

Full Length Research Paper

The role of urban agriculture in the development of middle-sized towns: Cases from East Africa

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This paper argues that urban agriculture can be transformed from its present underdeveloped status to a thriving sector in African towns, thus contributing to employment creation, income generation and the provision of food. Using three examples from East Africa (Nakuru, Morogoro and Mbeya), first, the present situation is described from a town's perspective, thereby focusing on resource allocation (land and water), the sector's benefits (food, income and employment) as well as its challenges (environment). Second, the question is raised how urban agriculture can be turned into a thriving economic sector, whereby three major themes are dealt with: the creation of a favourable legal and policy setting, the provision of support and education, and the improvement of market conditions. It is concluded that both the government and the private sector can and should take the lead, be it in different spheres.

Key words: Urban development, urban agriculture, urban environment, East Africa.

INTRODUCTION

In order to play a role in the wider regional development, middle-sized towns themselves should be 'strong', that is, relatively well-developed and 'resilient'. Yet, many (if not most) towns in Sub-Saharan Africa are 'underdeveloped' in terms of economy, infrastructure, employment, etc. So, how can they function as an engine for development? In most towns, the formal sector – providing permanent jobs and regular incomes – is poorly developed. As a result, lack of formal employment forces many people into informal economic activities, of which urban agriculture is a very important one. Urban agriculture is increasingly considered as a means to improve a town's food security, to provide employment, food and income to lower-income groups, to productively use barren land, to 'green' the urban landscape and to strengthen social relationships (community farming) (Smit et al., 1996; Bakker et al., 2000; Hovorka et al., 2009; Dubbeling et al., 2010; Prain et al., 2010; and the various issues of the Urban Agriculture Magazine [<http://www.ruaf.org/node/101>]).

Farming in town is a very common feature in Sub-Saharan Africa (Obudho and Foeken, 1999). It was estimated that in the mid-1990s as much as 40% of the

urban population in Africa was involved in urban agriculture (Mougeot 1994).¹ Farming is undertaken wherever land is available. In built-up areas, this can be in one's own compound ('backyard farming' or 'on-plot farming') or on land belonging to someone else ('open space farming' or 'off-plot farming'), the owner being the government, an institution or a private person. Farming is particularly common on the outskirts of urban centres, on formerly rural land that has become part of the urban centre due to boundary extensions ('peri-urban farming'²). In these zones, both small-scale and large-scale farming can be found. However, as the urban centre grows, these areas gradually lose their rural character and farming becomes increasingly of the other two types.

Urban agriculture has increased enormously over the past two decades due to the economic crisis that prevailed in most African countries. For the poor, increasing their food security is usually the main

¹ More recent estimations are not available.

² 'Peri-urban' is defined here as the zone between the built-up area and the town boundary.

motivation for farming in town, and for some it is even a survival strategy. Nevertheless, many of the poor also sell some of their produce, partly to be able to pay for other basic household needs, but also because some crops are perishable and cannot be stored and/or because storage space is unavailable. For medium-income and high-income households, commercial considerations are usually of more importance than for the poor, although the consumption of self-produced vegetables and milk is often highly valued by these households. But for most of them, the basic reason to farm in town is the same as for the poor, namely, as is often stated by the farmers themselves, "to subsidise my income" (Foeken 2006). Therefore, whatever the people's motives for practising urban farming, it is unrealistic to think that when urban poverty disappears, urban farming will disappear 'automatically' as well. Farming in town is of all times and of all places. Moreover, urban farming is not a side-activity for many households. It can also be a thriving, commercial sector, providing full-time employment and income and thus contributing to the wealth of the town.³

This paper looks at urban agriculture from the town's perspective (and not from the farmer's – or livelihood – perspective), using three East-African towns as examples: Nakuru, Morogoro and Mbeya. The major objectives are (1) to describe the practice of urban agriculture in these three towns, (2) to assess what it means for the towns in terms of resource allocation, benefits and challenges, and (3) to assess how the sector could be further developed.

The results presented here are based on two studies, one in Nakuru municipality in Kenya and the other in Morogoro and Mbeya municipalities in Tanzania (Figure 1). Fieldwork was done in Nakuru in 1999-2000 and in Morogoro and Mbeya in 2000-2001. In all three towns, the major fieldwork consisted of a general, representative survey – using a structured questionnaire – among households in the built-up areas:⁴ 594 households in Nakuru, 300 in Morogoro and 308 in Mbeya. In addition, in-depth interviews were held with a selected number of respondents in each town, as well as with key informants.

The three towns resemble each other in size, as they all had a population of around 250,000 in 2000. In terms of climate and physical characteristics, they also show many similarities. Nakuru lies at an altitude of about 1700 m and is fairly flat except for the Menengai Crater on its northern boundary. Being situated on the floor of the Great Rift Valley, it has fertile, volcanic soils. With an average annual rainfall of about 940 mm, Nakuru has a dry sub-humid climate. Morogoro has, except for its altitude (about 500 m above sea level), more or less the same characteristics. Mbeya is at the same altitude as

Nakuru but is hillier and receives more rainfall, on average about 1200 mm a year.

CROP CULTIVATION

In Nakuru, 27% of the households cultivated crops, but in Morogoro and Mbeya these percentages were much higher: 90 and 68%, respectively. In all three towns, maize was the most frequently cultivated crop, followed by beans in Nakuru and Mbeya, *kale* (*sukuma wiki*⁵) in Nakuru (Figure 2) and rice in Morogoro. These are all basic food stuffs, reflecting the importance of urban crop cultivation for the households' food supply above income generation.

The use of all kinds of inputs for crop cultivation was widespread in the three towns (Table 1). The use of improved seeds and chemicals was quite common, which shows that people seriously attempt to realise a maximum harvest. The table also shows that regarding some inputs, the towns differ substantially. For instance, manure as fertiliser was hardly used in Morogoro, chemical fertiliser was widely used in Mbeya, while irrigation was quite common in Nakuru but not in the other two towns. Overall, the Mbeya urban farmers were more 'input-prone' than in Nakuru and especially Morogoro.

Urban crop cultivation in Sub-Saharan Africa is generally seen as a female business. However, this depends to some extent on the type of crop and – related to this – the level of commercialisation.⁶ In Nakuru, it was mostly a woman (the wife of the male spouse or the female head) who was responsible for the household's crop cultivation. In Morogoro and especially Mbeya, it was more often the male head who was (mentioned to be) the responsible person. But being responsible is one thing, performing labour is another, as women did generally most of the work.

Urban farmers face many problems, some of which are typical urban. Figure 3 shows the five most frequently mentioned problems in the three towns. Theft of crops (one of those typical urban problems) was a serious problem in Nakuru, and especially those with plots located at some distance from the house complained about this. As one respondent said (Versleijen, 2002):

"Theft is a big problem. You know, people pass by and they just take what they want. Or those parking boys come and they just take and destroy the crops. And you cannot do anything about it. You know, it is Kenya Railways land so you cannot fence it off and since it is far from home you cannot look after it properly."

³Examples are the commercial gardens in Cotonou (Brock and Foeken 2006) and a commercial dairy cattle and pig farm in Morogoro, Tanzania (Foeken et al. 2004, p. 78).

⁴Hence, households in the peri-urban zone were not included.

⁵ *Sukuma wiki* (*Brassica oleracea* var. *acephala*) is the local name for a green, leafy vegetable in the cabbage family (also called kale), literally meaning "to push the week". This refers to the crop's importance for subsistence dwellers in their daily diet due to its high yield and low price.

⁶ In Cotonou, for instance, gardening is mostly a purely commercial business, generally run by men (Brock and Foeken, 2006).

Table 1. Inputs for crop cultivation, by town (%).

		Nakuru (N=160)	Morogoro (N=269)	Mbeya (N=208)
Seeds/seedlings	- local	70.6	36.4	54.9
	- improved	57.5	61.2	53.4
Organic fertilisers	- manure	53.1	16.9	62.4
	- crop residues	35.0	31.0	23.8
	- urban waste	3.1	0.0	2.1
Chemicals	- fertiliser	35.6	24.0	74.1
	- pesticides	29.4	14.0	34.7
	- insecticides	8.8	14.9	41.5
Irrigation		44.4	8.3	13.5

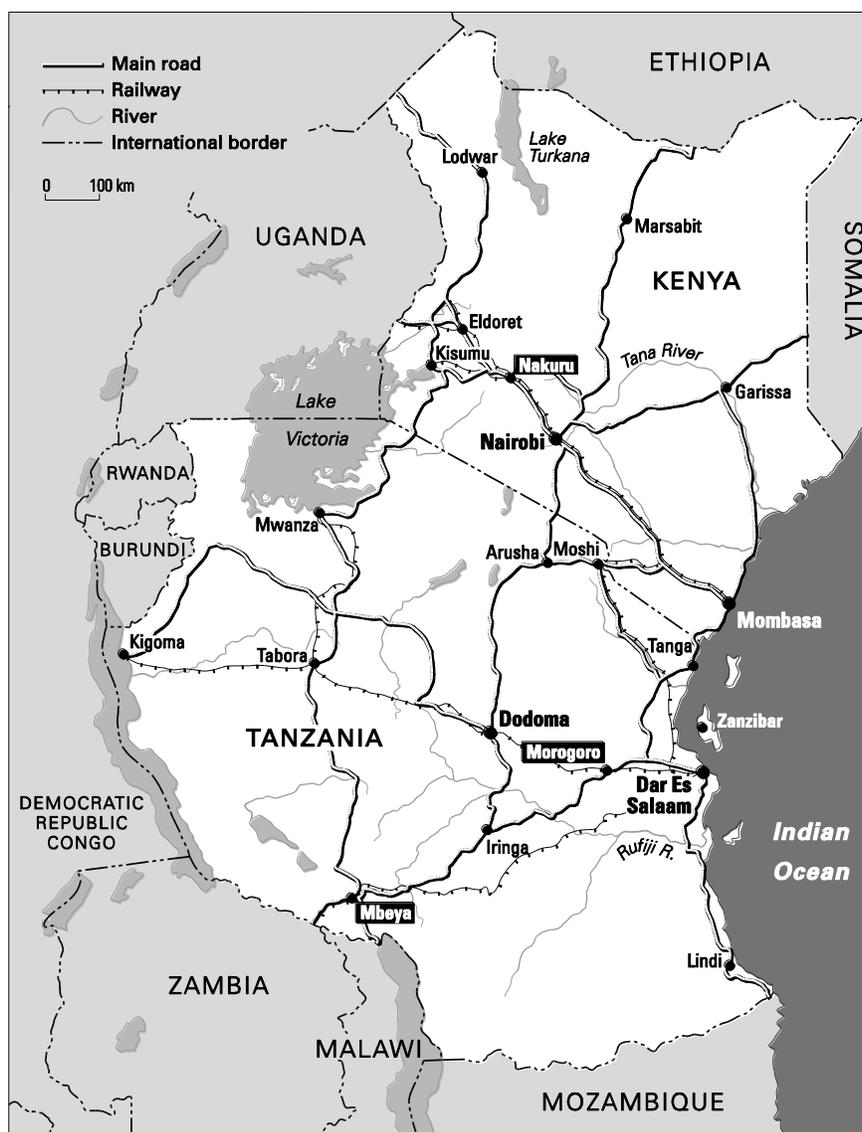


Figure 1. Kenya and Tanzania, showing research locations.



Figure 2. Woman cultivating sukuma wiki in front of her one-room house in Nakuru.

Lack of rain is obviously related to the climatic regime of each town; hence the lower percentage of farmers in Mbeya mentioning this.⁷ Pests, diseases, etc. are also common problems among all farmers, although the percentage for Mbeya is surprisingly low. Destruction of crops by animals was – like theft – also typical for Nakuru, which is especially caused by the wildlife from Lake Nakuru National Park (that lies within the municipal boundaries of Nakuru), baboons in particular. Finally, lack of capital/inputs was a very serious problem in Mbeya, mentioned by three-quarters of the crop cultivators (for 60%, it was even the main problem). This contrasted strongly with the farmers in the two other towns, Nakuru in particular.

One would expect lack of space/land to be a major problem for urban crop cultivators. Yet, in each town this was mentioned by a few farmers only. Some farmers simply do not want a bigger plot, for instance because of limiting input factors (Versleijen, 2002).

Baba Christopher would not want a bigger plot than he has now because of, first, the availability of labour, second, the needs of the family and, third, the amount of seeds and seedlings they can afford to buy. By cultivating a plot of 50 m², he is able to feed his family from the shamba⁸ in such a way and for such a period that he can

feed them from his salary for the rest of the year and even educate them and meet other expenses such as hospital bills. To cultivate a larger plot would mean that they have to buy extra seeds. Right now, all the seeds they use are from last year's harvest, so they do not incur any expenses in the planting season.

This does not mean that lack of space/land for farming purposes was not a problem in the three towns. This was for instance revealed by the answers of the non-farmers in Nakuru on the question why they did not farm. The large majority of them mentioned lack of land as one of the constraints and for three-quarters of them it was even the main reason. Moreover, further questioning among the crop cultivators indicated that many people would be happy with more space, but they also realised that due to the high costs involved, it is quite impossible to obtain that. Another reason for the relative satisfaction with what they have is the fact that many urban residents have access to rural land, giving them access to (additional) food and income sources.⁹

Harassment or destruction of crops by the local authorities is a typical constraint for urban farmers in Sub-Saharan Africa, although the practice has decreased over the last few decades, as numerous authorities now recognize the importance of the activity for many urban dwellers. According to Nakuru municipal regulations at the time of the survey, farming was forbidden within the

⁷ The following year, a follow-up survey was carried out in Nakuru. This was a very dry year; hence, *all* of the Nakuru crop cultivators mentioned lack of rain as a problem.

⁸ Swahili for plot or field.

⁹ In Nakuru, rural farming (by urban households) appeared to be more important than urban farming (Owuor, 2006)

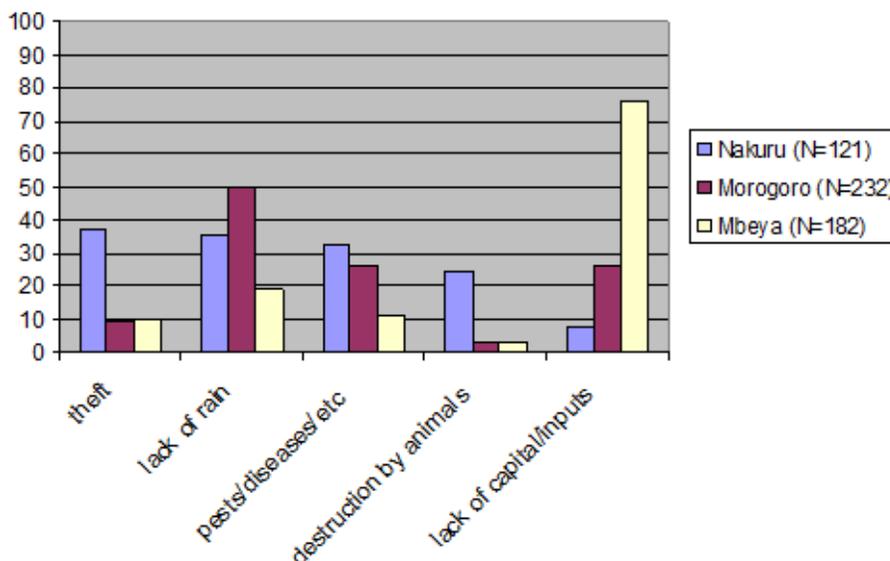


Figure 3. Major problems with crop cultivation, by town (%).

town's boundaries. The problem for the municipality was that enforcing such rules was difficult, so farming in town had thus become a common phenomenon. The municipality tolerated crop cultivation as long as the crop was less than one metre tall. Maize was thus forbidden, the argument being that thieves and other criminals could hide among the plants. Nevertheless, maize could be seen everywhere and although crop slashing hardly occurred anymore, cultivators could not count on being spared (Foeken, 2006). These problems did not occur in Morogoro and Mbeya; the major reason being that urban agriculture was although bound to certain restrictions, a legal activity.

LIVESTOCK KEEPING

Livestock keeping in African towns is generally a less common farming activity than crop cultivation. Twenty percent of the households in Nakuru and 38% in Morogoro kept some type(s) of animals. Mbeya, however, is a typical 'livestock town': no less than 78% of the households could be classified as urban livestock keepers (Figure 4). What this means for a town in actual practice is that in the built-up area of Nakuru, despite its relatively low percentage of livestock keepers, there were an estimated 11,600 head of cattle, 6,400 sheep, 6,500 goats, 350,000 chickens, 13,000 ducks, 3,000 rabbits, 1,400 doves and 580 turkeys. At the other extreme, in Mbeya there were some 90,000 improved cattle and over 800,000 improved chickens alone.¹⁰

¹⁰ Estimations based on the number of households keeping certain types of animals, the average number of animals they kept, and the total number of households (Nakuru: Kenya, 2000; Mbeya: URT, 2003).

Animals are either kept on the livestock keeper's own compound ('zero-grazing') or are herded outside ('free range') or a combination of the two. The choice of what rearing system to employ depends partly on the size of the animals (large livestock are more often kept in zero-grazing than small livestock) and whether it concerns improved varieties. As for the latter, almost all households in Morogoro and Mbeya with improved cattle or improved chickens kept these animals almost exclusively in their own compounds. In deciding which rearing system to use, various – mostly economic – considerations may play a role, as the case of this household (keeping three cows and a calf) illustrates (Versleijen, 2002):

"This year we started herding the animals outside; before it was only zero-grazing. We started herding them just to try, although the system is not as good as the zero-grazing. The yield of the milk is a little bit lower, but zero-grazing is more expensive because you have to buy the grass and it is also a lot of work since you have to feed them and take care of them. Next year, what we will do will depend on the weather. If there is plenty of rain, I will take them out because there is plenty of grass. You know, the yield is slightly lower, but the costs are much lower. There may be a bigger chance of diseases, but you know, even with zero-grazing, ticks are coming in with the grass because the grass is just collected outside."

The use of the five most frequently mentioned inputs in the three towns is shown in Figure 5. Improved breeds, veterinary drugs and feed supplements can be seen as more or less 'advanced' ways of keeping livestock and especially the latter two were quite common, in the two



Figure 4. Dairy cattle in zero-grazing (left) and vegetable cultivation in a compound in a high-density, low-income area of Mbeya. The same household kept about 70 chickens in a room in the house. [Photo: Dick Foeken].

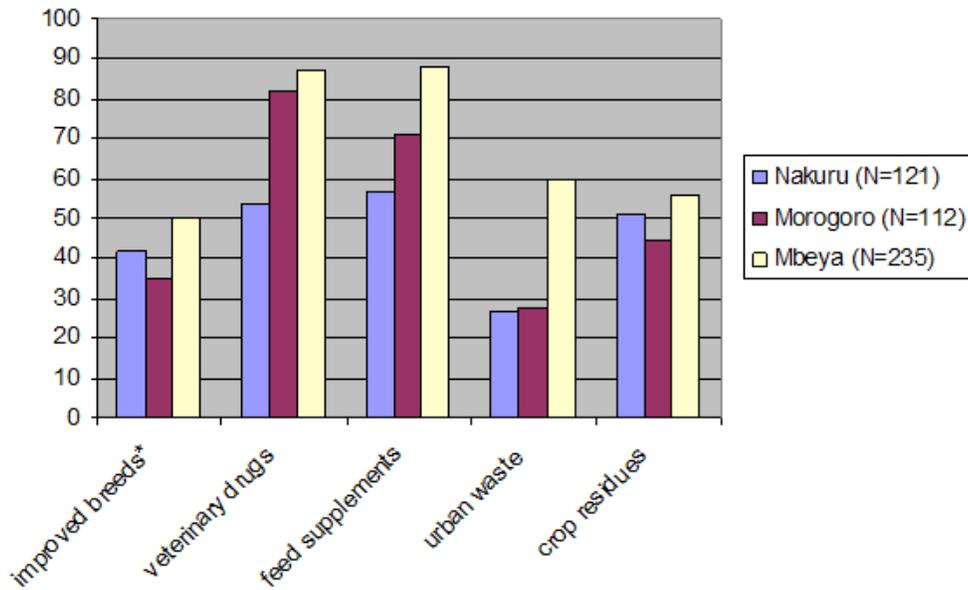


Figure 5. Major inputs for livestock keeping, by town (%).

Tanzanian towns. The use of urban waste and crop residues as animal fodder have two advantages, namely economic by reducing costs on animal feed, and environmental by recycling organic material. On the whole, Figure 5 confirms the status of Mbeya as

‘livestock town’.

Figure 6 shows the most frequently mentioned problems encountered by the livestock keepers. Although some of them (on average 15%) said they had not faced any problems, it is clear from the figure that animal health

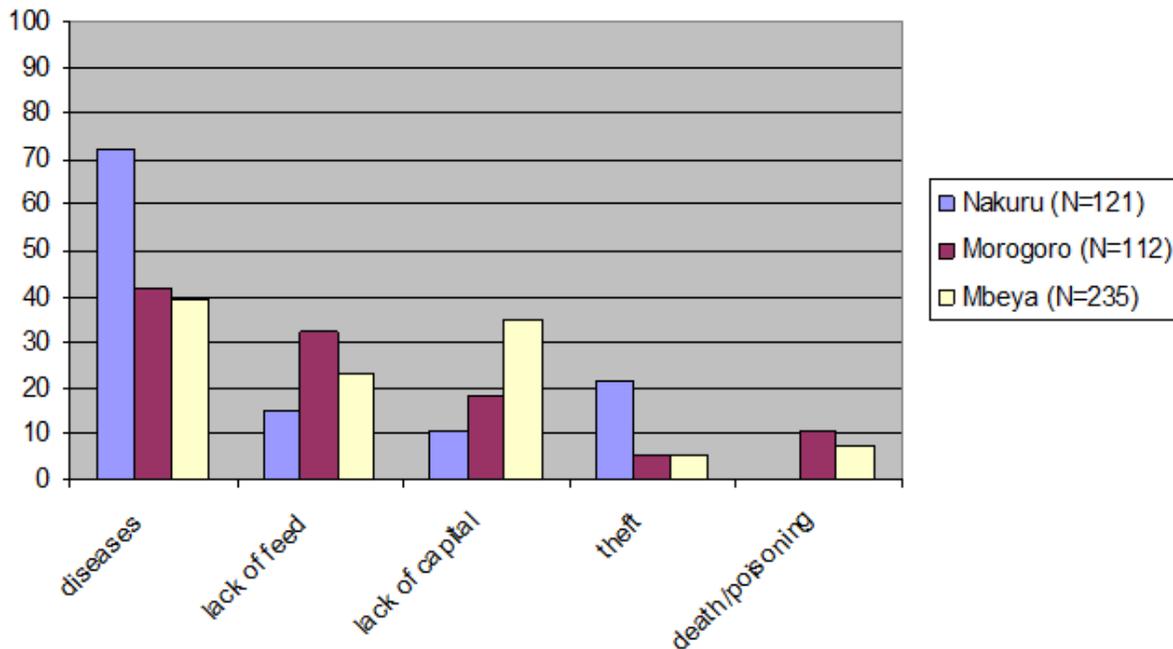


Figure 6. Major problems with livestock keeping, by town (%).

was the greatest concern for farmers, especially in Nakuru. According to one respondent who kept broilers that he sold to hotels in town, “[T]he business is risky. Once in a while I am forced to clear my stock because of chicken diseases.”

Lack of feed and lack of capital (to buy fodder and other inputs) were also frequently observed constraints, especially in the two Tanzanian towns. Theft was quite a serious problem in Nakuru. Yet, given that half of the livestock keepers in this town practised the system of free range, one would expect this percentage to be higher. One respondent, who also kept a few chickens, saw the theft of her animals not only as relating to the rearing system but also as a form of envy (she also faced the problem of diseases):

“Because I was doing quite well and because of lack of security, one day three of my chickens were stolen. And before I could recover from that loss, six of the chicks died as a result of an outbreak of a disease. Some chicken survived. But because I feared further loss, I started selling and eating the rest.”

Animal deaths were mentioned by almost 10% of the Tanzanian livestock keepers. This problem was voiced more frequently in Morogoro where various respondents said their animals had been poisoned. Finally, as with crop cultivation, harassment by the municipality was mentioned only a few times as a problem, and again only in Nakuru. Because keeping livestock is generally forbidden in Nakuru-and free range, which is quite common, in particular-this points at a lack of enforcement

from the side of the municipality.

ISSUES FROM THE TOWNS’ PERSPECTIVE

From the perspective of the town, several aspects of urban agriculture are important. First, the sector uses such often scarce resources as land and water. Second, on the positive side, the sector contributes (at least potentially) to the town’s food security and creates employment and an income for those involved. And third, on the negative side, the sector can (and often does) create environmental problems due to for instance the use of chemicals in crop cultivation and the waste produced by livestock.

Resource allocation: Land and water

As long as urban farmers only use land in their own compounds or are allowed to use land in the compound of an institution, there is no problem from the municipality’s point of view, at least in terms of the allocation of land. Besides the people’s own compound, it used to be normal to use any vacant land for crop cultivation purposes that was available, as this respondent, referring to the situation in Nakuru between 1963 and 1978, explained:

“Open spaces, which we used for farming, were many and nobody bothered with us. Many of these open spaces were undeveloped Municipal Council land. I had

three plots not far from each other. They were not very big; I think less than half an acre each. It was not advisable to take a big plot because of security and fear of losing the plot when the owner reclaims it. Three or four different people could cultivate a plot of about one acre. Of course they had other smaller plots elsewhere.”

Another respondent said that her husband had acquired a piece of “idle open land” of about half an acre in 1975. For twelve years, she cultivated maize and beans there, which was enough to feed her household for about six months a year. However, in 1987, the Municipal Council of Nakuru repossessed the land for expansion purposes and the only plot left to them was the small shamba bordering their house.

Usually, people did not have to pay rent for the use of the plot and if they had to, it was only a very modest amount. However, town expansion led to land scarcity and renting a plot became increasingly expensive:

“It was very cheap to rent a plot in the municipality by then. With not more than five shilling, you could get a sizeable plot to rent on a monthly basis. For those who liked farming, renting a plot was a normal and common thing to do those days. Nowadays, to rent a plot within the municipality, that is if you are lucky, costs no less than 6,000 shilling¹¹ per year for an acre.”

Because of these developments, it was no wonder that most of the people who did not practice urban crop cultivation mentioned ‘lack of land’ as the main reason. Therefore, because of the economic crisis that persists to the present day and that has driven an increasing number of urban residents in Sub-Saharan Africa into poverty, more and more other – that is officially non-accessible – ‘open land’ has been brought under cultivation: road reserves, river sides, under power lines, in parks, etc.

In total, 40% of the plots in Nakuru were located outside the farmers’ compounds, while the percentages in Morogoro and Mbeya were even higher (68 and 56%, respectively). The large majority of these outside plots were cultivated illegally and without the consent of the rightful owner. In only a few cases, the cultivator paid rent for the use of the plot. Not surprisingly, such ‘off-plot’ farming was more common among the poor than among the non-poor,¹² as many poor urban households have either only a very small compound or no compound at all at their disposal.

Nakuru and Morogoro both have a dry sub-humid climate and rainfall shows strong fluctuations within and

between years, making rain-fed agriculture a risky business. Mbeya has a wetter climate, at least more reliable for the growing of crops than the other two towns. This was reflected in the percentages of respondents mentioning ‘the weather’ or ‘lack of rain’ as a constraint with crop cultivation (see Figure 3). The fact that in Nakuru lack of rain was less often perceived as a problem than in Morogoro is most likely because 44% of the Nakuru crop cultivators practiced irrigation, against only 8% in Morogoro. All but two irrigators in Nakuru used water from the municipal taps to water their plants. However, even in ‘normal years’, water is scarce in Nakuru; hence, using tap water for irrigation purposes is illegal. And during years of drought, which occurs quite regularly, even tap water is by far insufficient to realise a reasonable harvest.¹³

In certain areas in Nakuru, crops were irrigated with (untreated) sewage water, illegally tapped from the main sewers. This can be a serious environmental hazard, sometimes leading to interventions by the municipality.¹⁴

The benefits: Food, income and employment

To increase the household’s food security is for almost all farming households the main reason to practice crop cultivation. Even though purchased food is usually the most important food source, ‘own urban production’ was for 45% of the Nakuru crop cultivators among their important food sources (during the year prior to the year of the survey). For Morogoro and Mbeya, these figures were even higher: 65 and 61%, respectively. Moreover, by producing part of one’s own food, the household is able to save money that can be spent on other needs. As Versleijen (2002), referring to one of her respondents, points out,

“(...) the current importance of the urban plot should not be underestimated. Baba David saves a substantial amount of money throughout the year by cultivating a large part of his own food.¹⁵ If he would not do this, he would have to take one or more of his children from school, travel less frequently to Nyeri¹⁶ or stop other activities [such as] drinking chang’aa¹⁷.”

¹³ This can be illustrated by the situations in 1998 (a ‘normal year’ in terms of rainfall) and 1999 (a dry year). In 1998, urban crop cultivation constituted an “important food source” for about half of the households involved, but in 1999 this applied to about 20%. The low-income crop cultivators in particular were hard hit by the drought: in 1998, 12% of these households said they had “not always enough to eat” during that year, but in 1999 this percentage had increased more than six-fold to 77% (see Foeken 2008, p. 237). The Nakuru study also showed that yields were significantly higher when irrigation was practiced (see Foeken 2006, p. 60).

¹⁴ As happened for instance in 2001. See Foeken (2006), p. 110.

¹⁵ He was living alone in Nakuru.

¹⁶ Where he had a rural plot.

¹⁷ A local (illegal) brew, usually made of maize.

¹¹ One thousand Kenyan shillings was about 14.3 US dollars at that time.

¹² Nakuru: 54%/31% (poor/non-poor); Morogoro: 73%/57%; Mbeya: 72%/29%. For definitions of ‘poor’ and ‘non-poor’ households, see Foeken (2008), p. 229.

At the level of Nakuru town, an estimated six million kilograms of crops were produced by the farmers in the built-up area. If the producers had consumed all of it themselves, it would have constituted almost 30% of their households' energy requirements. However, about a quarter of the produce was not consumed in the producers' households but sold instead. In other words, the direct contribution to the producers' energy requirements would amount to about 22%. This also implies that an estimated 1.5 million kg of crops produced within the built-up area of the town were marketed locally.¹⁸ Thus, many other households benefit from urban food production for their food supply, and at prices that are likely to be lower than the normal market prices. As for Morogoro and Mbeya, given their higher percentages of urban farmers, it is obvious that urban crop cultivation plays an even more important role in these towns' food supply than in Nakuru.¹⁹

Besides crops, an important food item produced in town is milk. In Nakuru's built-up area, the percentage of households keeping cattle was low (4%), but in Morogoro and Mbeya it was much higher: 21 and 66%, respectively (and mainly improved cattle). From the data of the Tanzania study, a rough estimate of the annual milk consumption from urban milk production per year for the towns' total populations could be made.²⁰ In Morogoro and Mbeya, total annual milk production in 2001 was calculated at about 385,000 and 625,000 litres, respectively. With populations of about 228,000 in Morogoro and 266,000 in Mbeya (2002 Census, see URT 2003), that would mean about 1.7 litres/capita/year in Morogoro and 2.3 litres/capita/year in Mbeya. This implies that although the total number of improved dairy cattle is substantial in the two towns (and in Mbeya in particular), total milk production is quite modest when compared to the milk needs of the population.

Even though crop cultivation is primarily practiced for the food, the income aspect should not be underestimated; not only indirectly by saving on food expenditures, but also directly by selling surpluses. However, the percentages of households indicating that their cropping activities were (also) a source of income differed between the three towns, ranging from about 10% in Nakuru to over 40% in Mbeya. Almost a third of the households in Morogoro and Mbeya growing maize (the most important crop there) sold part of their crop, but mostly in modest amounts. Other crops were sold as well, but usually by a (small) minority of crop cultivators only. Income generation from crops is naturally seasonal. During harvesting months, many cultivators are forced to sell part of their harvest, so prices tend to be low. The crops of those with storage facilities, however, can fetch a better price when demand is higher. As one respondent

in Morogoro explained: "When crops are scarce, prices for crops go up and when the farmers sell their crops they get a lot of money."

For livestock keepers, the direct income aspect is more important than for crop cultivators. Products sold are mostly from cattle (milk and meat) and chickens (eggs and meat). Animal products were a source of income for 37% of the livestock keepers in Nakuru, 67% in Morogoro and 70% in Mbeya. Most of these were people selling milk. However, milk production appeared to differ substantially between the various dairy cow owners, ranging from just a few litres to 15 litres per day per animal. Factors determining milk output were, amongst others, the type of animal, the quantity and quality of the feed, as well as the overall health and care of the animals. If well managed, keeping dairy cows could be very rewarding financially, as the study by Mlozi and Hella (2001) and the following example from Nakuru (Versleijen, 2002) indicate:

"Baba Josephine (...) had two good dairy cows that provided him with an annual income from milk sales of about Ksh. 180,000. The variable costs – grass, supplementary feeds, veterinary drugs and hired labour – came to about Ksh. 100,000. He therefore made a profit of some Ksh. 80,000 gross. Compared with a total initial investment of Ksh. 75,000 (two cows, a shed and milking utensils), Baba Josephine had good reason to be content with his business: "Cows are expensive animals to keep, because of the veterinary drugs and check-ups they require. However, they also bring in a lot of money!"

Engagement in urban agriculture provides direct employment for two categories of people: members of the farming households and hired labourers. As for the Tanzania study, more than 90% of the households in the two towns practised at least one type of agricultural activity within the municipal boundary, which means that in all these households there was at least one person employed in urban agriculture. Given that the sample is representative of the total populations, this means that some 48,000 persons in Morogoro and 58,000 in Mbeya could be considered as being self-employed in some way in the agricultural sector.²¹ In reality, the figures are even higher as in many households more than one person was involved in farming. For quite a number of households, urban farming was even a full-time activity. This applied especially to livestock keeping, which was a full-time occupation for 40% of the Mbeya livestock keepers and 14% of those in Morogoro. This implies that 31% of all households in Mbeya found full-time employment in urban livestock keeping. At town level, this accounts for almost 20,000 persons. In Morogoro, 5% of the population – or about 3,000 people – were employed full-time in urban livestock keeping. In Nakuru, an estimated

¹⁸ For the calculations of the amounts produced, consumed and sold, see Foeken (2006), p. 83.

¹⁹ See Foeken *et al.* (2004), pp. 81-85.

²⁰ See Foeken *et al.* (2004), p. 86.

²¹ These figures are 90% of the total number of households in 2002 (taken from URT 2003).

4,900 people could be considered as full-time urban farmers.²²

The second category of people employed in the urban agricultural sector is hired labourers. They can be permanently employed, seasonally employed or hired for just one or two days at a time ('on call'). Hiring labour depends not only on the types of work to be done, but also on whether the household head and/or his wife have time to do it themselves (in other words, whether they are employed elsewhere) and if they can afford it. One husband explained that his wife "spends a lot of time on crop cultivation (...) because not all the urban dwellers can hire labour". Hired labour for crop cultivation is seasonal in nature and will usually be no more than an additional type of labour for the person concerned. With livestock keeping, this is different. Quite a number of households hired somebody on a permanent basis, for example to look after their animals (if they were 'freely grazing') or to collect fodder for the animals kept in zero-grazing (the so-called 'grass boys'). It is not easy to assess the numbers of hired labourers in the urban farming sector. In Nakuru, an estimated 8,400 people found work in this way (of whom 37% in livestock keeping), in Morogoro about 13,000 (16% in livestock) and in Mbeya about 19,000 (33% in livestock).

These figures show that urban farming is of enormous benefit to the urban labour market because the sector provides employment for a substantial number of people. This was also shown in earlier studies carried out in Tanzania (Madihi, 1991; Jacobi et al., 2000). In addition, it is worth emphasising that urban agriculture creates jobs in other urban sectors as well. It generates demand for inputs and supplies the urban economy with outputs, activities that create a demand for labour. The web of formal and informal links creates employment and income in other sectors like transportation, marketing, equipment supply, and the provision of technical advice.

Environmental issues

Opponents of urban farming often point at the impact of the activity on the urban environment. The use of chemical inputs for crop cultivation may pollute the groundwater. Crops can contain (too) high levels of heavy metals due to for instance cultivation on polluted land (such as dump sites) and road reserves (exhaust fumes) or to the use of sewage water.²³ Livestock keeping in town can be harmful to the urban environment in a number of ways: (a) livestock freely roaming around cause soil erosion and sometimes traffic accidents and can also destroy crops, ornamental plants, lawns, water pipes, telephone lines, fences, etc.; (b) domestic animals

transmit diseases that can afflict humans and circulate among other animals; and (c) animal dung left to decompose in the compounds or along roads produces an odour (example, ammonia) and is a breeding ground for harmful bacteria and flies (Mlozi, 1999).

Some of these issues are dealt with in Annex 1. The three towns differed in terms of use of chemicals for crop cultivation. Especially in Mbeya, chemicals were widely used. In Nakuru, the chemicals may end up in Lake Nakuru (part of the world-famous Lake Nakuru National Park), which, due to its location at the bottom of the Great Rift Valley, has no outlet. As for livestock, almost half of the Nakuru keepers of large livestock (mainly cattle, sheep and goats) let these animals graze outside the compound ('free range'). In the two Tanzanian towns, cattle was mostly kept within the household's compound (zero-grazing), but sheep and goats were kept in free range by about half of the households. Dumping of the animals' waste in the street was (almost completely) non-existent in these towns, but dumping waste in one's own compound was somewhat more common. In Nakuru, however, one-third of the livestock keepers did dump waste in the street, be it mostly from small livestock only.

Despite its often negative image due to the environmental impact, urban agriculture is potentially able to contribute to a better urban environment.²⁴ This can be done in several ways, one of them being recycling (see Annex 1). The combination of crop cultivation and livestock keeping offers the possibility of recycling nutrients. In Nakuru and Mbeya, over half of the crop cultivators used manure as fertiliser. All livestock keepers in Morogoro and Mbeya said that the waste of their animals was used for crop cultivation, either using it themselves, giving it to neighbours or selling it. This indicates that there is a shortage of manure in these towns. The reverse, that is, feeding livestock with crop residues, appeared to be common as well, particularly for large animals. Crop residues were also used to re-fertilise the shambas by about a third of the crop cultivators. Finally, livestock was also fed with urban waste, especially in Mbeya.

A starting point for environmental sustainability of urban agriculture is the creation of awareness among urban farmers regarding the environmental impact of urban farming. In Nakuru, more crop cultivators than livestock keepers were aware of the potentially damaging effects of their activities for the urban environment (Annex 1). In Morogoro and Mbeya, however, it was the other way around. Just over a third of the crop cultivators in these two towns said they were aware of it – albeit very few of them mentioned pollution due to chemical inputs as one of these effects. Awareness among livestock keepers was higher. Nevertheless, about half of the livestock keepers in Mbeya were not aware of any damaging effects. This figure may be a reason for concern, given

²² For the calculations in this and the following paragraph, see Foeken et al. (2004), pp. 115-117 (Morogoro and Mbeya) and Foeken (2006), p. 93 (Nakuru).

²³ As was found in Nakuru; see Foeken (2006), pp. 119-120.

²⁴ For the example of Cotonou, see Brock & Foeken (2006).

the fact that the majority of the house-holds in this town could be classified as urban livestock keepers. Moreover, the large majority of those who said they took measures against damage by livestock did so by means of zero-grazing, implying that measures against noise, smells and dirt were hardly ever taken.

HOW TO DEVELOP A SUSTAINABLE URBAN AGRICULTURE SECTOR

To turn urban agriculture into a thriving and sustainable economic sector, all kinds of measures can and should be taken in various fields. Three of these 'fields' are dealt with below: the legal and policy setting, support and education, and market conditions.

Creating a favourable legal and policy setting

In many African countries, urban agriculture is (still) an illegal – be it usually tolerated – activity. As a result, many urban farmers are reluctant to invest in it, especially those who practise 'off-plot' farming. Nakuru is an example of a town where until recently, farming in town was officially forbidden. Research can help here, as has been shown by the Nakuru study. A workshop in 2002 to present the results of the studies contributed to the awareness among officials that urban farming is a fact of life and an important livelihood source for the urban poor. It led for instance to the development of the Nakuru Urban Agriculture By-Laws, which are unique in Kenya and indeed in many other parts of Africa. Based on the recognition that "every person within the jurisdiction of the Council is entitled to a well-balanced diet and food security" and that this entitlement "includes facilitation by the Council to acceptable and approved urban farming practices", farming is now (legally) recognized as an urban activity. Legalising the sector opens the way to develop it further and thus contributes to improve the livelihood of the poor. The local government can for instance create easily accessible zones for farming (the bulk of the land in Nakuru municipality is public land) and/or provide extension services through the Ministry of Agriculture.

In Tanzania, urban agriculture is practised in a generally favourable political and legal context. Recently, this favourable attitude of the national government towards urban agriculture was clearly expressed in the National Human Settlements Development Policy of 2000 put forward by the Ministry of Lands and Human Settlement Development (URT, 2000).

Urban agriculture [...] provide[s] income and employment opportunities to the urban populations, and [is] a reliable supplementary source of food supply to urban dwellers at affordable prices. As a land use, well-planned urban agriculture creates a pleasant greenly scene.

Yet, the Ministry also signalled the potential dangers of

the practice.

Although urban agriculture is considered an important component in sustainable development, improperly practised urban agriculture conflicts with other urban land uses and leads to land degradation, water pollution, and is a threat to health and safety.

Local by-laws on urban crop cultivation and urban livestock keeping do exist in Tanzanian urban centres since a long time. By-laws on urban crop cultivation regulate for instance where farming is not allowed (such as certain areas in the built-up area), which crops are prohibited (annual crops or crops taller than one metre), how crops have to be cultivated (use of machinery, planting time, use of inputs, weeding, use of certified seeds, planting on slopes, as well as what to do in case of pests or diseases). By-laws on livestock keeping deal for instance with what types of animals are allowed to keep, where to keep them, how to keep them (only zero-grazing is allowed), and how to deal with animal waste.²⁵

In fact, the Morogoro and Mbeya by-laws are quite restricting. As a result, comparing the by-laws with the urban agriculture practice in these two towns showed that many urban farmers were actually breaking the law. Respondents in the two towns were asked how effective they thought the by-laws are. Two citations from Mbeya are illustrative in this respect:

"They cannot stop the crop growing and livestock raising because these activities reduce the hardship of life and the by-laws are not applied equally to leaders and other people; so when the leaders break the laws, other people follow."

"Crop growing and livestock raising cannot be prevented [...] because the by-laws are there for many years and livestock keepers who are fined still continue to keep them. The municipality is slashing crops but the following year the urban farmers cultivate them again."

These quotes suggest that the municipality of Mbeya does try, to some extent, to exert control over farming activities, but to little avail.

Provide support and education

For the Ministry of Agriculture in the three towns, the municipality is just one of the extension areas in each district ("whether rural or urban, a farmer is a farmer").

This implies that, whether farming is a legal activity or not, people who farm in town can apply for support from extension officers. In Nakuru, the levels of support were quite low: only 6% of the crop cultivators and 30% of the livestock keepers indicated that they had received any assistance, in most cases from extension officers. As for

²⁵ See for instance the *Mbeya by-laws on urban crop cultivation, 1982* and the *Morogoro by-laws on urban livestock keeping, 1999* (cited in Foeken *et al.* 2004, pp. 184-188).

the livestock keepers, the level of support for those with large livestock was much higher (55%) than for those who kept small livestock (25%). Those livestock keepers getting assistance from professional advisers appeared to apply better rearing practices and better waste management. Support levels in the Tanzanian towns were much higher: almost 50% for the crop cultivators and 90% for the livestock keepers. As for the latter, this high percentage is related to the fact that cattle – which require thorough care – are very commonly held. A recent study among urban gardeners in Buea, Cameroon (Ngome and Foeken 2012) found that more than 40% of the farmers considered lack of education and training as a constraint. This applied more to female gardeners (61%) than male gardeners (21%).

Despite the relatively high levels of support, when respondents in Morogoro and Mbeya were asked what should be done to develop crop cultivation and livestock raising in town, several of them referred to support and/or education; for instance:²⁶

“Give farmers education on modern methods of crop cultivation and livestock keeping.”

“Farmers should be shown how to get inputs, especially seeds and those needed for cattle.”

“Livestock education, especially on zero-grazing, should be encouraged.”

While the local government, including the Ministry of Agriculture, could do a lot to improve farming practices in town, other organisations can step in as well. Two examples from Nakuru can serve as an illustration. The Catholic Diocese of Nakuru started a support programme called Agriculture and Rural Development Programme (ARDP) in 1992. The programme was mainly rural-oriented but included a few dozens of urban farmers as well.

The main forms of support consisted of training and the provisions of loans or equipment. In a sub-study of the Nakuru research project, ARDP-supported urban farmers were compared with non-supported farmers. Especially the support to the cattle keepers appeared to pay off, as average gross income from cattle and milk sales were substantially higher among the supported cattle keepers (Foeken, 2006). The second example concerns the Ecumenical Church Loan Fund (ECLOF Kenya), an organisation providing small loans to ‘small entrepreneurs’.

At the time of the study, five urban live-stock keepers in Nakuru town were among the recipients. Of these, three were in dairy farming (zero-grazing), one in pig farming and one in poultry keeping. Four of them were interviewed and are described in Foeken (2006). The conclusion was that all of them managed to raise their income levels considerably.

Improving market conditions

Selling of farming products is very common in the three towns. A study in Kampala showed that a wide range of markets may be available, including formal produce markets, informal produce markets, food processors, hotels and restaurants, fast-food outlets, institutions (example, schools), supermarkets, shops, kiosks, roadside vendors, etc. (Nyapenda et al., 2010). Although marketing was not a major focus in the two studies, from a study carried out in Dar es Salaam, it is known that both producers and traders faced serious problems including poor, unreliable and costly methods of transport, unpredictable demand, seasonal oversupply, price fluctuations, severe competition, and a high degree of perishability of produce (Yachkaschi 1997). For the large majority of the urban farmers in the three towns who sold crops and/or livestock products, the marketing of agricultural produce was a very simple affair, namely a direct transaction between producer and consumer. This occurred either at the plot (the ‘pick your own’ system), at the farm gate, in the street or at the market. Usually, women were involved in these transactions on the producers’ side and obviously only small quantities were traded this way. Yet, some urban farmers were not satisfied with the marketing infrastructure, as these remarks – all from Mbeya – illustrate:

“Markets for animal products should be found and the processing of animal products improved, especially milk processing. (...) The market for crop products should be encouraged by establishing small-scale processing plants, like tomatoes.”

“The important inputs for crops and animals should be available at low prices.”

“Find permanent markets for our crops and animal products. Reduce the prices of animal and crop inputs.”

One Mbeya farmer was so pessimistic about the market situation in his town that he did not see any future for urban agriculture, as “there is no market and the input and transport systems are not good”.

In the earlier mentioned Buea (Cameroon) study (Ngome and Foeken, 2012), despite the fact that the research locations enjoyed good road networks and are strategically located near two major markets to allow for the easy transportation of vegetables (mainly tomatoes) to sell, some respondents still complained about ‘market constraints’. Moreover, in order to improve the situation, many gardeners suggested the provision of cooled, public storage facilities so that post-harvest losses could be reduced.

CONCLUSION

It is widely recognized – including many municipal authorities – that urban agriculture is not only common practice

²⁶ Buea is in size comparable with Nakuru, Morogoro and Mbeya.

but also that it is an important source of livelihood for many (poor) urban dwellers in Sub-Saharan Africa. Potentially, the agricultural sector in African towns could benefit greatly to a town's prosperity in terms of employment creation, income generation and food supply. Yet, in actual practice, the sector is very underdeveloped (part of the informal sector), can be environmentally quite destructive, and is at best tolerated by the local authorities.

In the three East African towns investigated in this paper, urban agriculture is a very common economic activity. However, legislation, policy and practice show contradictions within and between the various levels of decision making (although recent developments in Nakuru show that these contradictions seem to be disappearing).²⁷ Such contradictions can put the local authorities in a difficult situation. On the one hand, the activity is illegal or is only allowed under strict conditions, as is the case in Nakuru, Morogoro and Mbeya. On the other hand, attempts (usually by NGOs) to promote the activity with the aim of improving the situation of the poor are being supported or even carried out by the municipality itself, for example in Nakuru and Morogoro. The strange thing is that the by-laws, even though implicitly recognizing urban farming as an important livelihood component for many of the urban dwellers and now as a legal urban activity, can in practice remain as restrictive as ever.

If the authorities are serious about developing the urban farming sector (and thus reducing urban poverty at the same time), the first thing to do is to integrate urban agriculture into urban planning, for instance by creating zones for farming purposes. Access to land is a major obstacle for many (poor) urban dwellers who would like to farm, so providing land should have the highest priority. Institutional support in combination with the creation of farmers' associations is another prerequisite for successful poverty eradication by means of urban agriculture. Examples like the credit schemes in Nakuru and the farmers' cooperatives in Cotonou²⁸ are promising developments in this respect. What such initiatives have in common is that the private sector takes the lead while the local government allows – or maybe even supports – proposals. Only in Morogoro did some initiatives originate from the municipal government itself, such as the allocation of plots in certain zones (Foeken, 2008).

It is time for local authorities to give up their wait-and-see attitude and to go a step further than only recognizing the urban farming sector in legal, policy and planning terms. First of all, the local governments should reconsider their urban agriculture by-laws by making them less restrictive as they are now. Moreover, there is a clear leading role for the local authorities in other fields. First,

the Ministry of Agriculture could be much more active in the field of training and education. Second, it is the municipality's responsibility to create favourable market conditions, such as good roads, well-developed market places, and good transport and storage facilities. The national governments could also step in, for instance by means of setting favourable prices for inputs. In short, to improve the sector, there is a major task ahead for the local as well as national authorities and also for the private sector, not only in these three towns but most likely all over Africa.

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²⁷ Martin *et al.* (2000) describe a similar situation in Harare (Zimbabwe) and, to a lesser extent, in Pretoria and Cape Town (South Africa).

²⁸ See Brock & Foeken (2006).

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Annex 1. Environmental issues of urban agriculture, by town (%).

	Nakuru	Morogoro	Mbeya
Crop cultivation: use of chemical inputs	(N=160)	(N=269)	(N=208)
- Chemical fertiliser	36	24	74
- Chemical pesticides	29	14	35
- Chemical insecticides	9	15	42
Livestock keeping: rearing system^a	(N=48)	(N=59/33)	(N=148/39)
- Partly or wholly in free range	46	9/58	10/46
Livestock keeping: disposal of animal waste	(N=121)	(N=114)	(N=235)
- Dump all or part of it in the street	33	0	2
- Dump in pits/compound	13	15	19
Recycling			
- Use manure as fertiliser (N=160/269/208) ^b	53	17	62
- Use animal waste for crop cultivation (N=121/114/235) ^b	63	91	97
- Use crop residues as fertiliser (N=160/269/208) ^b	35	31	24
- Use crop residues as animal feed (N=121/114/235) ^b	57	45	56
- Use urban waste as animal feed (N=121/114/235) ^b	27	28	60
Aware of damage to urban environment? (% yes)			
- Crop cultivators (N=40/240/189) ^c	58	33	39
- Livestock keepers (N=40/114/239) ^c	43	60	51

Notes: The Nakuru figures refer to large livestock (mainly cattle, sheep and goats) and the Morogoro and Mbeya figures refer to, first, improved cattle and, second, sheep and goats; N's refer to Nakuru, Morogoro and Mbeya, respectively; See note b. Figures for Nakuru are derived from a sub-study on the environmental issues of urban agriculture (Foeken, 2006).