

URBAN AGRICULTURE IN DAR ES SALAAM: PROVIDING AN INDISPENSABLE PART OF THE DIET

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1. Introduction

Dar es Salaam is by far the most important urban centre in Tanzania. With rapid urban growth in the last two decades, this city now accounts for about 35% of the total urban population of Tanzania (Burra 1997, CHS 1995). It is seven times larger than the country's next urban centre, Mwanza. It is the main destination in rural-urban migration, which the country has witnessed since its political independence in 1961 (Oyieke, Nnkya & Kofi Doe 1997). Rural-urban migration and natural growth equally share the increase in Dar es Salaam's population to date (CHS 1995).

Table 1: *Basic facts on Tanzania and Dar es Salaam*

	Tanzania	Dar es Salaam
Area	945,000 km ²	1350 km ² , ca. 200 km ² inner city
Population	Approx. 30 million	Approx. 3 million
Growth rate	2.8%	8%
Urbanisation	Estimated 20%	
Poverty	Ca. 50% of the total population and 60% of the rural population are below the poverty line*	

*) Ferreira 1994, Nayaran 1997.

Located 800 km south of the equator on the East African coast, Dar es Salaam was established by Sultan Seyyid Majid of Zanzibar in 1862. As a port and trading centre, the town grew rapidly, especially since the relocation of the German colonial headquarters in 1891. The Germans, later followed by the British, introduced a three-zone model to the city. Zone 1 northeast of the harbour was reserved for Europeans. Today the area is mixed but still a low-density area. The second zone around the harbour was reserved as a business zone and was later mainly inhabited by Indians. It is today's Central Business District and one of the most populated areas. Zone 3 was reserved for native quarters, rigidly planned in order to avoid further squatting (CHS 1995, Vicent 1970). The densely-populated second and third zones are considered the city centre of Dar es Salaam today.

In 1948, a first Master Plan introduced general guidelines for development of the city and led to the construction of low-cost tenant houses near the city centre around the harbour. After independence in 1961, housing was in short supply because of high rural-urban migration, and squatting increased rapidly. While in the beginning attempts were made to clear the slum areas, in 1972 the government changed its policy and ordered that squatter settlements should be improved rather than demolished. In the 1978 Master Plan, squatting was accepted and the focus shifted to uplifting these areas (CHS 1995). To date, about 70% of the population live in unplanned settlements with marginal access to tap water, sewage systems, infrastructure or basic social services (SDP 1992, United Republic of Tanzania 1996).

Formal employment is decreasing, and informal activities have become a necessary strategy for survival (Mascarenhas 1994;17, United Republic of Tanzania 1996). According to a study by the Planning Commission and the Ministry of Labour and Youth Development (1995), about 30% of the urban population gains an income in the informal sector and about 6.5% of the informal urban workforce works in urban agriculture, not taking into account the huge number of subsistence home gardeners in the city.

2. Types of urban agriculture

Dar es Salaams' coastal plain and climate (with 1000 mm annually in wet seasons from March to May and from October to December) do not offer very favourable conditions for intensive agriculture (Sawio 1998). Nevertheless, urban agriculture is widely practised (Jacobi 1997, Jacobi & Amend 1997, Mvena et al. 1991). Urban agriculture is a direct response to local needs and favoured by a still fairly low-density urban pattern and open areas available in town.

A large number of cultivators in the open spaces acquired their plots during the economic crisis in the first half of the 1970s, when the government encouraged people in the city to cultivate every available piece of land. Following a decline in farming in the latter half of the 1970s, it has increased again in recent years (Stevenson et al. 1994).



Home gardening in a high density areas of Dar es Salaam (Picture Urban Vegetable Promotion Project)



Cattle raising in Dar es Salaam's urban area (Picture Urban Vegetable Promotion Project)

Box 1: Definition of Dar es Salaam's urban farming**Intraurban production:**

Any agricultural activity which takes place in the continuously built-up residential, institutional or industrial areas in the city.

Periurban production

Any agricultural activity which takes place at the fringes of the continuously built-up areas. The periurban area has scattered homesteads, but is not as dense as the urban area. A change from rural to urban activities can be observed. The periurban area acts as a corridor between the urban and rural areas.

Both private and public land, residential plots and industrial or institutional areas are under cultivation. Use of private property needs either a formal (title, rent agreement) or an informal agreement (producer negotiates with the owner and obtains permission to cultivate, with no written contract). In most cases, public land is used without agreement and illegally encroached. A considerable amount is produced in open spaces without secure land rights.

Water is scarce in the dry season, as the public water-supply system can hardly keep up with the requirements of the increasing population. Access to a reliable source of water, which varies tremendously between wards, determines the potential of the agricultural enterprise. Where there is no water supply, farmers produce under rainfed conditions. Commercial production is carried out in locations with enough surface water for continuous production (rivers, open drains), as systems depending on tap water or shallow wells produce at a risk. Supply of drinking water is guaranteed through local water sellers, but purchasing water for irrigation or collecting it from distant sources is not economic.

In the inner town, vegetable production is the most common production system, followed by dairy and poultry keeping. In the periurban fringes, a mixed crop-livestock system, fairly rural in character, is often found. Here, fruit and nuts are also produced. Rooftop gardening, aquaculture and container gardening are promoted, but these "advanced" production techniques are not widely accepted.

Food production in urban areas has two clear objectives. It generates income and reduces costs. In previous studies¹, it became clear that the urban farmers form a complex mix of social groups. Stevenson et al. (1994) showed that urban farmers are rarely recent migrants. Urban farmers have been living in town for 10-15 years, which suggests that access to resources can be obtained only if a resident is well embedded in the social system. Nevertheless, food production is often a

1 Jacobi 1997, Mlozi 1998, Sawio 1994, Stevenson et al. 1994

recent activity to many residents. About half of the farmers started practising agriculture in the last five years (Mlozi 1998). This is related to the declining purchasing power and the absence of formal employment. Urban food production is often a necessary supplement to the household's food supply or budget (Mascarenhas 1995, UNDP 1996).

Farming is not restricted to certain age groups. Farm families are generally bigger than the average Dar es Salaam household (5-7 compared to 4-5 members). Larger households have a higher demand for family income and are thus using their resources to produce more of their own food (Stevenson et al. 1994).

Crop cultivation is dominant in Dar es Salaam (Jacobi 1997, Tesha 1996). Leafy vegetables are in high demand, because they are part of the traditional diet. Eggplant, sweet and hot pepper, okra and tomato as well as fruits like oranges, mangoes, banana, papaya and pineapple are produced in the periurban area. With their short production cycle, vegetables can be grown in locations where water is not available throughout the year, where there is no long-term right to using the land and where little space is available. Occasionally, green maize and rice is produced in the inner city during the long rainy season; otherwise, staples come primarily from periurban or rural areas.

Table 1: Yield potential of selected leafy vegetables and their cultivation period

Type of vegetable	Total yield/m ² in one period	Cultivation period in weeks
African spinach leaves (<i>Amaranthus</i> ssp.)	1.5 kg	3-4 weeks
Chinese cabbage leaves (<i>Brassica chinensis</i>)	5 kg	10-12 weeks
Sweet potato leaves (<i>Ipomea batata</i>)	1.5 kg	12-17 weeks
Swiss chard leaves (<i>Beta vulgaris</i> var. <i>cicla</i>)	6 kg	15-17 weeks
Kale leaves (<i>Brassica oleracea</i> var. <i>Acephala</i>)	3.5 kg	15-17 weeks
Cowpea leaves (<i>Vigna unguiculata</i>)	2 kg	9-11 weeks
Pumpkin leaves (<i>Curcubita moschata</i>)	0.7 kg	11-13 weeks

Source: UVPP field data.

Few resources are necessary for urban farming, which makes it a possible choice for all households. A hoe, a bush knife (*panga*) and a watering can are required for subsistence production. In more market-oriented systems, irrigation through

hoses or pipes, and knapsack sprayers for plant protection can be found. Also in the periurban areas, hardly any mechanisation or advanced irrigation systems are found.

All cultivation in town heavily depends on organic fertiliser (poultry or cattle manure). There is a well-established exchange system between poultry keepers and vegetable producers, but at times the demand is higher than the supply. In the periurban areas, also mineral fertilisers are used. Pest management ranges from zero treatment for subsistence to full treatment and even overdosage in the case of market-oriented producers. Recently, also organic practices are promoted by bilateral projects.

Cattle, goats and chickens are kept in close vicinity to urban settlements. While cattle are kept exclusively by medium- and high-income groups either in the periurban areas or in low- density settlement areas, goats and chickens are affordable to all income groups. The number depends on family income. Current cattle population in Dar es Salaam is projected at 34,000 cattle, 12,500 goats, 1,500,000 poultry and 5,000 pigs (MoAC 1999). Animal production is for the market, with only a small portion consumed in the household. Livestock rearing, especially in low-density and periurban areas, is often combined with cropping systems (Mlozi 1998, Tesha 1996). However, livestock and cropping systems are not always well integrated. This is especially true for free-ranging animals. Destruction of crops by chicken rates as the main problem of home gardeners in high-density areas and sometimes prevents cultivation.

By and large, the extension system concentrates on the rural areas. However, steps are taken to address additionally the various urban farmer groups and to develop appropriate strategies. More than 200 extensionists are currently stationed in the Dar es Salaam region, some of them with special duties in the city gardens. With the ongoing civil service reform, the number will decrease, but up to now there is a general interest to maintain the system. Because of the limited outreach of the governmental service, a private system for livestock services operates.

2.1 Home garden production

In Dar es Salaam, backyard farming is the most important type of urban farming according to the number of households involved. Gardens are found all over the city among all income groups and are cultivated with minimal inputs on an individual basis. Urban home gardens belong to a residential plot. The prevailing objective is home consumption. Home gardens are cultivated by one or more

persons of the same household. The right to use the land is linked with the tenure of the house or the permission of the landlord and therefore legal. Vegetables in particular are grown.

In Dar es Salaam, water is obviously the limiting factor and many gardens are entirely rainfed. Shallow wells and tap water are equally important. In the dry seasons, tap water is unreliable and the water levels decrease; production is therefore restricted from May to October. Besides lack of water, lack of land for further expansion, lack of marketing possibilities, pest management and availability of inexpensive but good-quality inputs (seeds, fertiliser) are major problems mentioned by gardeners.

2.1.i Gardening in high-density areas

Gardening in high-density areas or unplanned settlements is mostly subsistence-oriented and a clear survival strategy for the poorer households. In two unplanned areas (both sites are about 20 ha) it was found that 15-20% of all the houses had home gardens during the growing season (Jacobi 1997). These backyard gardens cover 40-80 m² on average².

Women are traditionally responsible for feeding the family and also for home gardening; men hardly play a role. A variety of leaves are produced, which are used for home consumption. Here, the drought-tolerant sweet potato leaves, as well as cow pea, cassava and pumpkin leaves are found. The varieties allow continuous picking over a prolonged period of time, serving as a low but steady food supply. When household budgets are tight, vegetables produced in the own garden are often the only source of vitamins. Besides consumption, the vegetables (ca. 10%) serve social functions and are given to neighbours and relatives. Surplus is sold to nearby retail shops.

2.1.ii Low-density settlements

These areas have more favourable conditions for home gardening. The plots are bigger in size (ca. 4.000 m²) and tap water is frequently available. Mlozi (1998) found that garden sizes on house plots varied between 500-800 m² and that the bulk of production was for home consumption. Medium-income groups, especially government employees, use these resources for additional income or to cut food costs. Gardening is not restricted to a specific gender.

2 Sawio (1994) found that the most commonly cited garden size ranged from 50-100 m²; Stevenson et al. (1996) and Yachkaschi (1997) found a higher average of 270 m² for home gardens.

2.2 Livestock production in urban homesteads

In the study by Mlozi (1998) on low-density home gardens, 65% of the gardeners reported having livestock, 24% had cattle followed by 21% of poultry (broilers/layers) and 19% local fowl. The importance becomes clear by the fact that around 16% of the urban milk consumption originates from urban production (44% periurban, 28% imports, 8% Masai herds, 4% others) (Sumberg 1997). The urban system is characterised as one “which is essentially a sideline economic activity; it is characterised by small herds, feed gathered and grazed from public land or purchased from boys who cut roadside grass, and direct marketing to individual consumers” (Sumberg 1996).

Compared to the periurban areas, the growth of urban dairy cattle population has been extraordinary in the last decade. Most urban cattle keepers are government employees using government plots allocated to them to increase their salaries. Taking into account the ongoing civil service reform, it is likely that there will be a reduction of staff combined with vacation of these prime residential locations and part of the urban production might shift to the periurban areas. Also, poultry keeping - both extensive and intensive - is widespread, though on a small scale (Sumberg 1996).

2.3 Community gardens

Community gardens are found in high- and medium-density areas on public land, normally close to the producers' homesteads. The gardens are farmed by formally or informally organised groups of people within the community, but with individual ownership. Production has a dual purpose of subsistence and income.

Mainly through efforts from outside, a number of informal "community garden groups" have developed. The fact that they are gardening as a group differentiates them from individual home gardeners or producers in open spaces. Plot sizes tend to be bigger than average home gardens. Women are more active in community gardens; however, about one third of the gardeners is male. The production is more diverse than in home gardens and open spaces. The bulk is for home consumption. Access to services (e.g. extension, inputs) is easier for these organised groups. Besides material benefits, the groups have important social functions. Most of the groups function as a security system, providing services to each other (credit and savings, contributions in times of sickness, funerals and weddings).

2.4 Open-space production

Open spaces are areas of market-oriented intraurban crop production surrounded by residential, industrial or institutional areas. The land is public (hazardous lands not suitable for construction, road reserves, available land for community use, etc.) as well as private (residential, industrial or institutional plots underutilised or awaiting development). While public land is generally farmed without official permission, use of private land depends on a formal or informal agreement with the owner. The area can vary considerably in size and ownership (Jacobi 1997, Kiango & Likoko 1996). In the urban area of Dar es Salaam nearly 650 ha of open spaces are cultivated with an average plot size of 700-950 m² (Dongus 2000, Stevenson et al. 1994, Yachkaschi 1997). Most of the open spaces stretch along rivers and water drains. Occasionally, shallow wells and legally or illegally tapped water are alternative water sources. Open spaces have a year-round production.

Open spaces are cultivated by more than one farmer, mainly men from low- and medium-income groups. The men do not necessarily work together as a group. Producers on one open space tend to come from the same tribe, but various tribes can be found in this business.

Production concentrates on market-oriented leafy vegetable production (*Amaranthus* spp, Chinese cabbage) which are an essential part of the traditional diet. Leaves are very perishable and do not tolerate transport. The short distances to the consumers offers open-space producers a niche market, which cannot be taken over by producers outside the city.

The marketing system depends greatly on the location of the open space: direct sales to passers-by, sale of an entire vegetable bed to middlemen or preparing bundles of leafy vegetables for the various markets in the city. Marketing strategies vary in time depending on overall demand and supply of vegetables. After the long rains demand is less, as many urban dwellers produce their own vegetables. In the dry season, when home gardens stop producing, open-space production is often the only source of fresh leaves. Insecure land tenure is by far the most important constraint, followed by fluctuating markets, insecurity of water quantity and quality, insecure sources for inexpensive but good-quality inputs, and lack of knowledge on pest and disease management.

2.5 Periurban production

Stevenson et al. (1996) estimated that about 35,000 farming households depend on periurban fruit and vegetable production for their income. Around 44% of the daily milk consumption (Sumberg 1997) is produced in the periurban areas. Stevenson et al. (1996) surveyed periurban areas within a radius of 15-25 km of the city centre to give an impression of Dar es Salaam's outreach. Depending on road infrastructure and how the city expands, this radius is likely to increase rapidly within the next few years.

In the periurban belt, originally rural farming communities are found. Step by step, they are being swallowed by the city, but their “rural” social system is still partly intact. Stevenson et al. (1996) found that, for 90% of 204 interviewed periurban farmers, agriculture was their primary economic activity; the average farm size was 5.1 acres, of which on average of 1.6 acres was under vegetable and fruit production³. A second group of farmers migrated to the periurban areas, 40 % came from the urban and 60% from the rural area. These households have similarities with urban low-density farmers in the inner city. The owner of the house might farm as a sideline or give the tasks to cultivate entirely to dependants or employees. Generally, the production is market-oriented and carried out by men (80%) (Stevenson et al. 1996). Agriculture is not the main motive for acquiring land at the city fringes, as land speculation is a more profitable business.

Crop and livestock production occurs in various combinations. In comparison to the small-scale production systems in the urban areas, only few specialised commercial producers are operating⁴.

The periurban produce directly supplies the various markets in town and, on account of the short distance, income opportunities are stable and likely to remain. Most farmers have a mix of marketing strategies. Stevenson et al. (1996) found for fruit and vegetable marketing that 67% are selling to middlemen, 47% directly to urban markets, and 33% is distributed via the village market. Milk is sold mainly to institutional consumers or kiosks (Sumberg 1997). In addition to proximity and infrastructure, crop-production levels and village collection markets also influence the different strategies. Traders tend to go to villages with high production levels, where they are sure to collect the product they want.

3 Sawio (1984) found that 75% of his respondents had farms of 1-10 acres; this corresponds with the findings of Stevenson et al. (1996).

4 There is, however, specialised milk and poultry production on a small scale (Sumberg 1997).

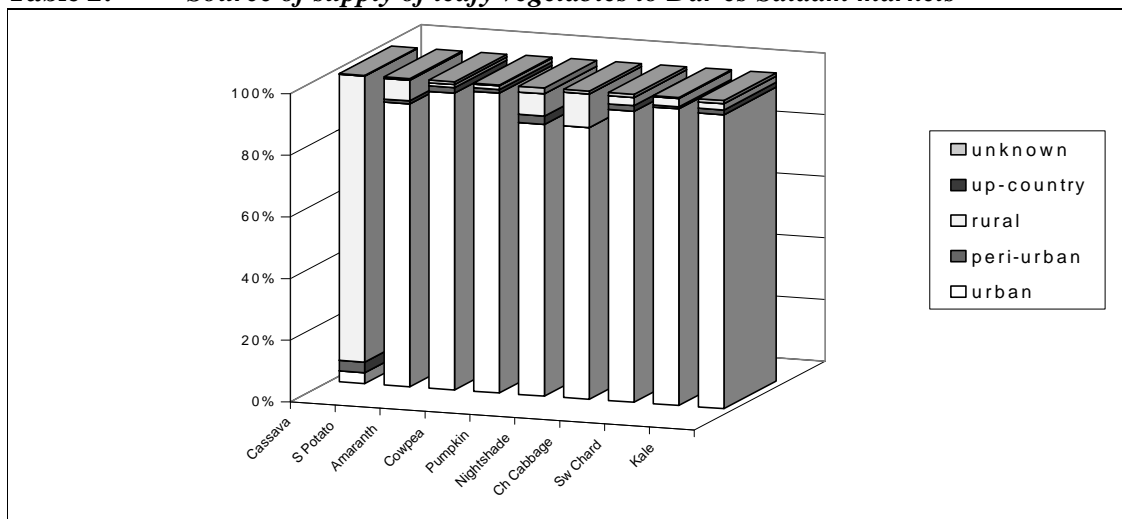
Because of this, several locations within the periurban zone are known for a specific crop. Nevertheless, the most urgent problems mentioned by farmers concern transport and marketing, quantity or quality of inputs available, financial constraints and inadequate technical knowledge.

As the periurban areas of today will be very likely swallowed up by the growing city, it is expected that the cropping pattern and the intensity of the systems will change (less staple crops, less fruit trees, more vegetables, more intensive livestock systems). Periurban production will partly become the open-space production of the future.

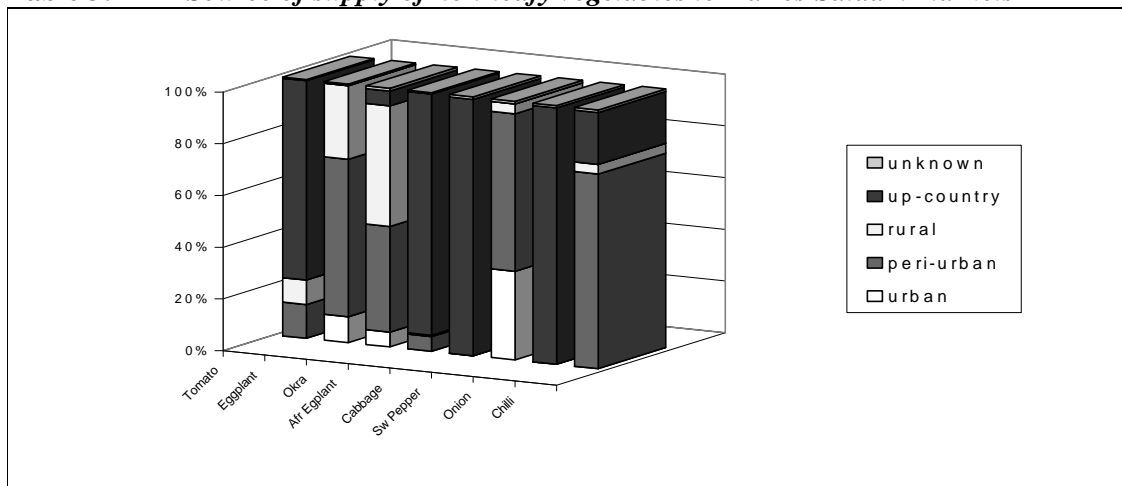
3. Food security, health and nutrition

Dar es Salaam rarely faces food shortages. The urban supply pattern follows classical theories. Perishables (e.g. milk, leafy vegetables) are produced in intraurban areas. The periurban belt supplies a mix of perishables, vegetables (sweet and hot pepper, eggplant, okra) and staples (maize, rice, cooking bananas and cassava). Major staple food production comes from the rural areas. Temperate vegetables and fruits (crucifers, leek, carrots, apples, pears) are supplied from up-country, as they cannot be produced in the tropical lowland climate.

Urban agriculture is vital for Dar es Salaams' food supply. More than 90% of leafy vegetables (especially amaranthus) come from the open spaces and home gardens (Stevenson et al. 1996), while 60% of the milk is produced in urban and periurban areas (Kurwijila 1995).

Table 2: *Source of supply of leafy vegetables to Dar es Salaam markets*

Source: Stevenson et al. 1996.

Table 3: *Source of supply of non-leafy vegetables to Dar es Salaam markets*

Source: Stevenson et al. 1996.

Food security at household level is mainly determined by the access of various groups to food. One argument for urban agriculture is the contribution to nutrition and its impact on the health of the urban poor. A one-year survey on consumption habits showed that own vegetable production plays a role in vitamin A and C supply, as purchases of fruits and vegetables from the market are cut when the household budget is tight (Kogi-Makau 1998).

It is difficult to separate the contributions of home production and purchased food. The role of home production varies tremendously with plot size, varieties produced and consumption habits. More indirect effects on nutrition are expected through additional income, which is channelled back into the household food

budget. Home gardening and open-space production systems are by far the most important sources for providing food for poor urban households.

Up to now, no direct link between consumption of e.g. leafy vegetables or raw milk in the city and negative effects on health has been established. This is not surprising if one considers the general environment of many urban dwellers.

4. Urban agriculture and the urban environment

In general terms, urban agriculture contributes to preserving open spaces, improving the urban microclimate, beautifying the city and preventing illegal dumpsites and squatting.

A major concern is the quality of crops from urban areas. Despite existing laws to control air, water and soil pollution, there is no strict enforcement in Dar es Salaam. Sewage is usually discharged untreated into streams or rivers. Roadside garages disposing of oil on the ground is a common sight. The traffic is ever increasing and no unleaded fuel is available. In recent years, three surveys analysed the level of carbon oxide (CO), suspended particulate matters (SPM) and sulphur dioxide (SO₂) in the air (Ceest 1996, JICA 1994, NEMC 1994). The results were contradictory: concentrations for CO, SPM and SO₂ both exceeded and remained within WHO standards, depending on the study. However, with ever-increasing (private) transport, the situation will deteriorate if exhaust levels remain unchecked.

The level of water pollution in different streams in Dar es Salaam was also assessed (NEMC 1994, Muster 1997, Qamara & Othman 1996, Sawio 1998). The contamination with heavy metals (lead, cadmium and chrome) was within the Tanzanian standards for irrigation water. The two rogue samples had higher concentrations of lead (Qamara & Othman 1996). Biological agents discharged from households and industries were also present in the water. Only in few samples were the concentrations higher than recommended levels (Muster 1997, Sawio 1996). One sample contained coli bacteria (Muster 1997).

Soils under agriculture contained only traces of heavy metals, which posed no risk for farming. In the immediate vicinity of a major road, however, higher than usual concentrations were detected, which might threaten cultivation in the future (Amend & Mwaisango 1998, Sawio 1996). Contamination of leafy vegetables by heavy metals was analysed by Othman & Bahemuka 1996 and Sawio (1996): lead

and cadmium were in excess in several samples, while copper and zinc were below the recommended limits in all samples.

5. Urban agriculture and the household economy

For poorer people, about 70-75% (CARE 1998, Kogi-Makau 1998) of the household budget is spent on food. Kogi-Makau (1998) found that about 20% of the food budget is spent on vegetables and fruits. During the times of the year in which vegetable production is difficult (heavy rains/dry season), consumption of vegetables and fruit is reduced (Kogi-Makau 1998). This suggests that any contribution from home production has a direct impact either on the nutrition level of the family or on the budget by reducing expenditures or earning additional income. Savings can be between 5-7% of a low-income household budget.

Open-space production is often a full-time activity and contributes considerably to the family income. Jacobi (1996) projected that 500 m² of intensive African spinach (*Amaranthus* spp) production is comparable to a basic government salary (about US\$ 60 or 45,000 Tanzanian shillings/month).⁵ The same applies to maintaining one or two dairy cows in Dar es Salaam and a well-maintained home garden of 750 m² (Mlozi 1998). Most open-space producers and cattle keepers earn more because they cultivate larger areas and have more cattle.

6. Urban agriculture and gender

Traditionally, both women and men are responsible for providing food for the household, but it is also understood that women have a greater responsibility. Both men and women farm, but their participation is clearly differentiated by the location of the field (Mascarenhas 1995) and is thus closely related to the production system. Women farmers are more numerous, producing on a micro-scale; in terms of yield produced, men are in the forefront as they occupy the larger plots.

There is a strong link between the socio-economic status of the family, the objective of the production and the involvement of women. In poor urban households, women produce mainly for subsistence; very little produce is sold in the marketplace (Kogi-Makau 1995). In medium-income households, both men and women are involved and they produce for both subsistence and sales.

5 The minimum salary in Tanzania is currently TSH 30,000.

Market-oriented production in open spaces is clearly dominated by men. In the periurban production system, both men and women play a role, but more equality is found on farms outside the city, where the situation is similar to the situation in rural households (Mascarenhas 1994). The differentiation of agricultural activities does not make the difference, but the location, magnitude of enterprise and orientation of production does. Most farmers in open spaces are men and farming is their main profession. Usually, no other family member is involved (Kiango & Likoko 1996). Plot size correlates with the single labour force. In contrast, women usually tend to home gardens, as these are more easily combined with traditional household duties and care for children and for old or sick family members.

”Female agriculture” renders more benefits for the household because the produce is either directly consumed in the family or the income obtained is spent on the basic needs of the family. Men contribute part of their earnings, but the share is less.

Access to land is a crucial issue to gender equality in urban agriculture. Significantly fewer women than men own land or houses. Mascarenhas (1995) found that local leaders are less likely to allocate land to women in the informal land distribution system, since women are culturally excluded from possessing land. The study shows that the situation in urban areas is slightly better for women, which gives them a chance to demand a more equitable share of urban resources. However, the constraints still outweigh the opportunities.

7. Factors affecting the development of urban agriculture

The most obvious reason for the popularity of urban agriculture is the need to look for income or food for the household. Urban agriculture is a survival strategy to cope with the declining standard of living in the city.

Access to resources, above all water, is the major constraint for urban agriculture. Farming depends on surface water and groundwater; in many parts of town, the groundwater table is high, allowing for low-cost shallow wells. Tap water is available to a number of households and used for productive purposes. Many areas with easy access to water are already occupied; access to these locations is therefore limited. Competition arises from other informal entrepreneurs, e.g. sand miners or hollow block producers. Dar es Salaam’s tap water supply has been problematic in recent years. Many areas do not have a permanent supply. This is

particularly true for unplanned areas. Further extension of urban agriculture will depend on a reliable water source and is likely to be limited.

Sometimes, no or only informal agreements exist between the owner and the user of the land. The insecure land-use title (and sometimes illegal land use) and unclear timeframe in which the land can be used makes open-space production highly insecure. Investments, e.g. in water infrastructure, are not undertaken and conservation measures are not considered.

In many parts, Dar es Salaam still has a low-density settlement structure. There are plenty of open spaces and undeveloped plots which can be cultivated or used for livestock. Some of the river valleys are not suitable for housing, on account of flood risk. Urban farmers use these areas at least part of the year.

Dar es Salaam is the biggest market in Tanzania and there is an increasing demand for food. There is an unsatisfied demand for fresh food like leafy vegetables, milk, eggs and meat, and few larger-scale producers operate near the city. Weak and expensive transport facilities in Tanzania favour urban over periurban and rural farmers.

Tanzanian consumption habits (e.g. green leafy vegetables) favour urban production because these vegetables are very perishable. Tanzanian agriculture depends on imported inputs, which often enter the country through Dar es Salaam. Urban farmers benefit from the proximity to these supply sources.

Dar es Salaam has existing bylaws for urban agriculture, with clear guidelines for livestock. However, law enforcement is rather weak. Especially intraurban livestock keepers take advantage of this situation. The shorter distance to consumers offers an advantage in comparison to periurban producers. Stricter law enforcement would lead to changes in the production system.

Many urban dwellers are of rural origin. Their rural background and knowledge play a role when starting urban agriculture. This also includes a certain status given to one's own field or own cattle.

Despite the magnitude of demand for fresh produce, the access to the urban retail markets is limited for the individual producers. Those farmers who have developed a close producer-consumer relationship have certain advantages; newcomers face problems.

Lack of knowledge in certain production techniques (e.g. plant protection, crop rotation, economic use of irrigation water) can cause considerable losses in production. Extension agents have little vision as to how to cope with urban farmers.

There is increasing competition for attractive spots (e.g. water supply) and for credit facilities or general support by the local administration. Compared to informal “business” people, urban farmers hardly acquire recognition as such, as farming is often regarded as backward and "rural". Some officials clearly recognise and support urban agriculture; others ignore or even try to inhibit it.

The level of organisation among urban farmers is very low. Most farmers operate on an individual basis. Other sectors increasingly organise themselves, often with the support of external agents. Lack of organisation might lead to severe disadvantages when it comes to allocation of resources from the city authorities.

8. City policies and urban agriculture

In Dar es Salaam, urban agriculture has received attention on various policy levels and is somehow accepted as a feature in the city. The recognition of urban agriculture is reflected in several laws and regulations like the Local Government Act (Section 80) of 1982, the Town and Planning Ordinance (CAP 378, 1992) and the Agricultural and Livestock Policy by the Ministry of Agriculture and Co-operatives (MoAC 1997).

The following guidelines are given (1992):

- "urban farming" means the carrying out of plant and animal husbandry activities within statutory township boundaries;
- no person shall occupy or use more than three acres of land for urban farming;
- only zero-grazing is allowed and the number of cattle is restricted to four head per person; and
- any farming activity which is 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 agriculture.

Urban livestock keeping is clearly permitted, but regulated in its practice. Crop production is not further guided. Despite the detailed regulations, authorities are not very strong in enforcing these bylaws. Especially livestock keeping is widely practised, often not following the rules and causing complaints of authorities and city residents. The National Land Bill, which indicates urban land uses, and an

update of a Strategic Development Plan for the future development of Dar es Salaam could improve this situation.

The National Agricultural Policy states that: "urban agriculture - although not considered a principal function of towns - has the potential to provide employment, income and is a supplementary source of food" (Sumberg 1996). The city land is categorised according to potential land use. Backyard farming and small-livestock rearing are not regulated, while open-space production falls under the zoning regulations and keepers of larger livestock (cattle) are advised to move to the periurban fringes of town or the rural areas. Urban agriculture is not explicitly mentioned in all policy papers, but is affected by a number of laws and initiatives (e.g. Natural Resource Management, Poverty Alleviation, Employment Generation for Youth).

Considerable research on urban agriculture was conducted by the University of Dar es Salaam – different departments (e.g. geography, chemistry), the Sokoine University of Agriculture and the University College of Lands and Architectural Studies. This research helped to gather information, raising awareness on agriculture and putting it on the agenda of policy-makers.

An initiative carried out under the City Commission was the rehabilitation of city gardens and efforts to green and beautify the city.

The Urban Vegetable Promotion Project implemented under the Ministry of Agriculture and Co-operatives aims to improve vegetable production in the urban areas of Dar es Salaam by upgrading the extension service in town, strengthening the organisational capacity of urban farmers, conducting complementary studies and promoting co-operation with various stakeholders. The AustroProject is concentrating on increasing dairy production in the coastal areas, but also has activities in urban and periurban wards of the city. Non-governmental and community-based organisations (NGOs, CBOs) are numerous in the city, but few have actively promoted urban agriculture on a political level. Some international NGOs working in the urban context have taken it up as an element in community development (Plan International, CARE International). There are various initiatives from local, often informal groups, who generate income through urban agriculture.

9. Outlook

Under the prevailing economic conditions in Dar es Salaam, urban agriculture will at least keep its importance. This applies to different groups in society, but most obviously to the poorer urban population. To many farmers (men and women), urban agriculture offers a certain degree of food security, income and employment. The city residents benefit from the fresh products. The city administration has to admit that urban agriculture, especially crop production, is a productive, although maybe temporary, use of land which would otherwise be used for more (unplanned) settlements or dumpsites. In this respect, urban agriculture can be seen as a tool to safeguard urban areas for future development. Once the various stakeholders realise this, land could be allocated for production on a temporary or even permanent basis. Both future town planning and the urban farmers would benefit.

9.1 Policy

- A coordinator for urban agriculture, open spaces and hazard lands has been appointed by the City Commission;
- bylaws need to be taken seriously, maybe revised and followed up to provide a legal base for both farming and non-farming residents. Special emphasis has to be given to environmental and health aspects. Taxation will have to be discussed, as well. Both farmers and city authorities would have to play a role in monitoring the situation; and
- it is important to realise that urban agriculture is one survival strategy among many for urban households and should not be separated from other informal activities. Up to now, the support to the informal sector focuses very much on petty trading and small-scale businesses, but neglects urban agriculture.

9.2 Allocation of resources

- Portions of land could be officially allocated to urban agriculture (allotments). Dar es Salaam has areas unsuitable for construction, but with a potential for agriculture. Production areas can serve as a green lung or as greenbelt around the city. Urban agriculture can be both permanent and transitory. Possibilities to obtain medium-term lease agreements for urban open space awaiting development would give semi-permanent land rights to farmers and prevent illegal encroaching. Particularly the allocation of land to women should be reviewed. Official campaigns, addressing companies with large undeveloped or underutilised areas, would increase the acceptance of urban agriculture as an urban land use;

- provision of water for agricultural production needs to be taken into consideration when designing town water supplies. The use of expensive tap water should be kept to a minimum to avoid competition with human beings. The use of surface water, shallow wells or rainwater harvesting needs to be encouraged. In cases of water scarcity, rainfed production systems might be promoted.

9.3 Research needs

- There is a need for a broad information base on urban farmers and their farming and household systems to convince policy-makers. Accurate city-wide data on the extent of production and the number of households involved is still lacking;
- additional research is needed on environmental aspects, especially pollution and health risks for consumers, analysed in relation to issues regarding the city's waste disposal and sewage systems and environmentally safe industrial production. The role of urban agriculture in recycling organic waste should be further explored. Only a close interaction between research and decision-making can fully exploit the potential of the findings.

9.4 Development needs

- Strategies for support – differentiated according to the various target groups – are still in an infant stage. There is nothing like an “average” urban farmer, and it must be clearly defined which forms of urban agriculture should be supported. Strategies should look at the supply function of urban agriculture for the city as well as the role of urban agriculture in urban land use. "Concepts" do not necessarily have to aim at urban agriculture alone but can include waste management/composting, with support targeting the urban poor in community and youth programmes;
- urban farmers need to organise themselves to articulate their needs and give weight to their demands. Direct support depends by and large on the organisational capacity of the farmers in their community. The need farmers express for extension and other services must be taken seriously. A clear concept, which takes into account the differences between rural and urban (intra- and periurban) farmers and their environment, has to be put in place and extension topics adapted to urban conditions. Special emphasis should be given to economic use of resources, intensive small-scale production and environmental aspects. Extensionists should act as a link between farmers and service providers, which differs from their conventional role in rural areas;

- market-oriented farmers need more knowledge on marketing, legal matters, bookkeeping and credit. There is a need to encourage informal group structures to become formal, to lobby jointly for their own rights and act as a pressure group; these are well-known elements for all informal sector activities, including urban agriculture.

Even with increasing population densities in certain parts of the city, urban agriculture will not disappear. Production sites might disappear in one area while they emerge in other parts of town. In this respect, urban agriculture has elements of shifting cultivation. Urban agriculture plays an important role in Dar es Salaam. More and more stakeholders acknowledge this, and steps are being taken to support urban dwellers in their efforts to make a living. It is a process in which a number of people need to join in, but the process has started.

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