

**MANAGING URBAN AGRICULTURE
IN DAR ES SALAAM**

**Strategic Urban Development Plan for Dar es Salaam City
June 1998**

by

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in

**Collaboration with SDP
Urban Agriculture Working Group**

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EXECUTIVE SUMMARY

In Dar es Salaam, Tanzania, the government, city authorities, NGOs, members of civil society and the donor community acknowledge the importance of urban agriculture which is one of the crucial factors of sustainable livelihood strategies of urban poor. In Dar es Salaam, definition of urban agriculture refers to carrying out farming activities in open space and keeping livestock in built-up and peri-urban areas.

The Sustainable Dar es Salaam Project (SDP) in Tanzania was launched in 1992. The programme aimed at two major objectives, 1) strengthening the capacity of planning, coordinating and managing environmental and development activities of the city in partnership with the public, private and popular sector and 2) preparing a long-term integrated urban development plan. With these two major objectives in mind, a workshop on urban agriculture took place in Dar es Salaam in November, 1993. This paper describes the various major issues outlined in the workshop and recommendations and plan of actions proposed by the workshop participants.

Few major recommendations from the workshop are listed below:

- * Intensive urban agriculture should be promoted and health and nutrition, gender, education and training on solid waste and wastewater management and aspects of poverty alleviation should be integrated into the process;
- * Special zones should be provided within the urban environment for promotion of urban agriculture and by-laws and regulations of urban agriculture should be clearly written and explained to the urban farmers to promote urban agriculture; and
- * Qualitative research on the extent, scale, nutritional, economic and environmental impacts of urban agriculture should be initiated.

In order to scope out sustainable urban agriculture in Dar es Salaam, adequate research from the government on market analysis of urban agriculture products and availability of credit for development of urban agriculture and policy guidelines on appropriate use of large open spaces in low-density residential areas for urban agriculture were identified as crucial. Conflicts between the related Ministries for promotion of urban agriculture, little attention to allocate or retain land for urban agriculture, apparent neglect of small urban livestock keepers and crop growers and conflicts between water user groups are the obstacles towards the growth of urban agriculture.

A Mixed Land Strategy was proposed for SDP in the workshop which allows both crop growing and livestock keeping in the built-up and in peri-urban areas of Dar es Salaam city. To promote urban agriculture through a mixed land use strategy, especially supplying crop input, training and technology to the urban farmers and other dwellers to rehabilitate already existing horticulture gardens. It was suggested that in order to conduct large-scale urban agriculture, utilization of coastal resources especially wetlands, mangroves, estuaries and lagoons can be combined with aquaculture production. Increase of zero-grazing livestock production was suggested to promote in hospitals, schools and church grounds which have large open spaces and farms. Non-permanent crops, floriculture and practice of tree plantation for flood plain urban agriculture was also recommended for large scale urban agriculture production.

MANAGING URBAN AGRICULTURE FOR DAR ES SALAAM: STRATEGIC URBAN DEVELOPMENT PLAN FOR DAR ES SALAAM CITY

1.0 INTRODUCTION

This paper proposes strategies for urban development plan for Dar es Salaam in Tanzania. It includes ideas from a mini-workshop on urban agriculture took place in November 1993 in Dar es Salaam. The workshop specifically addressed three issues: urban agriculture, building materials and hazards lands of towns resulting in land degradation and water pollution. It is argued that "within the next decade, more than half of the world's population, estimated to be 3.3 billion, will be living in urban areas (World Resources, 1996-97). The urban population is growing annually at the rate of four percent. The major concerns of rapid urbanization are the followings:

- i.. Inaccessibility of clean drinking water;
- ii. Inadequate food supplies;
- iii. Air pollution;
- iv. Lack of housing;
- v. Soil and water pollution; and
- vi. Increasing production of solid and liquid wastes.

Another critical problem associated with rapid urbanization in the developing countries is poverty. It is estimated that by the year 2000, about half of the world's absolute poor will be living in urban areas. This raises crucial questions on these topics::

1. Household food security.
2. Employment and education.
3. Health and medical support.
4. Low cost provisions of urban infrastructure improvements.

Evidence from recent world-wide research on urban agriculture shows that urban agriculture creates positive impact on food security, improvement of environment, economic development and urban planning. Dar es Salaam City has an estimated population of almost 3.0 million with a growth rate of nearly eight percent per annum (Table 1-1). It is one of the fastest growing cities in sub-Saharan Africa.

Table 1-1: Dar es Salaam Population Changes over Time

Year	Population	Urban agriculture growth rate (%)
1967*	272,515	7.0
1978*	843,090	10.8
1988*	1,360,850	4.8
1992p	2,300,000	7.2
2000p	3,500,000	7.2

Source: Baruti, et al., 1992; Nyakarungu, M. (1996).

* = Census; p = projection based on 1978 -1988 growth rates.

Although it is expected that the fast growth of the city should provide numerous economic opportunities to the urban population and stimulate economic and social development, previous research showed that social, economic and environmental conditions have deteriorated over the past twenty years.

Rapid urbanization during the last three decades has raised demand on supply and up-keep of basic shelter, community services and overall urban infrastructure in Tanzania. In order to address some of these problems, the Sustainable Dar es Salaam Project (SDP) within the global framework of Environmental Planning Management (EPM) is assisting in the creation of management capacity within the city government to enable stakeholders to formulate plans and policies aimed at sustainable development of the city.

1.1 Sustainable Dar es Salaam Project

The Sustainable Dar es Salaam Project (SDP) was launched in 1992. The overall objective is to strengthen the City Council's capacity in planning, managing of growth and development of the city in partnership with the public, private and popular sector. The Project would achieve sustainable development of the city region through:

- i. Strengthening the local capacity of the partners to plan, coordinate, and manage environmental and development activities; and
- ii. Preparing a long-term integrated urban development plan.

The project aims at achieving this by adopting a four stage approach: (1) Preparation of a city environmental profile; (2) Holding a city consultation on environmental issues; (3) Establishing institutional framework (working groups) to prepare preliminary development strategies and detailed action plans; and (4) Preparation of a SDP for Dar es Salaam.

During the consultation on urban environmental issues in 1992, nine areas were recommended for further research which are the followings:

1. Management of solid waste.
2. Upgrade urban settlements.
3. Improved services for city expansion.
4. Management of surface water and liquid waste.
5. Management of air quality and urban transportation.
6. Management of recreational resources, open spaces, hazard lands, green belts.
7. Managing urban economy and petty trading.
8. Management of coastal area resources.
9. Management of urban agricultural potential.

1.2 1997 Consultation On Urban Agriculture Management

This consultation took place in June 1997 in preparation of the Strategic Urban Development Plan (SUDP) for Dar es Salaam. It was recognized that urban agriculture proved to be an important input in the urban economy for employment generation and food production. It can be used to create a green belt for the city which enables the city to respond to its future demand for recreation areas.

Today, literature on urban agriculture shows that:

"since mid-1980s, there has been a marked growth of urban farming, particularly in newly independent countries, but generally in world's wealthiest and poorest nations. Youth groups are taking urban agriculture as enterprise. At the end of 20th century, a 100 year trend is being reversed that separated farming and human settlements...There has been a shift toward more accommodating official attitudes and policies in a number of countries - e.g. China, Cuba, Uganda, Peru" (SGUA, March 18-19, 1996).

Some analysts in main stream economics, perceive the dynamics and potential of urban agriculture's survival strategies differently for the urban poor. It is argued that: "there is little justification for a re-introduction of sectoral policies to support urban and /or peri-urban agriculture"... and that "much of the present very active promotion of urban agriculture as a response to urban poverty and food insecurity is probably misguided" (Sumberg, 1996). (ibid).

Such view points notwithstanding, our concern is not centred on what should be happening as a response to urban poverty because there is a standard way of responding. It is useful to emphasize that regarding urban agriculture, it is now commonly perceived that "city and regional policy can either regulate or promote urban agriculture. Doing nothing or stamping it out is not viable, while benign regulation can reap tremendous benefits" (SGUA, March, 1996:5).

1.3 Importance of Urban Agriculture for SUDP

For the Strategic Urban Development Plan (SUDP) for Dar es Salaam, urban agriculture is an important issue for its land consuming character and potential conflicts with service delivery network in relation to city expansion. It is therefore important to prove the need for urban agriculture taking place in open spaces in built-up areas and peri-urban agriculture, and identify areas where urban and peri-urban agriculture should be avoided. Urban agriculture is seen as a mechanism to alleviate population pressure on urban areas, promote sustainable practices, and to foster local, community-based participation in development (SGUA, March 18-19, 1996).

2.0 URBAN AGRICULTURE IN DAR ES SALAAM

There is not yet a common definition to include all the essential aspects of urban and peri-urban agriculture. Urban agriculture also referred to at times as intensive metropolitan agriculture, can be defined:

"as an industry that produces and markets food and fuel, largely in response to the daily demand of consumers within a town or city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and re-using natural resources and urban wastes, to yield a diversity of crops and livestock" (Smit, et al.; 1996:3).

In Dar es Salaam, according to the urban agriculture working group within SDP, urban agriculture refers to the carrying out of farming activities in the built-up areas where open space is available, as well as keeping livestock (dairy cattle, goats, sheep, pigs and fowl) in the built-up and peri-urban areas.

In Tanzania, urban agriculture is now recognized by municipal authorities¹ because of its importance to food security, (Sawio, 1993; Smit et al.; 1996; Mvena et. al.; 1991). Although according to the proposed New National Land Policy (MLHUD, 1995, Section 6.7.0, p. 30), urban agriculture is considered not to be a principal function of towns. It is recognized that:

"when properly organized, urban agriculture has the potential to provide employment, income, and is a supplementary source of food. In their present form agricultural activities often conflict with the proper planning of urban land uses. In some cases, agricultural activities are conducted in fragile environments or hazardous areas of towns resulting in land degradation and water pollution. In other cases agricultural activities are carried out in areas that are affected by industrial pollution. The keeping of livestock in urban

¹ There are reservations among some municipal authorities, economists and urban planners regarding urban agriculture.

residential, commercial and institutional areas, for example, is hazardous to the health and safety of urban residents" (URT- MLHUD, 1995:30-31).

The city authorities recognize urban agriculture. For them, urban agriculture or urban farming includes plant and animal husbandry. According to the Town and Country Planning Ordinance (CAP. 378), (Urban farming) Regulations 1992, section 78, (Government Notice Published on 5/2/93) it is stated that in these regulations: "urban farming" means carrying out of plant and animal husbandry activities within statutory township boundaries as provided in the schedule². And that:

- i. No person shall occupy or use more than three acres of land for urban farming;
- ii. No person shall, except where that person practices zero-grazing, graze his/her animal in an urban area" (Government Notice No. 10, of 5/2/93, p. 10); and
- iii. From the date of coming into effect of these regulations, any farming activity which may be deemed to constitute a nuisance in the form of noise or smell or pose a physical danger to the safety of the public shall not be permitted in areas other than those zoned for urban farming.

In addition to the above, there are other by-laws on urban livestock keeping which point to the fact that this is recognized as part of urban farming and there are efforts to regulate its practice. In Dar es Salaam city the by-laws state that:

- i. No person shall keep any animal within the City Area unless he/she shall have first obtained from the City Director a permit in the form of Schedule "A" hereto;
- ii. No person shall keep more than four head of cattle in any City Area;
- iii. No person shall graze any animal within the City Area;
- iv. Subject to any permit issued under these by-laws allowing animals to be moved, all animals within the City Area shall be kept in a building, structure or enclosure approved by and maintained to the satisfaction of the Council;

² **Stipulated Schedule: (I) cultivation of crops including horticulture (garden cultivation), viticulture (grape growing), floriculture (cultivating flowers), plant stirpiculture (breeding of special stocks, strains), including medicinal and cosmetic herbs; (ii) Rearing of animals including cattle, goats, sheep, pigs, poultry, rabbits, and horse; (iii) Urban Forestry, including arboriculture (cultivation of trees or shrubs), silviculture (tree growing), apiculture (bee-keeping), and sericulture; (iv) Wildlife keeping including zoos, zoological gardens, etc.; (v) Aquaculture, (vi) Serpentaria, including snakes and crocodile farms; (vii) Farm homesteads: the carrying out of any activities in (I) to (vii) in association with residential accommodation.**

- v. No animal shall be kept in any building or any part of such building which is used for human habitation;
- vi. The Medical Officer or Health Officer may require any person permitted to keep animals in the city area to make sure arrangements for removal of manure, liquid fifth and refuse as he/she shall consider necessary;
- vii. The Medical Officer or Healthy Officer may at any reasonable time enter upon premises in which animals are kept for the purpose of inspecting such premises and any person obstructing such officer or hindering him/her or giving false information shall be guilty of an offence....;
- viii. Any person permitted to keep or move animals within the City Area shall on request produce his/her permit to any Police or Authorized Officer; and
- ix. Any person who contravenes or fails to comply with any the provisions of these by-laws or conditions of any permit issued here under shall be guilty of an offence.

2.1 Urban Agriculture Is Not a New Urban Function

Recent research data³ affirms that urban agriculture is a diverse, omnipresent, thriving and profitable economic activity throughout the world for low and high income people (Smit and Ratta, 1992). In Dar es Salaam and other towns, it contributes significantly to the socio-economic development of towns and cities. It affects people of all statuses (Mlozi, 1995, Sawio, 1993, Mvena et al., 1991). It is generally perceived that in Dar es Salaam urban agriculture, is increasingly becoming important and is a survival strategy for the urban poor (the jobless, low-income male and female dwellers in squatters, and young girls and boys).

According to the 1988 Population Census, urban agriculture ranked as Dar es Salaam's second largest employer after small traders and labourers. Urban agriculture was seen to have occupied eleven percent of population aged ten and above, and twenty percent of those employed producing about 100,000 tons of food crops (Baruti, et al., 1992:8). It has also been observed that of the total Dar es Salaam area of 1,350 Km², 430 Km² are reserved for urban development and immediate city expansion; 20 Km² for forest reserve, and 900 Km² are suitable for urban and peri-urban

³ There is a large body of studies on urban agriculture in Dar es Salaam. This includes studies on the history of the development of Dar es Salaam (Leslie, 1963; De Blin, 1963; Mascarenhas, 1966; Sutton, 1970; studies on Dar es Salaam food system (Bryceson 1985; Sporrek, 1985; Changes in land use in and around the city of Dar es Salaam, (Kyessi, 1990; Sawio 1993; Mwamfupe, 1994; Kombe, 1994; Timothy, 1995); Dar es Salaam horticultural production and livestock development (Mullens, 1993; Airey, 1995; Hormann, 1993; Kogi-Makau, 1995; Stevenson, 1996; Lynch, 1994; Kurwijula et al., 1995); on livestock development in urban and peri-urban areas (Mtweve, 1987; Tesha, 1996; Bongole, 1988; Mlozi et al., 1989; 1992; 1995; Tukay, 1990; Briggs, 1991; Mvena et al, 1991; Ngoda, 1991; Mosha, 1991; Lupala, 1993; Schippers and Lewcok, 1994).

agriculture. Satellite imagery shows that twenty three percent of the city region is used for agricultural production, and about 3,400 ha are recorded as farms of over 10 ha which are run commercially.

2.2 Characteristics Of Urban Agriculture

Livestock is an important component of urban agriculture in Dar es Salaam (Table 1-2). In 1987/88 there were 5,700 dairy cattle ranging freely in residential areas; about 13,500 pigs; 237,000 broiler chickens; 445,000 layers; over 100,000 local free range chickens and about 8,100 ducks. The livestock sector in Dar es Salaam has expanded considerably. Current cattle population is over 23,000 head; there is a turn-over of 4.7 million day-old-chicks (DOCs) per annum from the large scale incubators (approximately 3.7 million table birds and 0.5 million layers. Dairy milk production amounts to about 95,000 litres per day, and 6,000 trays of eggs and 11,000 Kg of poultry meat per day (RALDO).

Table 1-2: Livestock Numbers in Dar es Salaam, 1985 - 1993

Year	Dairy cattle	Layers	Broilers	Local fowls	Ducks	Pigs	Goats
1985	3,318	221,920	146,205	88,720	4,900	6,795	1,361
1986	4,200	292,000	180,500	93,389	6,800	8,601	2,617
1987	5,278	390,000	194,500	98,304	8,100	10,454	3,820
1988	7,105	445,000	237,000	103,341	10,449	13,383	5,764
1989	8,597	551,800	282,083	108,508	13,497	15,658	,531
1990	10,404	664,232	335,624	113,933	17,388	18,946	12,626
1991	12,586	824,448	399,393	119,630	22,431	22,92	18,686
1992	15,229	1,027,275	275,276	125,611	28,936	27,739	27,655
1993	18,286	1,225,392	565,579	131,91	37,327	33,564	40,930

Source: Mlozi, 1995:65

Regarding livestock raising, small livestock can be raised on bookshelf cages and well-built sheds on backyards of houses. Larger livestock in the built-up areas with ample space must be zero-grazed. This can be tolerated if livestock keepers abide by the laws and/or regulations on sanitation and other social and environmental issues. Large livestock rearing should be raised in the peri-urban farms.

2.3 How Much Land Should be Reserved for Urban Agriculture?

Urban land use planners and other decision-makers may worry as to how much land must be officially reserved for urban agriculture because this activity is land-demanding and competes with other urban land uses.

This proposition paper argues that there is no need to be worried as to how much land must be reserved for urban agriculture. The rationale for this argument is that while access to land and other resources like water, energy, fertilizers, etc. are essential, urban agriculture is an adaptive and mobile land use and is found on sites of various types (Table 1-3).

Table 1-3 Farming Systems Common in Urban Areas

Farming System	Product	Location or Techniques
Aquaculture	Fish, seafood, vegetables, seaweed & fodder	Ponds, streams, lagoons, wetlands
Horticulture	Vegetables, fruits, compost	Homesteads, parks, rights-of-way, containers, roof tops, wetlands, hydroponics, greenhouses
Livestock	Milk, eggs, meat, manure, hides, skins	Zero grazing, hillsides, cooperatives, open spaces around houses, peri-urban areas
Agroforestry	Wood fuel, fruits & nuts, compost, building materials, fodder	Street trees, homesteads, steep slopes, green-belts, wetlands, orchards, forest parks, hedgerows
Other systems	House plants, medicinal herbs, beverages, flowers, insecticides	Ornamental horticulture (floriculture), roof tops, containers, roadsides, rights-of-way, urban forests

Source: The Urban Agriculture Network (Smit, et. al.; 1996:108).

As urbanization proceeds, space demanding forms of urban agriculture migrates to more peripheral or less valued locations. This takes place in much the same way as do single-storeyed residences, extensive institutional uses, warehousing, and industrial compounds, transportation terminals, and ground-level parking facilities. Urban agriculture in central locations tends to become more labour and capital intensive.⁴

⁴ **In Dar es Salaam there are urban agriculture activities, especially livestock keeping very close to the city centre. Vegetable growing in open spaces in the city is common and roadside floriculture is increasingly becoming common.**

3.0 1993 MINI WORKSHOP ON URBAN AGRICULTURE IN DAR ES SALAAM

A mini-workshop on urban agriculture took place in November 1993 generated various ideas to develop a proposal for further study of urban agriculture and environmental planning in Dar es Salaam. IDRC and UNCHS have jointly funded the study.

In the one day workshop, the Commissioner for Agriculture and Livestock Development recommended for studies needs to be conducted in urban agriculture. The Commissioner raised few questions as follows:

1. Existing by-laws that allow or prohibit certain types of urban agriculture activities are inadequate to handle problems caused by urban agriculture.
2. Whether livestock and poultry keeping can continue in high density urban residential areas.
3. Dar es Salaam is the main market centre for up-country food products, but to what extent urban agriculture efforts compete with farmers in the region.
4. Whether urban agriculture is carried out as an economic activity or as a survival strategy.

The papers presented at the workshop raised numerous issues regarding opportunities and problems of urban agriculture practices. Some of the concerns are listed herebelow:

- i. Lack of policy guidelines on urban agriculture;
- ii. Lack of market analysis of urban agricultural products;
- iii. The city is expanding horizontally and not vertically and this means possible diminution of land suitable for urban agriculture; and
- iv. Credit availability and administration for development of urban agriculture were lacking.

This proposition paper considers the recommendations obtained from the workshop are crucial ingredients of strategies to manage urban agriculture in Dar es Salaam. Those recommendations are follows:

1. Regulations should be explained to the urban farmers to promote urban agriculture and should specify activities that will allow urban agriculture in built-up peri-urban areas.
2. Urban agriculture should be intensive because of the high value of urban land.
3. It should be integrated with solid waste and wastewater management.
4. Special zones should be provided within the urban environment for promotion of urban agriculture.

5. Qualitative research require on the extent, scale, nutritional, economic and environmental impacts of urban agriculture.

A working group within SDP was formed to deal with the development and management of urban agriculture in recreational areas, open spaces, hazards lands, and green-belts since 1994.

3.1 Activities of SDP Urban Agriculture Working Group

The urban agriculture working group within SDP was in engaged in the following key activities since 1994:

1. Shared information with other SDP working groups that deal with open spaces and cemeteries, hazard lands, city expansion, and recreational areas to identify problems and suggest strategies for solution.
2. Collaborated with donor agencies to enhance urban agriculture community activities. For example, it coordinated activities in Natural Resources Institute (NRI) urban and peri-urban pilot project in Vingunguti/Buguruni and Mbutu areas on vegetable and fruit production. The urban agriculture group benefited from training with urban farmers on adaptive technology transfer.
3. Evaluated the pilot projects of NRI and trained urban farmers on adaptive technology transfer and degree of adoption.
4. Promoted participatory learning from site visits such as visit to GTZ urban vegetable promotion projects (UVPP) in Temeke, Manzese, etc.
5. Initiated planning for rehabilitation of the horticultural gardens. Later a proposal was materialized and a project, funded by STOAS/NIGP started for income generation, food production and training of farmers in their neighbourhoods to grow fruits, vegetables and trees.
6. Initiated activities on livestock development, identified the issues related to by-laws and open grazing problems. With a loan from SDP the group started a revolving fund to finance rounding up of roaming livestock. It imposed penalties for careless livestock keepers.
7. Carried out assessment of urban agricultural activities taking place at the former Tabata dump which was chemically contaminated.
8. Tried to issue development stop orders through Dar es Salaam City Council to stop invasion of horticultural gardens at Mburahati, Tegeta and Kawe.

9. Conducted a Radio program for "Ukulima wa Kisasa" in collaboration with Kilimo Mkoa (Regional Agricultural Development Office) to disseminate information on Urban agriculture and NRI Pilot project regarding adaptive technology, nursery preparations, fruit grafting, Integrated Pest Management (IPM) methods using natural or biological methods, as well as learned how to carry out on-farm or household composting.
10. Worked with City officials to solve problems related to cattle tracking en route to slaughter houses from the Pugu market, and re-opened of former cattle tracking routes.

3.2 Constraints Within Projects as Identified by the Working Group

The urban agriculture working group initiated a number of project plans, but the following constraints were identified.

3.2.1 By-Law Ambiguities

The working group has encountered ambiguities in the city by-laws. For example, The Local Government (Urban Authorities) Act 1982 (No. 8 of 1982) By-Laws under Section 80, The Dar es Salaam City (Animals in the City Area) By-Laws 1989, interprets: "Animal" to include camel, cattle, goat, horse, mule, pig, sheep and rabbit, but does not include cat and dog...; "City Area" means all area lying within the boundaries of the Dar es Salaam city. (What about ducks, local fowl, and poultry in general? Does "city area" include the entire city region?, what about "peripheral areas"?) Besides, there are other interpretations. The By-Laws state that:

- i. No person shall keep any animal within the city area unless he/she shall obtained a permit in the form of Schedule A from the City Director;
- ii. No person shall keep more than four cattle in any city area; and
- iii. No person shall graze any animal within the city area. Only zero-grazing is advocated, and so on.

Ambiguities arise because:

1. The criteria for deciding on four animals or any other number are not explained.
2. The procedure of obtaining permits from City Director is not explained.
3. A model of standard sheds (structures) suited for animals in the urban areas is not available for demonstration.
4. Despite the by-laws, open grazing remains unchecked without serious law enforcement.
5. Government planned areas like Oysterbay and other high density areas are continuing to keep large numbers of livestock instead of four heads of cattle.

6. Health hazards related to livestock keeping, e.g. removal of dung which piles on roadsides causing environmental degradation are increasing.

3.2.1.1 Views of Workshop Participants

It was observed that the issues of ambiguities of by-laws in guiding urban agricultural activities in Dar es Salaam result from the fact that:

- i. There is inadequate knowledge among urban dwellers and decision-makers on urban agriculture activities;
- ii. Urban planning regulations do not clearly permit urban agriculture activities; and
- iii. By-laws that are formed to guide urban agricultural activities are not clearly understood by all practitioners.

3.2.1.2 Proposed Strategies

Workshop participants agreed that:

- i. By-laws that allow or prohibit any urban agriculture activity (crop growing or livestock keeping) must be clearly written and explained; and
- ii. Plans should be made to integrate urban agriculture with other urban process such as health, nutrition, gender, education, environmental awareness and aspects of poverty alleviation. This involves educating practitioners on positive and negative aspects of urban agriculture.

3.2.2 Persistent Use of Hazardous Areas for Urban Agriculture

Despite training throughout the Natural Resources Institute project and exhortation from researchers and decision-makers from time to time on the dangers and unsustainable way of using hazardous areas in the city, poor and some well-off urban residents continue to practice urban agriculture (vegetable growing, livestock keeping) in hazard areas, such as in Msimbazi valley. Table 1-4 shows contamination levels of Msimbazi River by heavy metals. Farmers in the valley irrigate crops with this contaminated water and Apart from carrying out farming in the Msimbazi valley, other people are constructing houses in the valley by ignoring the threat of seasonal flood.

In steep, erosion prone areas, housing and urban agriculture are carried out haphazardly. Such areas include: Kimara, Changanyikeni, Makongo and Mbagala. Practice of urban agriculture in hazardous areas is not necessarily bad if land conservation measures are incorporated, e.g. terracing, tree planting, planting certain types of grass to stabilize slopes and curb erosion.

As shown in Table 1-4, of all the heavy metals in Msimbazi valley, lead was found most abundant, with concentrations ranging from 0.07 to 0.30 mg/l. This was followed by cadmium (0.008 to 0.020 mg/l) and zinc (< 0.002 to 0.015 mg/l). Copper and chromium were the least

abundant (less than 0.002 and 0.003 mg/l, respectively). The results show that the pollution of Msimbazi water is abated in some way. In previous studies a few years back, the concentrations were much higher (Kondoro, et al., 1994; Othman et al., 1995). According to Kondoro, copper was found to be present in concentrations ranging from 0.05 mg/l (River Sinza) to 0.36 mg/l (Msimbazi River, Sukita, downstream).

Table 1-4: Concentration of Some Heavy Metals in Water Table of Msimbazi Valley

Sample Site/Concentration (mg/l)	Cu	Cr	Pb	Cd	Zn
Luhanga/Ubung	<0.002	<0.003	0.13	0.008	<0.002
Before Sukita (upstream)	<0.002	<0.003	0.13	<0.001	<0.002
Vingunguti	<0.002	<0.003	0.12	0.014	<0.002
Hananasifu	<0.002	<0.003	0.17	0.020	0.011
Brewery Greek	<0.002	<0.003	0.30	0.012	0.015
Kigogo	<0.002	<0.003	0.19	0.017	<0.002
After Sukita	<0.002	<0.003	0.17	0.027	0.003
Msimbazi River Delta	<0.002	<0.003	0.15	0.018	0.011
Keko Bondeni	<0.002	<0.003	0.18	0.019	<0.002
Sinza	<0.002	<0.003	0.07	0.019	<0.002
Kajima	<0.002	<0.003	0.26	<0.001	<0.002

Source: Survey, 1995.

The quality of water for human, livestock and agricultural use is regulated by the Water Utilisation (Control and Regulation) Act of 1974, Amendment 1981. According to this act, water for livestock consumption and irrigation purposes should not have a maximum lead and cadmium concentration of 0.1 and 0.2 mg/l, respectively. This disqualifies all Msimbazi valley water, with exception of Sinza River, from being used for livestock and for irrigation. However, people continue to use water for irrigation.

Since a good number of small plots are in unsuitable areas (e.g. polluted railway-yard, in the harbour area; or around industrial areas that are known to produce much toxic waste water), health risks are being aggravated.

3.2.2.1 Views of Workshop Participants

Participants in the workshop noted that there is an ineffective control of public health risks within the city management. Below are a number of proposed strategies to deal with the problem.

3.2.2.2 Proposed Strategies

- i. Main water supplies in Dar es Salaam should take care of all needs of residents including urban agriculturists. People should be advised to use river water when concentrations of metals are lower;
- ii. Irrigation can be carried out by using groundwater from shallow wells;
- iii. Deeper wells should be used where risk of water pollution from shallow wells is high. Use of deep wells should be practised in Mbutu, Ukonga, Mabwe Pande and Kigamboni. Simple mechanically worked pumps can be installed;
- iv. Promote duckweed farming for waste water purification and for irrigation;
- v. Utilize less polluted stream water for urban agriculture such as water from Sinza, Tegeta,
- vi. Water harvesting (storing rain water in tanks or well constructed dams) and safe water storage can be useful for small plots in backyard farming; and
- vii. Trees and grasses should be planted in steep slopes and terraces to protect soil erosion.

3.2.3 Large-Scale Livestock Rearing in Urbanized Areas

Large-scale livestock keeping is taking place in some high density areas of Kinondoni and Kurasini. Low-density areas such as Ada and Regent Estates and Oysterbay are keeping more than the stipulated four head of cattle. Few livestock farmers prefer to move to the peri-urban farms. The risk of being away from the investment or not possessing adequate plot can be the reasons of moving towards peri-urban areas.

3.2.3.1 Proposed Strategies

Workshop participants agreed that:

- i. Keepers of large-scale livestock, dairy cattle, goats and poultry should be encouraged to move to the peri-urban areas in all the three districts. They should obtain requisite certificates of occupancy and title deeds of the farms which they will develop;
- ii. In built-up areas only small number of livestock can be allowed;
- iii. Structures for rearing livestock must be erected properly;
- iv. All livestock (e.g. poultry and dairy cattle) must be kept indoors in recommended structures suited for zero-grazing. Animal waste must be removed frequently and will be recycled in selected sites; and
- v. Large livestock keepers should be trained in producing small scale biogas and compost from animal waste.

3.2.4 Inappropriate Use of Large Open Spaces in Low-Density Residential Areas

Livestock keepers in low-density urban areas inappropriately use their large open spaces by keeping more than four cattle in poorly erected sheds.

3.2.4.1 Proposed Strategies

The participants of the Workshop agreed that law enforcement should be strengthened to:

- i. Let livestock keepers erect accepted livestock sheds and locate the sheds on their property;
- ii. Encourage the keepers to remove all animal droppings and other refuse from their areas; and
- iii. As per by-laws, keepers of more than four head of cattle should be discouraged from keeping more than four cattle in the city. Law breakers will be penalized.

3.2.5 Stop Orders on Land Invasions not Honoured

Efforts to issue development stop orders from the city council to reduce the rate of land invasion is difficult to implement.

3.2.5.1 Proposed Strategies

It was agreed that law enforcement should be strengthened to:

- i. Ensure land earmarked for public development e.g. horticultural gardens are well zoned out, fenced and protected by issuing title deed; and
- ii. Periodic inspection of land belong to City Council must be carried out.

3.2.6 Small Ridges Made by Farmers are Potentially Malaria Hazardous

Small ridges for potato farming are the right places for mosquito breeding and increases chances of urban Malaria.

3.2.6.1 Proposed Strategies

It was suggested that this problem can be solved by educating urban farmers through extension services to appreciate the importance of less water retaining ridges and proper drainage for better yields.

4.0 POTENTIAL (INTER SECTORAL) CONFLICTS THAT NEED COORDINATION

4.1 Ministry of Agriculture & Co-operatives and its Perception on Urban Agriculture

The Ministry of Agriculture and Cooperatives recognizes the practice of urban agriculture and aware of agriculture productions in Dar es Salaam, Morogoro, Arusha, Dodoma and Mbeya. However, it is not clear whether urban agriculture will receive financial and planning attention

from the Ministry of Agriculture and Cooperatives in future. Moreover, there is a lack of co-operation among related ministries (Ministry of Agriculture and Livestock Development, Ministry of Water and Minerals, and Ministry of Lands, Housing and Urban Development) for promotion of urban agriculture.

4.2 Apparent Neglect of Small Urban Livestock Keepers and Crop Growers

In the Ministry of Agriculture and Cooperatives there is a unit on horticulture, but few activities are linked to livestock and crop production systems as well as processing, marketing and extension services for small vegetable farmers. To improve production in these areas, Ministry of Agriculture and Cooperatives has to enhance the extension service sector for urban agriculture

4.3 Little Attention to Allocate/ Retain Land for Urban Agriculture

As Dar es Salaam is expanding rapidly along with the major road arteries, agricultural land is lost. In Dar es Salaam, land north of Morogoro road in Kimara, Mbezi Luisi, all the way towards Kibamba and Kiluvya to Kibaha is hilly. Intensive building is not recommended in these areas due to risk of soil erosion.

However, lateral urban expansion are in progress in Dare es Salaam. Potential agricultural land in these peri-urban areas is good for production of fruits and vegetables is lost. New settlements are developing towards Bagamoyo road and to the west towards Goba and in SalaSala area. A ring of land with scattered houses is extending westwards towards Goba and further is perceived to be the potential green-belt of Dar es Salaam.

There is land speculation in the peri-urban areas. There is little attention on conflicts regarding demand of land for urban agriculture for those who want to farm in the peri-urban areas and those who own peri-urban land customarily. Speculators buy land on a customary tenure basis and begin development regardless of other planned urban land uses that might crop up in the future. It is important to question whether city authorities will allocate land for urban agriculture in the peri-urban areas?

4.3.1 Why Little Attention in Locating Land?

Workshop participants highlighted that little attention has been given to the allocation of land for urban agriculture as the city expands because, the Ministry of Land, Housing and Urban Development (MLHUD) does not:

- i. Permit urban agriculture activities in the city per se; and
- ii. Clearly state and recognize urban agriculture activities.

4.4 Urban Agriculture Competing with Other Urban Land Uses

Urban agriculture competes for land alongside other urban land uses. Along the Bagamoyo road, for example, vegetable growers on road reserves compete with brick makers, timber dealers and petty traders. As Dar es Salaam grows fast, more migrants male and female workers arrive from the rural areas. Once open spaces and road reserves are occupied by petty businesses like kiosks, shops, brick making, garages, etc., these establishments make it difficult to compensate when the need to expand roads or install utilities arises. How can the road reserves be protected?

It was discussed that growing small scale vegetables, flowers, and promotion of floriculture will protect road reserves. It was also argued that since the crops would not be permanent and require costly compensation, urban agriculture should be seen as a management tool to protect road reserves.

4.5 Conflicts between Use of Water for Urban Agriculture and Other Uses

Apart from experiencing water shortages due to drought, a major conflict exists between NUWA (now DAWASA - Dar es Salaam Water and Sewage Authority), the provider of treated water for all urban uses, charging very high tariffs (between 20,000/= and 30,000/= and above per month) against farmers who use treated water for irrigation purposes. DAWASA has threatened and even discontinued water pipes for urban agriculture practitioners. This results in big losses for farmers.

But DAWASA loses more than forty percent of its water through leakages, pirating and non-functional mains. Treated water is used in industries, brick factories and irrigation related to urban agriculture. Denying water to food producers who are potentially alleviating poverty through self-employment is unethical therefore, better understanding between DAWASA and urban agriculture practitioners is important to harmonize tariffs and supply adequate water to the city residents.

Urban agriculture practitioners should explore opportunities of digging shallow wells, and use hand and electric pumps for irrigation. In peri-urban areas construction of small reservoirs to retain water is a strategy to avoid using DAWASA water for urban agriculture.

4.6 Invasion of Valleys and Other Hazard Lands for Housing vs Urban Agriculture

Urban agriculture is carried out in valleys that are prone to flooding. The valleys (Msimbazi valley, River Luhanga, Sinza River, Kizinga River, Mzinga River, Mbezi River, Tegeta River, Ubungo River, etc.) (Map 1.0), if planted with trees could become great 'green lungs' and become recreational areas.

4.7 Disappearance of Open Spaces, Cemeteries, Playgrounds, Road Reserves and Utility-Rights-of-Way

There are major institutional problems with regard to law enforcement on invasion of public lands, e.g. gardens, valleys, open spaces planned for playing grounds, road reserves and utility-rights-of-way. In the city of Dar es Salaam nearly everyone is looking for a piece of land to erect a structure for informal businesses. Laws to protect these open areas are not strongly enforced. Therefore, it was recommended that urban agriculture can protect some of these lands.

5.0. GENERAL OPPORTUNITIES TO SOLVE POTENTIAL CONFLICTS

Opportunities to solve the potential conflicts through promoting urban agriculture are based on principles currently being pursued by the sustainable cities programme (SCP) and Agenda 21 for developing sustainable urban settlements. Major opportunities and objectives, including action lines for local governments and city authorities must include efforts to:

- i. Promote optimal use of productive land in urban and rural areas from the negative impacts of human settlements, inter alia, through developing and supporting the implementation of improved land management practices that deal comprehensively with potentially competing land requirements for agriculture, industry, transport, urban development, green space, protected areas and other vital needs;
- ii. Use urban agriculture as a management tool to integrate land and housing development with policies of reducing poverty and creating jobs for environmental protection, preservation of cultural heritage, for education and health, for providing clean water supply and sanitation facilities, and for empowering men and women who are disadvantaged;
- iii. Ensure an adequate supply of serviceable land at appropriate levels of legal framework; i.e local governments or city authorities have to make full use of existing infrastructure in urban areas encouraging optimal density of the occupation of available serviced land. It must ensure adequate provision of parks, play areas, common spaces and facilities, and plots of land for home gardening;
- iv. Enact simple procedures (regulations) for the transfer and conversion of land use within the context of a strategic policy framework for protecting arable land and environment;
- v. Keep away urban development from fragile areas and promote land use patterns that minimize transport demands, save energy and protect open and green spaces;
- vi. Promote urban agriculture as an appropriate urban density and mixed land use strategies, geographically and strategically protect indispensable agricultural land; land that sustain

biodiversity, water quality and groundwater recharge; and fragile areas including coastal areas; and

- vii. Promote green spaces and vegetation in urban and peri-urban areas for biological and hydrological balance and economic development, absorption of rainwater, and control of flooding in hazard prone valleys; reduce air pollution and better climatic conditions.

5.1 Opportunities Specific to Dar es Salaam

For Dar es Salaam, development of strategies to match the opportunity areas to promote urban agriculture and integrate them in the city mosaic encompasses the following:

1. City council or the Ministry of Lands Housing and Urban Development must introduce Restructuring Land Access and Land Use Legislation, provide land to urban poor men and women for housing and farming but should not own more than three acres for farming on a small scale.

In Dar es Salaam peri-urban areas private investors have acquired up to 5,000 hectares. The workshop participants suggested:

- i. Fixing land ceilings by the government on the basis of use, location, feasibility study and proven ability of the applicant to develop the said parcels of land;
 - ii. Discouraging land hoarding by strict enforcement of development conditions and by the use of local by-laws, planning and land use regulations (URT-MLHUD, 1995:13).
2. Re-developing high density areas and or squatter areas surrounding town centres, and developing new areas zoned for residential purposes by encouraging vertical building to free land that is consumed by the extensive lateral growth and hence make room for urban agriculture (i.e releasing some land for backyard gardening, trees and fruits on house plots, creating new open spaces for children play and air circulation).

This strategy may appear unworkable at first sight.⁵ But the National Land Policy (URT, MLHUD, 1995:25-26) aims at achieving this. It argued that: "While urbanization is inevitable and desirable for the development of Tanzania, the impacts of uncontrolled expansion of towns, particularly the encroachment upon productive rural agricultural and pasture lands are not desirable. Thus pertinent policy statements or strategies to achieve this indicate:

⁵ There are a few vertical/ high rise examples in Dar es Salaam that are worth replicating to achieve this goal and thus releasing the said space for Urban agriculture use, e.g. Tazara Flats, NHC Flats in Ilala and Morogoro Road near Urafiki Textile Factory.

- i. The government will constitute measures to limit the loss of agricultural land to urban growth by controlling lateral expansion of all towns. In addition to minimizing the demand for urban building land, both compact development and vertical extension of buildings will (a) reduce the costs of installing, operating and repair of infrastructure facilities and utilities, and (b) shorten intra-urban distances;
 - ii. Urban land use and development plans will aim at more intensive use of urban land;
 - iii. To achieve these objectives, the government will (a) revise all space and planning standards, including standards for provision of infrastructure to promote more compact form of buildings in all urban areas, and (b) zone out more areas of towns for vertical development so that wherever it is socially acceptable, and technically and economically feasible, more dwelling units will be accommodated. "Within town centres and in the immediate surroundings of town centres, vertical extension will constitute the principal building form" (URT, MLHUD, 1995:25-26).
3. Using new urban agriculture techniques that use land more intensively and in small and marginal areas as opposed to large tracts of land in the peri-urban. Trying out hydroponic farming, encouraging container farming and limited soil media; and training farmers to use more vertical growth of plants (trellising).
 4. Incorporating non-food production urban agriculture systems (e.g. promoting floriculture encouraging young boys and girls to grow flowers in pots, arboriculture, tree planting) by roadsides, homes, and in water-shed areas.
 5. Moving large livestock to peri-urban lands and promote growing fodder on peri-urban farms; composting organic urban waste and generate biogas.
 6. Reclaiming land which were left derelict after quarrying /mining (e.g. Kunduchi quarrying/ mining sites near Sala Sala) for use by urban farmers.
 7. Encouraging people to use more underground water through construction of wells and use of hand pumps and electricity-run pumps.
 8. Developing aqua-culture in coastal lagoon and other appropriate areas inland and in tanks.
 9. Protecting all 'sensitive areas' within the urban region through urban agriculture. According to National Land Policy (URT-MLHUD, 1995:13) sensitive areas which must be protected include: water catchment areas, small islands, border areas, beaches, mountains, forests, national parks, rivers, river basins and banks, seasonal migration routes of wildlife, national heritage and areas of biodiversity. Within the confines of Dar es Salaam city region, the sensitive areas which could be protected by using urban agriculture

as a management tool by planting trees and grasses are water catchment areas, forests, beaches, hilly areas prone to erosion, rivers and river basins and banks.

Before outlining other strategies to adopt urban agriculture in Dar es Salaam, the following section describes the soil types and other factors influencing urban agriculture development. Potential suitable lands for agriculture and the overall problems of practising urban agriculture are discussed.

6.0 SOIL TYPES AND OTHER FACTORS INFLUENCING URBAN AGRICULTURE DEVELOPMENT IN DAR ES SALAAM

The suitability of Dar es Salaam soil (Map 3.0) for urban agriculture depends on land-form characteristics, soil properties, drainage and slope which determines the degree of erosion. The following sections outlines soil clusters and their suitability for arable agriculture. But urban agriculture is quite diverse and highly adaptive and can be carried out even in limited soil-less conditions.

6.1 Soil on Coastal Plain with Lower Marine Terrace

This type of soil is found along the coast in Ununio and Mbweni in Kinondoni District. This is also found in Kigamboni and Kimbiji. These areas are suited for the development of aquaculture. Planting of more mangroves was recommended.

6.1.2 Soil on Coastal Plain with Upper Marine Terrace

This type of soil is found between five and fifteen metres above sea level in Kigamboni and Kimbiji in Temeke District. This also cover broad areas of Ilala and Kinondoni. Small scale irrigated horticulture (growing of fruits and vegetables) is practised. Towards Kimbiji, large farms can be cultivated and there is ample land for open extensive grazing.

6.1.3 Alluvial Deposits

Mixed alluvial deposits occur on recent flood plains along Msimbazi valley and Mzinga rivers. The areas are subject to frequent flooding. This type of soil is marginally suitable for arable agriculture. There is also mixed soil on sub-recent or old alluvial deposits which is no longer flooded by river overflows. Fruits and vegetables are grown in the valleys.

6.1.4 Neogene Deposits

This type of soil occur in extensive areas of Dar es Salaam especially in western Kinondoni district, the far end of Ilala District towards Kisarawe, few areas of Temeke near Mbagala and a

small area adjacent to coastal area towards Kimbiji. Peri-urban agriculture is flourishing in these areas and zero-grazed livestock keeping is a fast developing industry.

Table 1-5: Soil Types and Guidelines for Arable Agriculture in Dar es Salaam

Soil & Land Characteristics	Moderately Suitable	Marginally Suitable	Currently Unsuitable	Permanent Unsuitable
Texture of Surface soil	Loam to clay loam	Sandy loam to friable clay	Sand to clay	
Texture of sub-surface soil	Sandy loam to friable clay	Loam sand to clay	Loam sand to clay	
Depth of Rock (cm)	> 125	> 100	> 50	< 50
Slope (%)	< 5	< 9	< 15	< 15
Drainage	Well & moderately well drained	Some what poorly to excessively drained	Poorly to excessively drained	Very poorly drained
Salinity	< 4	< 6	< 8	> 8
Flooding	Never flooded	Never flooded or occasionally flooded	Never flooded to frequently flooded	

Source: Coast/Dar Water Master Plan, 1977.

6.2 Other Factors Influencing Urban Agriculture in Dar es Salaam

There are several factors which effects urban agriculture and those require proper attention. Availability of proper transportation and good roads to carry urban agriculture produce to market, water supply for vegetable farming, irrigation and feeding livestock, space for production and the like. These are discussed below.

6.2.1 Easy Accessibility to Farms and Urban Markets

Dar es Salaam region is well accessible by road. Four main radial road routes - Morogoro road radiating from the city centre westwards connects the city and the rest of the western hinterland; Bagamoyo road (renamed Ali Hassan Mwinyi Road) to the north, and Pugu (renamed Nyerere) road running southwestwards from the city centre; and Kilwa road to the south, all connect the urban centre to all surrounding rural villages. This facilitate the urban and peri-urban farmers to bring their produce to the urban markets.

Other primary roads inter-connecting the main arterials include: the Sam Nujoma-Nelson Mandela-Port Access ring road; The Uhuru (Buguruni-City Centre Road); The United Nations - Msimbazi Road (in Kariakoo); Morocco (Kawawa) - Msimbazi - Ali Hassan Mwinyi Road; New Mabibo-Morocco Road; Chang'ombe-Temeke Road; Morogoro-Shekilango-Bagamoyo Road and several others. For certain urban agriculture producing areas, however, road infrastructure is poorly developed, therefore, overall improvement of the feeder road is necessary to enhance development of urban agriculture in Dar es Salaam.

6.2.2 Availability of Water Sources

With exception of extreme drought conditions, water for agriculture is generally available. In rainy seasons, farms depend on rain and during the dry season, water for irrigation and small scale agriculture come from several streams and rivers that pass through the city.

6.2.3 Availability of Open Spaces / Unused Areas in the Built-up Areas

In low density areas, there are open spaces in backyards and frontyards available for urban agriculture. Unused land of institutions e.g. schools, hospitals and military grounds, as well as road reserves, utility-rights-of-way; and undeveloped plots are utilized for small scale urban farming.

6.3 Potential Areas Suited for Urban Agriculture Development in Dar es Salaam and Proposed Strategies

1. Dar es Salaam does not have great fertile lands. But looking from the city expansion point of view (Map 1.0), it appears that city expansion is devouring much agricultural land and little is going to be left for urban agriculture.
2. City expansion notwithstanding, there are pockets of good, moderately suitable and marginally good areas in the peri-urban villages. Areas adjacent to these peri-urban villages (Map 8.0) are productive (for livestock, fruits and vegetable). Some land in these areas should be reserved for urban and peri-urban agriculture. Areas in Kigamboni, Kibugumo, Geazaulole and in Kimbiji in Temeke District have good agricultural potential and open grazing may be encouraged. Underground water can easily be harvested.
3. In Ilala district, peri-urban areas as far as Msongola and much of the land bordering Kisarawe is good for arable agriculture. Much of the Msimbazi valley should be planted with trees and certain types of grass for flood control and conservation. Large portions of Kinondoni district that are rural as far as Mabwe Pande, Kibamba, Kiluvya, Boko, and Goba should have areas demarcated for fuel woodlots, and farms with livestock and fruit trees.

4. There are steep slopes in Ubungo, Kimara, much of Kinondoni to the west, Goba and Mbagala. Terracing should be practised to allow small scale urban farming and grasses and trees must be planted.
5. All water catchment areas (Map 1.0) for example, Pugu Hills and Pande Forest, should be restricted from intensive cultivation and urban development. Instead they should be planted with trees; and road reserves, utility rights-of-way; undeveloped plots in planned areas, and the numerous open spaces on backyards contribute to urban agriculture should be given equal attention.

The following section summarizes the main points about the justification of promoting urban agriculture in Dar es Salaam.

7.0. SUMMARY: JUSTIFICATION FOR URBAN AGRICULTURE IN DAR ES SALAAM

Workshop participants supported the views that the promotion of urban agriculture on a strategic urban planning basis in Dar es Salaam is justified on the basis of the following aspects:

7.1 Economic

- i. Urban agriculture generates employment and income to urban poor men and women;
- ii. Enhances urban economy by recycling goods;
- iii. Saves transportation costs; and
- iv. Urban agriculture makes land productive, i.e land that is either vacant and idle within the city and in peri-urban areas.

7.2 Social

- i. Most urban agriculture is carried out by women. It enables women to access resources to provide food close at home and learn techniques in urban agriculture practice;
- ii. Urban agriculture promotes technology transfer e.g. food preserving, cooking, processing and animal and plant husbandry, and broadens community networking to develops skills; and
- iii. Institutionalizing urban agriculture may stimulate NGOs and CBOs to contribute to poverty alleviation because urban agriculture contributes directly to household food security, and memo from sales can pay for children's education, purchase of medicine etc.

7.3 Environmental Management

- i. Urban agriculture is linked to waste recycling which has potential use in tree planting, gardening in parks and recreational areas, without use of chemical fertilizer;

- ii. Urban floriculture encourages young girls and boys along with men and women farmers towards greening the city and promote confined space management by container farming;
- iii. Roadside urban agriculture conserves soil;
- iv. Planting trees and grass in valleys & flood plains protects hazard areas from human encroachments for housing in hazard prone areas. Terracing reduces erosion hazards on steep slopes, and
- v. Urban agriculture helps reduce the "urban heat island" through effects of trees and green zones.

8.0 WHO ARE INVOLVED IN URBAN AGRICULTURE?

Within the context of Dar es Salaam City, the following are the main groups involved in urban agriculture. These include:

- i. Urban poor men and women and some economically well off residents;
- ii. Popular sector groups, NGOs and CBOs within the city and in the urban villages;
- iii. Village governments (especially in the peri-urban areas);
- iv. Government ministries: The Ministry of Agriculture and Cooperatives, Ministry of Lands, Housing and Urban Development, Ministry of Natural resources, Tourism and Environment, Ministry of Water, Energy and Minerals;
- v. Dar es Salaam City Council (Now Dar es Salaam, City Commission) and the National Environment Council;
- vi. Financial Institutions, e.g. the Banks (NBC, or CRBD); The National Insurance Corporation (NIC);
- vii. Business groups: Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA); Charcoal makers and retailers; Wood building materials cutters and retailers; firewood cutters and dealers; and
- viii. Informal businesses. e.g. petty trading-street hawking, street food vending, market practitioners.

8.1 Roles and Responsibilities of Various Sectors

It was suggested that there will be different roles for various sectors in order to implement strategies and plans that are proposed in the workshop to promote urban agriculture as follows:

8.1.1 Communities

- i. Mobilize community to participate in urban agriculture campaigns to improve household food security, farming techniques, etc.;
- ii. Participate in decision-making, i.e. formulate regulations to guide how urban agriculture should be carried out for city development; and
- iii. Ensure women are involved in all community discussions and allow their full participation.

8.1.2 Business Sector

- i. Initiates various investments in urban agriculture;
- ii. Assists in market and processing of surplus urban agriculture produce; and
- iii. Trains men and women urban farmers in techniques of marketing and price fixing for urban agriculture produce.

8.1.3 Government

- i. Ensures adequate food security for urban households by controlling the price in food market and allow urban agriculture;
- ii. Recognizes the importance of urban agriculture through the Ministries of Agriculture and Cooperatives and Ministry of Lands, Housing and Urban Development;
- iii. Formulates gender-sensitive legislation to decentralize urban agriculture; and
- iv. Creates an enabling environment to promote urban agriculture for income generation, nutrition and environmental management.

8.1.4 The City Council

City Council prepares the by-laws in collaboration with the Ministry of Lands, Housing and Urban Development to guide urban agriculture and

- i.. Promotes mixed land uses (to feature urban agriculture) in both urban and peri-urban areas;
- ii. Enforces urban development plans and laws that prohibit development of hazard-prone areas and promote urban agriculture;
- iii. Reviews existing by-laws and enact new ones to accommodate urban agriculture support;
- iv. Avails license or permit that allow temporary tenure to users of open space for small scale urban agriculture activities and collect taxes;
- v. Protects vacant land or open spaces for creation of parks, botanical ground, cemeteries and road reserves; and
- vi. Allows market places for urban agriculture trading activities.

8.1.5 Commercial Organizations

- i. Mobilize resources (material and financial);
- ii. Initiate processing of urban agriculture products where appropriate. e.g. pasteurizing of milk, bottling fruits, jam making etc.;
- iii. Participate in planning of urban agriculture activities for the benefit of urban dwellers; and
- iv. Initiate projects to enhance urban agriculture e.g. financing water improvements, waste recycling for urban agriculture use and tree planting to green the city.

8.1.6 Donor Organizations

- i. Assist in urban agriculture research and information generation; and
- ii. Mobilize resources (financial & technical through NGOs and CBOs) to enhance capacity building among urban agriculture practitioners.

9.0 FUNDING AND IMPLEMENTATION OF STRATEGIES

The workshop participants recommended that funding for the implementation of the various proposed strategies will be conducted by the following:

9.1. City Residents

- i. Those who are interested in urban agriculture and may wish to start engaging in future; and
- ii. Those who are engaged in urban agriculture activities.

9.2 Institutions in the City

- i. Cooperative societies.
- ii. The Dar es Salaam City Council.
- iii. NGOs and CBOs.
- iv. Financial companies.
- v. Insurance companies.
- vi. Local (national) and foreign donors.

10.0 STRATEGIES FOR INTERVENTION

10.1 Lessons Learned and Possibilities for Replication

Urban agriculture scopes out possibilities of replications such as:

- i. Growing multiple crops (vegetables and fruits) in one garden (inter-cropping);
- ii. Encouraging urban young farming groups (e.g. groups of young girls and boys in JET Club, TAZARA, CHANG'OMBE-KIBASILA area; UVIKIUTA and others) to practice urban farming;
- iii. Using solar energy from underground water sources (evidenced at Kigamboni) for floriculture farming;
- iv. Encouraging floriculture gardening along suitable road junctions for production of flowers and tree nurseries; and
- v. Terracing steep hills with grass and ring of crops and using concrete drains to avoid erosion.

The following section outlines the major proposed Urban Agriculture Strategy for adoption in Dar es Salaam in the context of Strategic Urban Development Plan (SUDP). The overall strategy is built around a mixed land use strategy.

11.0 PROPOSED URBAN AGRICULTURE STRATEGY FOR SUDP: A MIXED LAND USE STRATEGY

Workshop participants supported a Mixed Land Use Strategy which allows both crop growing and livestock keeping in the built-up open spaces and in the peri-urban areas. The implications are that:

- i. **In areas of low density** with enough spaces in the backyards and frontyards, crop growing in the form of home gardening will continue to be practised. This will also allow some livestock rearing;
- ii. **In high density built-up areas** open spaces available in backyard, vegetable growing and small livestock can be permitted (e.g. Guinea fowl or chicken). This form of urban agriculture need not be discouraged if cleanliness of structures, removal of animal droppings and strict "in door keeping of birds" as opposed to free ranging fowl, is observed; and
- iii. **Where new plots are to be surveyed and allocated,** especially in peri-urban areas, (e.g. peri-urban areas as in Goba, Bunju, Kimara-Mbezi, etc.) bigger plots of at least three or four acres should be allocated for residential purposes for those who intend to carry out urban farming (crop growing and livestock keeping. Large areas of three or four acres of land would supply space for fodder and disposal of manure or construction of composting system;

The sections below present the proposed strategies for urban agriculture promotion in Dar es Salaam in view of SUDP.

11.1 Strategy for Urban Agriculture -Livestock Keeping

- i. High density areas are not suited for this activity because land is limited and areas are congested;
- ii. Zero-grazing in built-up low density residential areas are allowed; and
- iii. Open grazing only in peri-urban areas, where appropriate, and reasonable numbers of livestock should be kept.

In all the three strategies suggested above, it was further emphasized that strict adherence to city by-laws is necessary if implementation is to be effective.

For strategic urban development, small scale livestock rearing can be accommodated in small structures around houses. The number of birds to be reared could be in range of 100 to 500. Above this number will be considered as large scale business and should be carried in areas with low density and ample space, preferably in the peri-urban areas.

For small number of dairy cattle, the city by-law of keeping only four head of cattle should be upheld and adhered to strongly. This should be permitted only in low-density areas, and on zero-grazing. Areas should have well built sheds and will allow proper space and availability of water. Larger number of cattle should be reared in the peri-urban areas. Fodder cultivation must be encouraged in valleys and open spaces around houses, and in especially allocated plots in the peri-urban areas.

Open grazing is only possible and may be viable in Kigamboni and in areas towards Kimbiji. It must not be carried out in open spaces in the built-up areas or in most of Kinondoni steep slopes, where soil erosion is a threat. Goats and pigs should be reared in the peri-urban zones.

11.2 Strategy for Urban Agriculture - Field Crops

Field crops can be accommodated in strategic urban planning of Dar es Salaam through a mixed land use approach. In peri-urban areas growing field crops is not a problem. But to grow food crops or trees in built up areas, be it in the school compounds, churches, factory areas or road sides and valleys, means adopting a mixed land use strategy and allow activities to co-exist instead of having agriculture pushed entirely into rural areas.

11.2.1 Observations and Recommendations of Workshop Participants

- i. It was observed that urban agriculture in Dar es Salaam is a kind of activity that will always be carried out around houses (back yard gardening, zero-grazing etc.). Also urban agriculture will continue to occur in the peri-urban areas. To avoid haphazard urban agriculture as well as unplanned urban development, participants recommended that strategies aimed at allocating plots for building houses (in the city or peri-urban areas) need to be prepared at earlier stages;
- ii. With respect to roadside/road reserve farming activities, participants noted that there are many land use conflicts in Dar es Salaam. There is need to formulate guiding plans to identify types of road reserves that can be allowed to carry out urban agriculture, and other road reserves which should be used for other activities such as operating kiosks, brick-making, small carpentry shops etc.;
- iii. Avoiding subdividing certain residential areas by over-building, but keeping the open spaces under some form of urban agriculture. It was recommended that areas in peri-urban areas that are already under organized large-scale mixed farming, should not be subdivided for the sake of obtaining high density plots for allocation to people. Rather,

these farms should remain as they are -- in the peri-urban areas-- and be treated as demonstration centres. Urban agriculture practitioners will visit these centres and learn the value, role, practice and significance of urban agriculture; and

- iv. Maintain trees as wind breakers and prevent air pollution.

11.3 Instruments to Supply Inputs and Techniques to Promote Urban Agriculture in a Mixed Land Use Strategy

The working group suggested to promote urban agriculture through a mixed land use strategy, especially supplying crop input, training and technology to the urban farmers and other dwellers to rehabilitate already existing horticultural gardens. A proposal was prepared in collaboration with the Regional Agricultural Livestock and Development Office (RALDO) and was accepted by the Dar es Salaam City Council and through Agriproject Foundation Department of Sub-Saharan Africa (STOS) and the National Income Generation Program (NIGP). The rehabilitation of urban horticultural gardens was perceived as a major instrument of promoting urban agriculture within a mixed land use strategy in the city. Rehabilitation of the Dar es Salaam Horticultural Gardens is now operational.

11.3.1 Background of Urban Horticultural Garden Rehabilitation

- i. Dar es Salaam region has vast potential for the development of horticultural crops;
- ii. For survival purposes, many households are carrying out horticultural production in open spaces around residences and other non-built spaces;
- iii. Some are engaged in commercial production of fruits and vegetable; and
- iv. Through reconnaissances and field studies, it became clear that development of horticultural sector is critical to overall city development, macro-economic stability, food security, creation of jobs and poverty alleviation. In the 1970s, Dar es Salaam regional authorities initiated horticultural gardens and several problems were encountered which caused the management and production to decline.

11.3.2 Problems Faced by Former Dar es Salaam Urban Horticulture Gardens

The major constraints which caused rapid decline in the performance of horticultural gardens since the mid-1980s include:

1. Inadequate credit facilities.
2. Inadequate transport facilities.
3. Poor irrigation facilities and unavailability of water.
4. Crop destruction by pests and diseases.
5. Lack of necessary agricultural inputs.
6. Lack of secure boundaries or fences and title deeds to guarantee security of tenure and prevention of invasion.

The project for urban horticultural garden development selected former gardens and added new ones (Map 9.0).

The horticultural gardens which have the potential to green the city include: I) Malolo Pilot Project Garden; II) Kawe Pilot Project Garden; III) Gezaulole Pilot Project Garden; IV) Ukiviuta Pilot Project Garden; V) Kinyamwezi Pilot Project Garden, VI) Uzuri-Manzese Pilot Project Garden; and VII) Msongola Garden. The Uzuri-Manzese gardens are in the urban areas, and so is Kawe. Rest of the areas are peri-urban.

The strategy of rehabilitating the city horticultural gardens will benefit many who work in the informal sector. In the peri-urban horticultural gardens in areas of Malolo, Gezaulole, Kinyamwezi and Ukiviuta, youth groups will support farming activities. Tree nurseries will be prepared and will be acquired by residents on their homesteads to combat soil erosion and conserve water catchment areas. Production of citrus fruits, vegetables and flowers, for example, will be emphasized and processing and marketing will be encouraged. Planting of trees will contribute to charcoal production and construction materials.

11.3.3 Overall and Specific Objectives

The overall objective of NIGP, SDP and Agriproject Foundation Department of Sub-Saharan Africa in rehabilitating the urban horticultural gardens is to increase production of fruits and vegetables to satisfy the city demand and to improve the economic and nutritional status of the residents. The following are the specific objectives of the agreed strategy:

1. To train and help farmers raise productivity in limited land areas of Dar es Salaam without chemical pesticides and fertilizers.
2. To promote production and use of local (traditional) vegetables and fruits and create awareness (among producers and consumers) on their nutritional values.
3. To provide facilities for women to participate in training for vegetable and fruit production and enable them to participate in seminars to share their experiences.
4. To promote practice of indigenous knowledge of preserving vegetables and fruits and other foods.
5. To promote growing of non-traditional crops and flowers to diversity horticultural production.
6. To improve marketing skills of urban farmers and promote production and sale of vegetables, fruits and ornamental (flowers).
7. To identify market opportunities both local and international to sell the produce.

8. To improve the environment in Dar es Salaam by planting tree (fruit and non-fruit trees) of species appropriate for Dar es Salaam.
9. To provide good quality seeds and other planting materials such as coconut, mango, citrus, banana, pineapple etc.

12.0 INSTRUMENTS NEEDED TO IMPLEMENT PROPOSED URBAN AGRICULTURE STRATEGIES

It was observed that several additional instruments are needed to enhance the implementation of the proposed urban agriculture strategies. The followings were suggested:

12.1 Mobilization of Resources

Urban agricultural projects should be funded by:

- i. City residents themselves;
- ii. Local institutions; and
- iii. Foreign/External donors and communities.

12.2 Information Campaigns

1. Mass media plays an important role in educating practitioners and decision makers on the significance of urban agriculture. TV and news papers often carry articles on urban farming research and other issues.
2. Workshops and seminars help to disseminate information on urban agriculture and its potential positive and negative impacts. Special attention should be focussed on urban agriculture's impact on income generation and improvement of poor urban household food security and nutrition.
3. Issuing of booklets and leaflets on urban farming or horticulture development and methods of controlling pests and insects through intermediate or adaptive technology e.g. integrated pest management (IPM), water harvesting, etc.
4. Creating awareness at all levels on importance of maintaining city gardens (or Urban agriculture) in Mixed Land Use Strategy.

12.3 Economic Incentives

1. Provision of insurance from the National Insurance Corporation to cover livestock investment is an important incentive to urban agriculture livestock keepers who are market-oriented producers.
2. Provision of extension services and ensuring availability of veterinary drugs, dairy and chicken feed, seeds and other agricultural inputs.
3. Providing information on various tree nurseries for urban practitioners to create woodlots for fuelwood as an agroforestry strategy.
4. Provision of refrigeration facilities, where possible, to help urban agriculture practitioners reduce post-harvest loss of perishable foods like tomatoes.
5. Charging reasonable tariffs for use of treated water in crop irrigation.
6. Making small credit available to small-scale urban agriculture producers as an economic incentive.
7. Owners of land especially public institutions should allow their under developed areas for urban agriculture.

12.4 Strategic Interventions

1. Obtaining NIC coverage for large numbers of livestock and poultry.
2. Stimulating large scale production of dairy cattle (over 100) or thousands of birds (poultry) in the peri-urban areas (e.g. Kigamboni, Southern parts of Ilala district, and western parts of Kinondoni) to supply big institutions like schools and the army within the city region.
3. Specializing on market gardening and commercial floriculture.
4. Investing in major supply units for gardens, e.g. installation of water pipes, tanks and pumping machines in order to tap underground water.
5. Construction of systems to harness rain water.
6. Upgrading the feeder roads to access farms and markets.
7. Developing simple composting systems.

12.5 Regulations

1. The City Council/Commission must enforce existing by-laws which prohibits rearing more than four head of cattle in urbanized areas.
2. The City Council/ Commission in collaboration with the Ministry of Lands, Housing and Urban Development should allow residents with plots in the peri-urban areas or low density areas to practice urban agriculture provided the areas do not exceed three acres as stipulated in the by-law (Urban farming of 1992).
3. The Dar es Salaam City Council should make efforts to:
 - i. Issue stop orders to prohibit building in hazard or flood plains especially Msimbazi Valley;
 - ii. Green Msimbazi valley with trees, fruit trees and other vegetation to curb flooding and stop human invasion; and
 - iii. Train and support dwellers near Msimbazi valley and other eroded ones to plant fruit and other trees as well as certain types of grass to avoid loss of life through flooding.
4. People wishing to keep more than four head of cattle should be helped to move to the peri-urban areas.
5. Farming in water catchments to be prohibited to protect surface water sources; however trees should be planted in all water sources.
6. Enforce by-laws to protect road reserves from haphazard building and squatting.
7. Ensure secure land tenure by allocating land to urban agriculture practitioners, and give large plots in peri-urban areas for people intending to have mixed uses to feature urban agriculture (crops & livestock keeping).
8. Avail fair water tariffs for urban agriculture practitioners.
9. Free grazing to be restricted to peri-urban areas and zero-grazing to be encouraged in the rural areas.
10. Revival of recreational areas, open spaces and allocation of more land for cemeteries to be effected soon.
11. Urban agriculture on house plots in open urban areas will continue but residents must keep environments clean and recycle household waste as possible. City planners and community development experts should promote composting.

12.6 Possible Resources for Urban Agriculture Development in Dar es Salaam

Since the city is expanding fast, along the major road arteries, efforts must be made to coordinate with developers and road construction companies to allow enough areas for road reserves for utility installation and for planting trees, flowers and growing of fruits and vegetables. The possible resources that can be developed for urban agriculture development include:

1. Coastal resources, especially wetlands, mangroves, estuaries and lagoons, instead of being drained for beach recreational development only could be combined with aqua-culture production.
2. Low-density plots, in planned areas (e.g Oysterbay, Mikocheni, Regent Estate, etc) with unused spaces to be encouraged to grow non-permanent crops (e.g. amaranths, spinach, pumpkins and vegetables) and practice of floriculture (growing of ornamental flowers) will also be encouraged.
3. Several river valleys in Dar es Salaam offer suitable areas for flood plain urban agriculture and tree planting (fruit, fodder and other trees). Trees in these areas will improve micro-climate of Dar es Salaam.
4. There are institutions, such as, hospitals, schools, churches, factories, the army (JWTZ & JKT), which have large open spaces and farms that can be used more intensively for horticulture and zero-grazed livestock production.

These aspects were discussed in the context of relationships which exist between urban agriculture and three other workshop topics which were deliberated for SUDP. These are summarized below.

13.0. CONCLUSION

Dar es Salaam city enjoys a unique position of incorporating urban agriculture in its strategic development plan largely because the practice is prevalent and cuts across a wide segment of the inhabitants. The government, city authorities and the donor community are aware that without urban agriculture, survival of the urban poor would have been worse.

Urban agriculture can be incorporated into the SUDP and overall development of Dar es Salaam through a Mixed Land Use Strategy. A mix of farming systems and action plans are implied in the process of managing urban agriculture on a sustainable basis in Dar es Salaam. The mix of urban agriculture farming systems and action plans encompasses field crops and livestock rearing. Farming in the city is not a straightforward business. For this reason, urban agriculture "requires much finer technological and organization precision than rural agriculture because it must be more intensive, more tolerant of environmental stress, more responsive to market behaviour, and more carefully monitored to protect public health. More high-value urban agriculture systems

need to be adapted to smaller scale operations, including animal husbandry and limited space farming - hydroponics and stall feeding and container farming (DGIP/UNDP, 1993)."

BIBLIOGRAPHY

- Airey, J. 1995. "**Livestock and Meat Supply to Dar es Salaam City, Tanzania**". Dar es Salaam, Ministry of Agriculture and FAO.
- Baruti, P. et.al.,1992."**Environmental Profile of the Metropolitan Area**".UNDP/URT/90/033.
- Bongole, A. 1988. "**Urban Dairy Farming: A Case Study of Dar es Salaam City**". Unpublished Dissertation, Sokoine University of Agriculture (urban agriculture), Morogoro..
- Briggs, J. 1991. "**The Peri-urban Zone of Dar es Salaam, Tanzania: Recent Trends and Changes in Agricultural Land Use**". Transactions of the Institute of British Geographers, 16: 319-333.
- Bryceson, D. F. 1985. "**Food and the Purchasing Power: The Case of Dar es Salaam**" African Affairs, 4:499-522.
- De Blin. H. J. 1963."**Dar es Salaam: A Study in Urban Geography**". Chicago, Northwestern University Press.
- Ellis, F. and Sumberg, J. 1996. "**Food Production, Urban Areas and Agricultural Policy**" Unpublished Manuscript.
- Egziabher, A. G. et al., 1994. "**Cities Feeding People: An Examination of Urban Agriculture in East Africa**". IDRC, Ottawa, Canada.
- Fowler, E. P.1991."**Land Use in Ecologically Sensible City**".Alternatives,Vol.18.No.1: 26-35.
- Franz, V., Emiel W., and Kadmiel, W. 1995. "**Policy Program Options for Urban Poverty Education: A Framework for Action at Municipal Government Level**". UNDP/UNCHS (Habitat) / World Bank Urban Management Program, 20, Urban Management and Poverty. The World Bank, Washington D.C.
- Freeman, D. 1991. "**A City of Farmers: Informal Urban Agriculture in Opens Spaces of Nairobi, Kenya**", Montreal and Kingston, McGill University Press.
- German Tanzanian Cooperation (GTZ). 1995. "**Urban Vegetable Promotion Project (UVPP)**", ZOPP 5 Planning Workshop (& Project Evaluation) 28 March - 1 April, Arusha, Tanzania.
- Hartvelt, F. and Gross, B. 1984."**Urban Agriculture in Latin America, Africa and Asia**", mimeo.
- Helmore, K.and Ratta, A.1995."**The Surprising Yields of Urban Agriculture Choices**",22- 26.

Howorth, C. et. al., 1995. **"Feasibility Study of Urban Horticulture in Dar es Salaam"**, carried out on behalf of the Natural Resources Institute by ETC. (UK). (Final Draft).

Hormann, D. M. 1993. **"Urban Horticulture for the Poor in Urban Tanzania: A Rapid Appraisal for Selected Cities"**, Institute for Horticultural Economics, University of Hannover, Germany. pp. 25.

Khouri-Dangher, N. 1986. **"Food and Energy in Cairo: Provisioning the Poor"**, Research report No. 18. Food-Energy-Nexus Program. UNU, Paris.

Kiango, S. and Likoko, T. 1996. **"Vegetable Production in Open Spaces in Dar es Salaam City"**, MOAC and GTZ, The Urban Vegetable Promotion Project.

Kishimba, M. A. 1996. **"Urban Agriculture in Dar es Salaam: How Polluted are the Irrigation Waters?"**, (unpublished paper).

_____. 1993. **"Environmental Issues Pertinent to Urban Agriculture: The Case of Dar es Salaam"**, Paper presented in a One Day Workshop on Urban Agriculture in Dar es Salaam, British Council Hall, November 12, 1993.

Kombe, J. W. M. 1994. **"The Demise of Public Urban Land Management and the Emergence of Informal Land Markets in Tanzania: A Case of Dar es Salaam"**, Habitat International, 18 (1): 23-43.

Kyessi, A. and Mtani A. 1993. **"Potentials for Sustainable Urban Agriculture in Dar es Salaam"** paper presented to a one day Workshop on Urban Agriculture in Dar es Salaam", British Council Hall, November 12, 1993.

Kyessi, A. G. 1990. **"Urbanization of Fringe Villages and Growth of Squatters: The Case of Dar es Salaam, Tanzania"**, Unpublished MSc. Dissertation, ITC, Enschede, The Netherlands.

Lado, C. 1990. **"Informal Urban Agriculture in Nairobi, Kenya: Problem or Resource in Development in Land Use Planning and Land Use Policy"**, 7 (3): 257 - 66.

Lee-Smith, D. and Trujillo, C. H. 1992. **"The Struggle to Legitimize Subsistence: Women and Sustainable Development"**, Environment and Urbanization., Vol.4, No.1: 77 - 84.

Leslie, J. A. K. 1963. **"A Survey of Dar es Salaam"**, Oxford, Oxford University Press. England.

Lupalla, A. M. K. 1993. **"Towards Best Practice of Urban Agriculture in Dar es Salaam, Tanzania"**, Institute for Housing and Urban Development Studies, ITC.

Materu, J. S. 1993. **"Urban Agriculture in the City of Dar es Salaam, Who are the Main Actors?"** Paper presented in a One Day Workshop on Urban Agriculture in Dar es Salaam, British Council Hall, November 12, 1993.

Mlozi, M. R. S. 1995. **"Information and The Problems of Urban Agriculture in Tanzania: Intentions and Realizations"**. Unpublished Ph.D. Thesis, University of British Columbia, Canada

_____. 1996. **"Urban Agriculture in Dar es Salaam: Its Contribution to Solving the Economic Crisis and the Damage it does to the Environment"**, Development Southern Africa. Vol.13, No.1:47-65.

Mlozi, M. R.S., Lupanga I.J., Mvena, Z. S. K. 1992. **"Urban Agriculture as a Survival Strategy in Tanzania"** in Baker, J. & Petersen, P. O. (eds.). The Rural-Urban Interface in Africa: Expansion and Adaptation. Uppsala, SIAS.

Mosha, A. C. 1991. **"Urban Agriculture Farming Practices in Tanzania"** in Review of Urban and Rural Planning in Southern and Eastern Africa. No. 1:83 - 92.

Mougeot, L. J. A. 1994. **"Leading Urban Agriculture into the 21st Century: Renewed Institutional Interest"**, in A. G. Egziabher, et al., Cities Feeding People: An Examination of Urban Agriculture in East Africa. IDRC, Ottawa, Canada, pp. 105 - 115.

_____. 1994. **"Urban Food Production: Evolution, Official Support and Significance"**, Cities Feeding People Series, Report 8 (IDRC).

Mvena, Z. S. K. et al., 1991. **"Urban Agriculture in Tanzania: A Study of Six Towns"**, A Draft Report submitted to IDRC.

Mwamfupe, D. G. 1994. **"Changes in Agricultural Land Use in the Peri-Urban Zone of Dar es Salaam, Tanzania"**, Unpublished Ph.D. Thesis, University of Glasgow.

NIGP/STOAS. 1995. **"Project for The Development and Maintenance of Horticultural Gardens in Dar es Salaam"**, NIGP/STOAS (Foundation for Development of Agriculture, Education and Training).

Ngoda, S. G. 1991. **"The Economic Analysis of Broiler Production in Dar es Salaam"**, Unpublished Doctoral Thesis, Sokoine University of Agriculture (URBAN agriculture), Morogoro.

Rogerson, C. M. 1993. **'Urban Agriculture in South Africa: Policy Issues from the International experience"**, Development Southern Africa. 10 (1): 33 -44.

Sawio, C. J. 1994. **"Who are the Farmers of Dar es Salaam?"** in A. G. Egziabher, et al., Cities Feeding People: An Examination of Urban Agriculture in East Africa. IDRC, Ottawa, Canada, pp. 25 - 46.

_____. 1994. **"Urban Agriculture and the Sustainable Dar es Salaam Project"**, Cities Feeding People Series Report 10, IDRC.

_____. 1993. **"The Scale and Extent of Urban Agriculture in Dar es Salaam"**, Paper presented in a One Day Workshop on Urban Agriculture in Dar es Salaam, British Council Hall, November 12, 1993.

Schippers, R. and Lewcock, C. 1994. **"Case Study of Urban and Peri-Urban Agriculture in Tanzania"**, Chatham, Natural Resources Institute (NRI).

Support Group for Urban Agriculture (SGUA), Meeting, IDRC, March 18-19, 1996 (Notes).

Smit, J. et al., 1996. **"Urban Agriculture, Food, Jobs and Sustainable Cities"**, UNDP, One UN Plaza, NY.

Sommers, P. and Smit, J. 1994. **"Promoting Urban Agriculture: A Strategy Framework for Planners in North America, Europe, and Asia"**, Cities Feeding People Series, Report 9. (IDRC).

Sporrek, A. 1985. **"Food Marketing and Urban Growth in Dar es Salaam"**, Unpublished doctoral dissertation. The Royal University of Lund, Department of Social and Economic Geography, Lund, Sweden.

Stevenson, C. 1996. **"Market Production of Fruits and Vegetables in the Peri-Urban Area of Dar es Salaam, Tanzania"**, MOAC and GTZ, (Urban Vegetable Promotion Project).

Sutton, J. E. G. 1970. **"Dar es Salaam, City, Port and Region"**, Tanzania Notes and Records, 71, 165-172.

World Resources, 1996-97. **"The Urban Environment, World Resources, A Guide to the Global Environment"**, (Habitat II).

United Nations Centre for Human Settlements (Habitat), 1994. **"Sustainable Cities, Concepts and Application of A United Nations Program"**, Nairobi, Kenya.

United Republic of Tanzania, Ministry of Lands, Housing and Urban Development (URT-MLHUD), 1995, **"National Land Policy"**.

