest level of administration in any urban setting of the Local Government Authority.

[2] *Kitongoji* (*vitongoji* in plural) is a Swahili word which is used to describe the lowest level of administration in any rural setting of the Local Government Authority.

Quantitative data were collected using structured questionnaires.

In stage two, a list of twenty two (22) wards in Dodoma urban division was obtained and eight (8) wards with significant UA activities were purposively selected. In stage three, a list of thirty seven (37) *mitaa* in the selected wards was obtained and fifteen (15) *mitaa* as shown in Figure 1 with significant UA activities were purposely selected. In stage four, primary data were collected from twelve (12) respondents (urban farmers) from each *mtaa* using convenience and/or snowball sampling methods (Figure 2).

In qualitative approach, different types of respondents were purposively selected to participate in in-depth interviews and Focus Group Discussions (FGDs). Key informants for in-depth interviews were drawn from the municipality, CDA and other actors who have a stake in UA activities. The key informants were 17 ward executive officers, 25 *mitaa* executive officers, 2 planning officers, 2 extension officers and 2 land officers from the municipality. Other key informants were 2 land officers from the municipality and 2 officers from Dodoma Urban Water Supply and Sewerage Authority (DUWASA). On the other hand, a total of 8 FGDs were conducted in the study area whereby 96 respondents who were adult community members participated. Data were analyzed using both quantitative and qualitative techniques. Qualitative data were analyzed through content analysis. Qualitative data were translated and categorized into various themes and sub-themes based on the objectives of the study. Subsequently, quantitative data from the questionnaires were coded, summarized and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to obtain frequency counts of various coded responses and to compare means of quantitative responses of variables. Descriptive statistics were used for comparison purposes on variables of interest for explaining the phenomena. Chi-square test was employed to assess associations between variables on various attributes related to UA. Data were analysed by category of settlements (squatter and non-squatter) and comparison of variables was made by settlement.

RESULTS AND DISCUSSION

Accessibility of urban farmers to land for UA activities

Accessibility of urban farmers to land for UA in the context of this paper refers to ownership of land for UA among farmers. Accessibility relates to the opportunity for the actual utilization of available land by needy households or groups, taking into account administrative procedures and conflicts that may arise. The accessibility means the availability of land as well as the power to use it. In many cases, the ownership and tenure patterns of land are not known because of lack of records or frequent change of hands; further, land may also be far from where farmers live and public transportation and roads could be inadequate or not available so available land may be too costly for farmers to rent (Namwata, 2013; Flynn-Dapaah, 2002). Table 2 shows distribution of urban farmers by ownership of land for UA.

Overall results show that 55.7% indicated that they owned land plots on which they carried out UA activities with an average size up to 2 acres (44%). All variables on accessibility to land for UA activities among urban farmers between the squatter and non-squatter areas were found to be statistically not significant at $p>0.05$ with exception of the problems they encountered in accessing land. Also, overall results in Table 2 show that urban farmers carried out their UA activities on residential plots (34.3%), rented plots (23.1%) and governmental plots (21.3%). Obuobie et al. (2003) suggested that there are two main ways by which farmers can gain access to land for farming in both urban and peri-urban areas of Accra. These are the formal and informal access. Though Accra has a formal land delivery system, in the urban areas, this is more or less closed to agricultural uses. In the peri-urban areas where it is expected to be open to agricultural uses, the procedure is complex, inordinately long, not appropriately efficient or cost effective (Flynn-Dapaah, 2002). The findings of this study are confirmed by Mubvami and Mushamba (2008), Al Hudhud (2007) and Kyessi (2001) who deduced that land may be available but not accessible because of social or political reasons. Likewise, Al Hudhud (2007) added that the usability of available and accessible land is determined by factors such as topography, size of plot, soil texture and quality, availability of water and security of tenure. Land tenure determines who can use what land and how. Land tenure determines the level of investment that urban farmers themselves put into UA activities. The financial institutions are often not willing to give credit services to urban farmers as they lack legal rights to land and are therefore unable to use it as collateral. In this respect, as can be deduced from the observation by Kyessi (2001) that the problem of land tenure is the major challenge for UA as a viable long-term source of food and income in urban and peri-urban areas in Tanzania.

Problems in accessing land for UA activities

On the other hand, urban farmers encountered a number of problems in accessing land for UA activities (Table 3). These included unsuitable land (24.3%), shortage of land (21.3%), lack of money to buy land (18.8%) and high prices of buying land (16.8%). Likewise, overall results show that 59.7% needed an extra land for UA activities. The majority of urban farmers indicated that they are actively searching for land, and mention to have plans to borrow from government or relatives, or seek funds to buy. According to Smit et al. (2001), in cities around the world, a vast amount of land is farmed that is neither officially allocated for that purpose nor reported. Informal or illegal land transactions include usufruct agreements between landowners and farmers. However, private landowners often will not lease their land for farming because of the lack of adequate laws governing tenancy and lease arrangements. Public landowners may also hesitate to make land available for farming.

Level of security on land for UA activities

Findings from focus group discussion revealed that one

Table 1. Sampling procedure of respondents (urban farmers).

Sampling procedure	No
All divisions in the municipality (Dodoma urban, Hombolo, Kikombo and Zuzu)	4
Purposively selected Dodoma urban division since it has significant UA activities	1
All wards in Dodoma urban	22
Purposely selected wards with significant UA activities in Dodoma urban division with both squatter and non-squatter settlements	8
All *mitaa* in the selected eight (8) wards	37
Purposively selected *mitaa* with UA activities in the selected wards	15
Convenience and/or snowball sampling methods were employed to select respondents involved in UA activities from 15 *mitaa*	12
Total	300

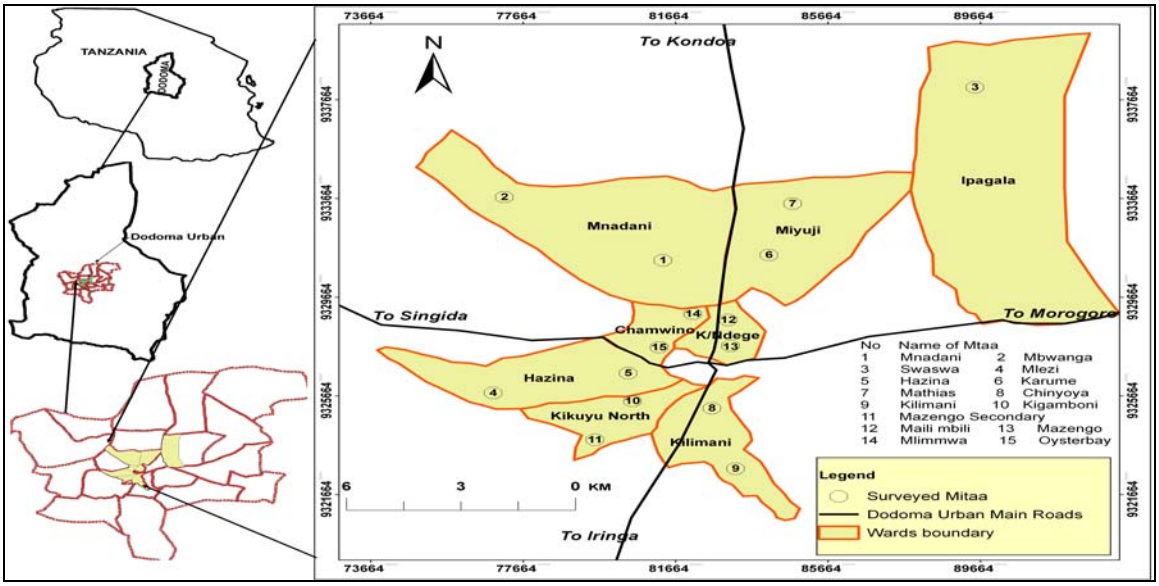

Figure 1. Map of surveyed *mitaa* in Dodoma municipality.

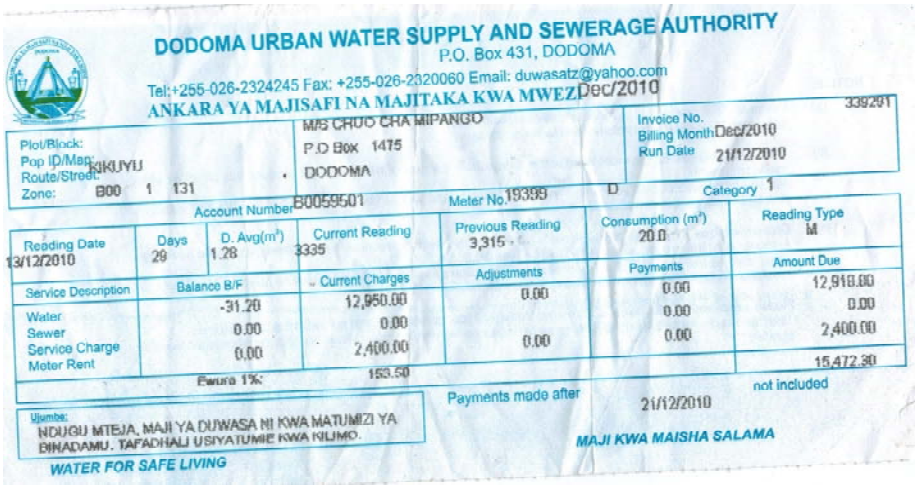

Figure 2. Water Bill with words that strictly prohibit the use of tap water for UA

Table 2. Ownership of Land for UA Activities (N=300).

Variable	Area of residence				All (n = 300)	Chi-square value
	Squatter (n = 119)		Non-squatter (n=181)			
	N	%	N	%	N (%)	
Do you own land for UA activities						
Yes	68	57.1	99	54.7	167 (55.7)	0.17^{ns}
No	51	42.9	82	45.3	133 (44.3)	
Average size of land owned by household						
Up to 2 acres	37	43.0	55	45.5	92 (44.4)	2.47^{ns}
2.1-4 acres	23	26.7	27	22.3	50 (24.2)	
4.1-8 acres	11	12.8	11	9.1	22 (10.6)	
Above 8 acres	10	11.6	17	14.0	27 (13.0)	
I don't know	5	5.8	11	9.1	16 (5.3)	
If not owned, typology of land for UA						
Rented	17	27.4	22	20.6	39 (23.1)	7.13^{ns}
Government plot	16	25.8	20	18.7	36 (21.3)	
Open space	8	12.9	8	7.5	16 (9.5)	
Residential	15	24.2	43	40.2	58 (34.3)	
Commercial and industrial	-	-	1	0.9	1 (0.6)	
Along road and streets	-	-	1	0.9	1 (0.6)	
Surveyed/unsurveyed plots	6	9.7	12	11.2	18 (10.7)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05).

Table 3. Problems in accessing land for UA activities (N=300).

Variable	Area of residence				All (n = 300)	Chi-square value
	Squatter (n = 119)		Non-squatter (n=181)			
	N	%	N	%	N (%)	
Need for more access to land for UA						
Yes	74	62.2	105	58.0	179 (59.7)	0.52^{ns}
No	45	37.8	76	42.0	121 (40.3)	
Problems in accessing land for UA						
High prices of land	22	27.8	12	9.8	34 (16.8)	
Lack of money to buy land	12	15.2	26	21.1	38 (18.8)	
Lack of information to access land	7	8.9	16	13.0	23 (11.4)	
Absence of friends	-	-	2	1.6	2 (1.0)	
Shortage of land	13	16.5	30	24.4	43 (21.3)	17.59*
Uncertainty of land status	3	3.8	3	2.4	6 (3.0)	
Land grabbing	-	-	2	1.6	2 (1.0)	
Unsuitable land for UA	21	26.6	28	22.8	49 (24.3)	
Conflicts with other urban uses	-	-	3	2.4	3 (1.5)	
Urban pressure on land markets	1	1.3	1	0.8	2 (1.0)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05).

of the greatest constraints to UA development and growth is the limited access to land and the lack of secure of tenure on that land, particularly where UAs are competing with other uses that provide greater profit for the landowner (Table 4).

Observations of this study indicate that many UA

Table 4. Land security for UA activities (N=300).

Variable	Area of residence				All (n = 300)	Chi-square value
	Squatter (n = 119)		Non-Squatter (n=181)			
	N	%	N	%	N (%)	
Level of security on land for UA						
High security	11	12.9	23	17.3	34 (15.6)	
Medium security	31	36.5	54	40.6	85 (39.0)	4.61^{ns}
Low security	25	29.4	23	17.3	48 (22.0)	
Insecure	18	21.2	33	24.8	51 (23.4)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05).

activities were undertaken on open spaces, unsurveyed plots and underdeveloped surveyed plots without the direct permission or agreement of land owner. Generally, urban farmers had either no or informal arrangements with owners of the land they use for UA activities. The insecure land-use title and unclear timeframe in which the land can be used makes UA undertaking highly insecure. According to Smit et al. (2001), both landholders and farmers need secure access to and exploitation of a property. Since agricultural use does not have to be permanent, landowners' fears can be assuaged with the right contractual arrangements. The validity and enforce-ability of permits, leases, and contracts determines whether such arrangements will be practice-able. Where no arrangements exist, the informality, illegality, and thus the precariousness of the activity (eviction is always a possibility) are not conducive to efficient farming. With low tenure security and questionable legality, the farmer is not motivated either to follow efficient farming practices or to be concerned about the long-term condition of the land, the need to regenerate the soil, or the impact of the farming activity on the environment. Such farmers are also considered high-risk borrowers by credit agencies.

Furthermore, even urban farmers who own their land may face problems from zoning laws that prevent them from farming. In Kampala, middle- and low-income urban farmers identify access to land, harassment, and eviction as important problems. Farmers may or may not be given any notice to quit the land to make room for other development. The benefit to landowners is that continuous cultivation keeps the land clean of weeds and prevents encroachment as well as urban sprawl as the cultivators provide the on-site enforcement against unofficial settlement (Obuobie et al., 2003; Obuobie, 2003; Flynn-Dapaah, 2002). This is mostly practiced by open-space farmers in the low-density areas of the city. These farmers are either engaged in seasonal farming (growing crops such as maize, tomatoes, pepper, okra, groundnut etc), relying entirely on rainfall or are engaged in irrigated vegetable farming (growing crops such as lettuce, cabbage, cucumber, spring onion, cauliflower, green pepper) when there is a water source nearby (Obuobie, 2003; Flynn-Dapaah, 2002). There exists another similar informal arrangement, only in this case an individual or a private organization owns the land. Access to land is either through direct negotiation involving the prospective farmer and the landowner or caretaker, or through the mediation of a third party. This arrangement is used both by urban and peri-urban farmers. Household farmers are normally tenants of the houses and cultivate the land around it and therefore do not pay for such cultivation. Some open space farmers pay a token depending on the individual landowner. But more often than not individual landowners, like government agencies, view farming on their land as a way of preventing encroachment (Obuobie et al., 2003).

Accessing water for UA activities

Water is very important for UA activities. Overall results in Table 5 show that 54.5% indicated to have not received reliable water supply for UA. The differences on reliability of water supply to urban farmers in both squatter and non-squatter residential areas were found to be statistically significant at $p<0.05$. The results of this study are confirmed by Obuobie et al. (2003) who suggested that availability and access to low-cost water for farming in the urban and peri-urban areas of Accra is another key factor affecting farmers. Water access allows vegetable production in and for the lean season and is crucial for profit generation. Household farmers use mainly pipe borne water and *grey water* (water from bathrooms and kitchens); open-space farmers use drain water, streams/ rivers, pipe borne water and hand-dug wells, in decreasing order; peri-urban farmers rely mainly on rainfall and streams/rivers. There are no formal procedures that farmers follow to get water for farming. Pipe-borne water is perceived to have the best quality, but is expensive and therefore unaffordable to many.

For those who have a reliable access to water for UA, most of them (68.1%) indicated to have used tap water

Table 5. Access to water for UA activities (N=300).

Variable	Area of Residence				All (n = 300)	Chi-square Value
	Squatter (n = 119)		Non-Squatter (n=181)			
	N	%	N	%	N (%)	
Do you have a reliable source of water?						
Yes	33	32.4	84	54.2	117 (45.5)	11.83*
No	69	67.6	71	45.8	140 (54.5)	
Main sources of water for UA						
Tap water	63	66.3	110	69.2	173 (68.1)	
Stream/furrow	16	16.8	22	13.8	38 (15.0)	
Wastewater/stabilization ponds	15	15.8	18	11.3	33 (13.0)	5.55^{ns}
Deep and/or shallow wells	1	1.1	9	5.7	10 (3.9)	
Both deep & shallow wells and stream/furrow	16	16.8	22	13.8	38 (15.0)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05).

for UA activities. Generally, it is strictly prohibited by DUWASA that tap water supply is for human consumption and not for UA activities (in *Kiswahili: maji ya DUWASA ni kwa matumizi ya binadamu. Tafadhali usiyatumie kwa kilimo*) as shown in Figure 2. For household farmers, the houses in which they live are usually connected to the water supply system. Though pipe-borne water supply is meant for drinking, cooking and other domestic or industrial uses, household farmers may extend it to watering of perishable crops and pay for it. However, due to the difficulty in meeting the increasing domestic and industrial demand, DUWASA, has cautioned the public to put a stop to the use of treated water for irrigation purposes.

An official from DUWASA stated that: “Water is not enough for all household and non-household activities, as the DUWASA water-supply system can hardly keep up with the requirements of the increasing population of urban dwellers. Access to a reliable tap water is very problematic as some areas do not have a tap water supply system particularly in squatter areas. So development and growth of UA will depend on a reliable water source and is likely to be limited”. Observation revealed that some UA farmers used water from streams or furrows, deep or shallow wells and rainfall for undertaking UA. Some urban farmers were found using raw wastewater with little consideration for health consequences (Figure 3). Differences between the two settlements in terms of the various sources of water for UA activities were found to be to be statistically not significant at p> 0.05. These findings confirm the work of Drechsel *et al*. (2002) who suggested that open-space farmers frequently irrigate their crops with polluted surface water. They locate their farms along major drains and streams to access water for irrigation. Each farmer controls, more or less, the portion of the drain or stream that is within the span of his farm and regularly maintains water drawing points within the drain or stream for fetching water effectively with watering cans. In the wet season when there is enough water in streams/rivers or drains, every farmer is free to fetch water from any point along the drain or stream but there are restrictions in the dry season, which sometimes lead to conflicts. Stream/ river and major drains have continuous flow and farmers pay no fee for using the water.

During focus group discussion with farmers, it was observed that water is very essential for crop productivity as most of them were involved in crop cultivation than livestock keeping. Most crops have differing critical growth periods, and if water stress occurs during critical stages of growth, yield is directly affected. Some crops are not drought resistant like crops and some drought resistant like maize, sunflower and vegetables. Which are not commonly grown in the urban setting of the municipality. When moisture requirements are not met during this critical phase permanent, irreparable damage usually is the result. The crop quality is diminished, or ultimately the crop yield is reduced and hence farmers are affected by and large. As such, urban farmers are compelled to use any available water at their disposal for irrigating their crops.

Accessing inputs for UA activities

Foeken et al. (2004) reported three categories of capital inputs that can be used for UA activities in Tanzania. The first category consists of cultivation inputs directly related to the growing process. Some are chemical, such as artificial fertilizers and pesticides, and some non-chemical

Table 5. Access to water for UA activities (N=300).

Variable	Area of Residence				All (n = 300)	Chi-square Value
	Squatter (n = 119)		Non-Squatter (n=181)			
	N	%	N	%	N (%)	
Do you have a reliable source of water?						
Yes	33	32.4	84	54.2	117 (45.5)	11.83*
No	69	67.6	71	45.8	140 (54.5)	
Main sources of water for UA						
Tap water	63	66.3	110	69.2	173 (68.1)	
Stream/furrow	16	16.8	22	13.8	38 (15.0)	
Wastewater/stabilization ponds	15	15.8	18	11.3	33 (13.0)	5.55^{ns}
Deep and/or shallow wells	1	1.1	9	5.7	10 (3.9)	
Both deep & shallow wells and stream/furrow	16	16.8	22	13.8	38 (15.0)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05).

Figure 3. Swaswa wastewater stabilization pond in Ipagala Ward in 2013.

(traditional), mainly organic (and more environmentally friendly) inputs like manure and crop residues. The second category consists of equipment including hand tools for farm work such as hoes and machetes, and a higher-level technology that includes motorized implements. The third category is money drawn from family resources or other formal or informal institutions. In the context of this study, the first category of cultivation inputs directly related to the growing process was considered as shown in Table 6. Some were chemical, such as artificial fertilizers and pesticides, and some non-chemical (traditional), mainly organic inputs like manure and crop residues. Overall results in Table 6 indicate that 59% did not use inputs for UA and for those who use it they mostly use farm yard manure (55.2%). The differences of respondents' use of various types of inputs between squatter and non-squatter settlements were found to be statistically significant at p< 0.05. It was learnt that majority of urban farmers indicated to apply farmyard manure (FYM) because it is cheap to use, increases crop yields for a long time once applied, FYM fertilizes the soil for a longer time and is environmentally friendliness and retaining moisture for longer time in soil. Even those who were using other types of inputs apart from farmyard manure were sourced within the urban limits of the municipality. According to Smit et al. (2001), lack of

Table 61. Access to inputs for UA activities (N=300).

Variable	Area of Residence				All (n = 300)	Chi-square Value
	Squatter (n = 119)		Non-Squatter (n=181)			
	N	%	N	%	N (%)	
Do you use inputs in UA activities						
Yes	44	37.0	79	43.6	123 (41.0)	1.32^{ns}
No	75	63.0	102	56.4	177 (59.0)	
Type of inputs used						
Chemical fertilizer	16	33.3	15	17.4	31 (23.1)	15.79*
Farmyard manure (FYM)	26	54.2	48	55.8	74 (55.2)	
Crop residue	3	6.3	-	-	3 (2.2)	
Chemical insecticides	1	2.1	14	16.3	15 (11.2)	
Chemical pesticide	2	4.2	9	10.5	11 (8.2)	
Costs of inputs used in UA (Tshs)						
Less than 20,000	14	40.0	47	61.8	61 (55.0)	1.32^{ns}
21,000-30,000	8	22.9	13	17.1	21 (18.9)	
31,000-40,000	10	28.6	10	13.2	20 (18.0)	
41,000-50,000	-	-	3	3.9	3 (2.7)	
Above 50,000	3	8.6	3	3.9	6 (5.4)	
Aware of the places for getting inputs for UA						
Yes	16	13.4	38	21.0	54 (18.0)	2.77^{ns}
No	103	86.6	143	79.0	246 (82.0)	

ns = Non significant (P>0.05), * = Significant at (P< 0.05)

access to farming inputs such as seeds, fertilizer, pesticides, equipment, chicks and heifers, feed, and medicine — is another major constraint facing urban farmers. These inputs are not readily available in cities because the markets and sales channels are either not developed and organized or are oriented toward rural farmers. Moreover, the limited supplies are of uncertain quality. For example, the available seeds may not produce high yields. For many poor farmers, the only source of seeds is spoiled produce in the marketplace. Moreover, equipment and tools are usually designed for rural agriculture and are seldom well suited to urban needs, smaller fields, and more intensive production. There is a vast untapped global market for agricultural supplies and equipment appropriate to urban farming. Italy and Japan produce special equipment for small-scale and urban farmers, but they are the exception rather than the rule.

CONCLUSION AND RECOMMENDATIONS

Evidence from this paper indicates that urban farmers are constrained by land tenure insecurity, erratic water access and inadequate inputs for optimizing UA productivity and profitability. There is need for urban planners, policy makers and other stakeholders to integrate UA into their urban system design and planning so as to address problems for accessing land, water and inputs for UA. The starting point for this should be policy and planning recognition that UA is central to the livelihoods of many urban dwellers and urban farming households. Once this policy recognition is institutionalized, the next step should be improving access of urban farmers to supportive infrastructures and services. On accessing land for UA, the municipality in collaboration with relevant authorities such as CDA and the Ministry in charge of land should survey and temporarily allocate the open spaces and any other public land for UA. On the other hand, the municipality in collaboration with CDA should enforce effectively the Master plan for Dodoma National Capital City that recognizes UA as one of the urban land use. On accessing water for UA, the municipality in collaboration with DUWASA and development partners should initiate innovations that will promote water use efficiency for UA. On the other hand, they should promote systems for rainwater collection and storage, construction of wells and the establishment of localized water efficient irrigation systems (e.g. drip irrigation) in UA to stimulate production and to reduce the demand for potable water. The municipality of Dodoma in collaboration with

development partners facilitates adequate supply of inputs such as quality seeds, natural fertilizers and bio-pesticides in small quantities to a well established network of urban farmers.

Conflict of Interests

The author have not declared any conflict of interests.

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