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Urban Agriculture: Ethnicity, Cattle Raising and Some Environmental Implications in the City of Dar es Salaam, Tanzania

Malongo R.S. Mlozi

Introduction

Since gaining independence in the mid 1970s, the economies of many Third World countries have been worsened by a number of external and internal causes such as the oil crisis, political strife and economic mismanagement, coupled with droughts, increased populations, distorted industrialization and lack of job creation. These and other factors have led to an attrition of civil servants' efficiency, a decline in real incomes, increased balance of payment problems and low productivity, both in rural and urban areas (World Bank 1995, 1994; Bukuku 1993; Nyang'oro and Shaw 1992; African Development Bank 1992). In an attempt to address the continuing decline of their economies, Third World governments have pursued a variety of policies and practices collectively designed to encourage the involvement of the labor force in informal sector economic activities. The principal objectives of such activities include subsidizing individuals' incomes and increasing food production. One of these activities has been urban agriculture that emerged as a major urban sector activity during the 1980s (Rakodi 1988; Yeung 1988; Tricaud 1987; Sanyal 1985). Urban agriculture in Tanzania, and especially in the city of Dar es Salaam, involves the raising of livestock and growing of crops (cash, food) both for earning extra money and nutritional purposes.

In spite of its perceived beneficial impact on individuals and society, urban agriculture is generally associated with serious problems relating to environmental degradation. Ironically, Third World countries have largely ignored this problem even though the environmental degradation that urban agriculture causes is rampant. Tanzania is no exception. It appears that most research and literature on urban agriculture has neglected to tackle the issue of environmental degradation caused by urban agriculture. This study, therefore, seeks to contribute toward urban theory that helps to explain reasons for raising cattle by various ethnic groups in an urban milieu. A key question that the study asks is: Why do people continue to raise cattle even when

they know of the possible negative effects on the environment? Specifically, this article discusses the practice of raising cattle by members of 33 ethnic groups in the city of Dar es Salaam. The paper discusses data collection and analysis. It provides a review of literature on both urban agriculture and the environmental degradation that livestock can cause. The paper then uses the model to explain factors that encourage people to raise cattle, and then concludes and offers policy recommendations for averting environmental degradation.

Methodology

The researcher collected the data on livestock numbers and their owners that are reported in this study in August 1993. Data came from the Ministry of Agriculture, Livestock and Co-operative Development (MALCD) in three urban-based district veterinary offices of Ilala, Kinondoni and Temeke in Dar es Salaam. From May to September 1992, MALCD personnel carried out a cattle rinderpest vaccination campaign in the region of Dar es Salaam. During the vaccination campaign, the personnel recorded each cattle owner's name, their home area and the number of animals each kept. As vaccinations were free of charge, cattle owners did not hide their animals to evade costs as they had done in the past. The researcher asked for permission from each of the three veterinary doctors in-charge of each District to collect data on the livestock numbers and their owners. This permission was granted. Later, the researcher got six experienced livestock extension staff (two from each District) who had also taken part in the vaccination campaign to list names of livestock owners based on their ethnic groups. The six staff selected had each about seven years of working experience with the livestock owners and knew them well. The staff were separately asked to identify the ethnicity of most cattle owners. Each staff looked at the roster provided of the family names of people raising cattle in their respective districts and recorded the ethnicity to which they belonged. The staff recorded the name of each cattle owner's ethnicity in front of the family name(s). Later, the researcher collected the rosters, compiled them, did frequency counts and calculated simple and descriptive statistics, some of which are presented in this paper.

Literature on Urban Agriculture

Traditionally, in Third World societies, it is citizens of lower socio-economic status (SES) who mostly engage in urban agriculture. Today, however, studies suggest that the activity is no longer the exclusive preserve of people of lower SES. A wide range of people engage in urban agriculture for a variety of economic, cultural, nutritional and social reasons (Tinker 1994; Diallo 1993; Freeman 1991,

1993; Sawio 1993; Mvena, Lupanga, and Mlozi 1991). Urban agriculture is a diverse, omnipresent, thriving and profitable activity in cities all over the world, both for low-income and high income people (Mougeot 1994a; International Development Research Centre 1994; Smit and Nasr 1992, 142). Urban agricultural activities vary widely, both within and between countries, also throughout urban socio-economic status (SES). Some years ago, O'Connor (1983) perceived urban agriculture to be an important part of small-scale enterprises. Surveys from the late 1980s in Bolivia, Egypt, Kenya, India, Mali, Thailand, Tanzania and Uganda show that poor urban households spent 60 percent—and in some cases as much as 89 percent—of their income on food. In 1990, households in nearly half the Least Developing Countries' (LDC) largest cities were spending 50 to 80 percent of their income on food (Ethelston 1992; Population Crisis Committee 1990).

Yet, urban agriculture is found in the countries of the developed West and Asia. For example, most residents in Asian cities strive to produce their own food (Hartvelt and Gross 1992; Yeung 1988; Sachs and Silk 1987; Wade 1987). Urban agriculture is also undertaken in countries like England, Germany, Holland, Japan, Poland, Italy and the United States of America (van der Blik 1992; Bills 1991; Latz 1991; Kleer 1987). In the Greater Vancouver regional district of Canada, the author observed that some people, in summer months, grew vegetables in their backyards, balconies and community gardens that include climbing beans, tomatoes, onions, carrots, spinach and potatoes. In South America too, urban agriculture provides opportunities for the beleaguered people of lower SES (Bohrt 1993; Lee-Smith and Trujillo 1992; Gutman 1987; Wade 1987).

In Africa, urban agriculture for food and economic survival is undertaken everywhere (Diallo 1993; Gefu 1992; Ngwa Nebasina 1987; Streiffeller 1987; Tricaud 1987; Khouri-Dagher 1986). In Central and West Africa, for instance, urban agriculture is the occupation of people of lower SES because of difficult economic conditions in their cities (Hartvelt and Gross 1992; Manshard 1992; Gbadegesin 1991; Streiffeler 1987). Another example is in Harare, Zimbabwe, where urban agriculture is done by most people (Drakakis-Smith, Bowyer-Bower, and Tevera 1995; Mbiba 1994; Drakakis-Smith 1992). Similarly, in Lusaka, Zambia (Rakodi 1988; Sanyal 1985), and Lilongwe, Malawi (Potts 1989), people of lower SES do urban agriculture for food and to earn some extra income. In South Africa, most people of lower SES are undertaking urban agriculture (May and Rogerson 1995; Rogerson 1993; Molefe 1991). Urban agriculture is omnipresent in Addis Ababa, Ethiopia (Egziabher 1994; Wayburn 1985), in Kenya (Freeman 1993; 1991; Memon and Lee-Smith 1993; Lado 1990) and Uganda (Maxwell 1994; Maxwell and Zziwa 1992). In Tanzania, the situation is similar to that found generally in Africa, except that commercial raising of

livestock (crossbred dairy cattle, broiler and laying chickens) predominates. Urban agriculture that includes the raising of livestock and growing of vegetables and field crops is found everywhere in Tanzanian towns and cities (Mlozi 1995a, 1995b; 1994; Sawio 1993, 1994; Mlozi, Lupanga, and Nvena 1992; Mosha 1991; Mvena, Lupanga, and Mlozi 1991; United Republic of Tanzania 1991; Bongole 1988). In Dar es Salaam, urban farming is the second largest source of employment after petty trade and labor, and 74 percent of urban farmers keep livestock (Mougeot 1994b).

Urban agriculture is done globally and has numerous benefits, specifically nutrition, income generation and poverty reduction, community well-being, waste management and conversion of food items. Despite these advantages, however, in areas where cattle husbandry is common, urban agriculture causes environmental degradation, a serious problem in Tanzania, and especially in the city of Dar es Salaam.

Environmental Degradation

Two common aspects of environmental degradation caused by raising cattle are risks to health, and aesthetic and social concerns. These issues are discussed in the following section.

Risks to Health

It is increasingly recognized that urban agriculture has “negative impacts for the population and the urban environment and poses new problems for planning” (Rogerson 1993, 37). It is possible that the global ubiquity of urban agriculture in most countries causes environmental degradation. For instance, domestic animals transmit zoonoses or animal diseases that can afflict humans and circulate among other animals (Wathes 1994; Phillips and Piggins 1992; Harrison and Sewell 1991; Madkour and Gargain 1989; Acha and Szyfres 1987). The frequency of this infection load almost increases proportionally with the size and aggregation of the human population (Cohen 1992, 55).

In the city, animal dung not removed from sheds and compounds decomposes, produces an odor and acts as a breeding ground for harmful bacteria and flies. Animal dung is a source of tetanus (Ellner and Neu 1992; Rosen 1975), especially if the animals are left outside to graze—a phenomenon often seen in the city. Slurry containing dung, urine and water that emanates from the dairy cattle and chicken sheds and pig pens is seen in most compounds with livestock. This pollutes the surroundings and attracts disease-causing vectors such as mosquitoes. Mosquitoes are probably the most important insect vectors, even in the urban areas: they bear malaria, yellow fever (*Aedes* mosquitoes), dengue (*Aedes* mosquitoes), *Bancroftian filariasis* (elephantiasis) and

lymphatic *filariasis* (*Culex quinquefasciatus* mosquitoes), along with several lesser known diseases (Bradley 1993; McGranahan 1993; Sutherst, 1993; World Health Organization (WHO) 1992; Service 1989). In many cities or poor periphery city districts, malaria is one of the main causes of illness and death (Satterthwaite 1993; Rossi-Espagnet, Goldstein, and Tabibzadeh 1991).

For instance, the dairy cow produces about 45 kilograms of excreta per day, giving a total production of approximately 16,000 million tons per year globally (Phillips and Sorensen 1993, 63). Table 1 shows that in 1993, the city of Dar es Salaam had 1,937 people raising 14,721 dairy cattle in its urban wards. So, if three quarters (11,041) of these animals were adult cattle, and as Mlozi (1995b) found, the animals were not well fed, it is estimated that each animal produced 10 kilograms of excreta per day. And they would have produced about 110,410 kilograms (110 metric tons) of dung per day. The 3,680 yearlings and calves would each produce an estimate of two kilograms of dung per day totaling 7,360 kilograms (7 metric tons) of dung. The total dung per day for all animals would be 117,770 kilograms (117 metric tons). In the city, evidence suggests that most people dispose of dung by leaving it to rot in house compounds, along the roadside, in live hedges, fences and other open spaces in part because of the lack of an elaborate sewage and solid waste collection system. About 72 percent of livestock keepers in Dar es Salaam dumped cattle dung along the roadside, 12 percent used City Council dump trucks and the remainder used their own transportation to dispose of animal wastes (Shauri 1989). The raising of livestock in urban areas has, if anything, worsened the already overloaded sewage system in many urban areas (Mvena, Lupanga, and Mlozi 1991, 7). Similar observations have been reported in other cities' urban agriculture studies (Mlozi 1995b; Moshia 1991; Bongole 1988). In residential places where dung often accumulates, it smells, and attracts harmful microbial activities. This has caused considerable concern for a Dar es Salaam City Council (DCC) already struggling with the poor refuse collection facilities and malfunctioning drainage (Kironde 1992; Yhdego 1992). Sometimes corpses of cattle and chicken are significant pollutants if dumped and allowed to rot on the roadside.

Urban cattle raising also causes serious air quality problems. Gaseous pollutants are on the increase because livestock production creates unavoidable and undesirable waste products. The degradation of Nitrogen-containing compounds leads to ammonia (NH_4) which is repulsive to neighbors and contributes to the impairment of the ozone layer (Mukherjee 1992; Tamminga 1992; Crutzen, Aselmann, and Seiler 1986). World-wide, four separate animal contaminants have already received attention by regulators: methane, reactive organic compounds (ROC), ammonia and particulate matter not greater than 10 micron in aerodynamic diameter (Brenk 1993). In the city, for instance, cattle

feed consists of forage containing high fiber contents. This means that there is more methane gas (CH₄) emitted by the methanogenic flora bacteria as they digest cellulose in the animals' rumen. The ROC are organic gases and include "ethane, acetone, isopropyl, alcohol, propyl acetate, ethylamine, and trimethyl amine" (Morse 1995, 2734). The ROC are precursors to the ground level ozone, which is claimed to irritate respiratory tissue, especially in elderly adults, very young children and asthmatics.

Medical and health personnel also worry that there may be increased pollution of water sources (e.g., shallow wells) with nitrates from dung that contaminate human drinking water supplies. Nitrates in drinking water are potentially dangerous, especially to newborn infants and young animals (Morse 1995, 2734), and cause respiratory dysfunction or abortion in animals (Merck Veterinary Manual 1979). Nitrates in water also pose risks to human health, they cause *methaemoglobinaemia* or "blue baby syndrome" and increase the possibility of gastric cancer (Phillips and Sorensen 1993, 64; Satterthwaite 1993; Klaasen, Amdur, and Doull 1986). There is also chemical contamination to humans from the use of acaricide to control East Coast Fever, a notorious tropical disease caused by ticks in cattle. Other problems are caused by the overuse of antibiotics to treat diseases such as mastitis, abscesses, wounds and other bacterial diseases common both to cows and chickens. In the city, the economic propensity to get money from milk sales takes precedence over the need to heed and cater adequately for the health and safety of consumers. For instance, public health personnel do not test the milk for purity or adulteration, nor do urban veterinary staff test the cows for the presence of zoonotic diseases.

Aesthetic and Social Concerns

In the city, livestock destroy ornamental plants, roads, lawns, water lines, telephone lines, parks, fences and traffic signs. They obstruct pedestrians and motorists, and sometimes cause accidents. Cows, chickens and goats, if housed in sections or servants' quarters in government, public institutions and private company houses, cause extensive structural damage to buildings. Cattle raising activities also contribute both directly and indirectly to urban desertification. Desertification leads to a decrease in the biological productivity, and, consequently, a reduction in plant biomass. In the city of Dar es Salaam, the most conspicuous effects of raising cattle are soil erosion along the beaches, household compounds, recreational areas, playgrounds and other open public spaces. This is of two forms: cattle grazing in the fragile urban lands; other people gathering forage to feed the zero-grazed cattle. Evidence and literature from the HADO project in

Kondoa, Dodoma region, clearly suggest that large numbers of cattle per unit area are detrimental to land ecology and its productivity. Cattle also cause other social concerns such as noise, dust, noxious odor and smoke from burning of animal wastes. Some people are allergic to such pollution and asthmatics may suffer most. In the city, there is every reason, therefore, to be highly concerned about environmental damage that cattle engender, because of their potential negative effects on public health.

The Study Area: Dar Es Salaam

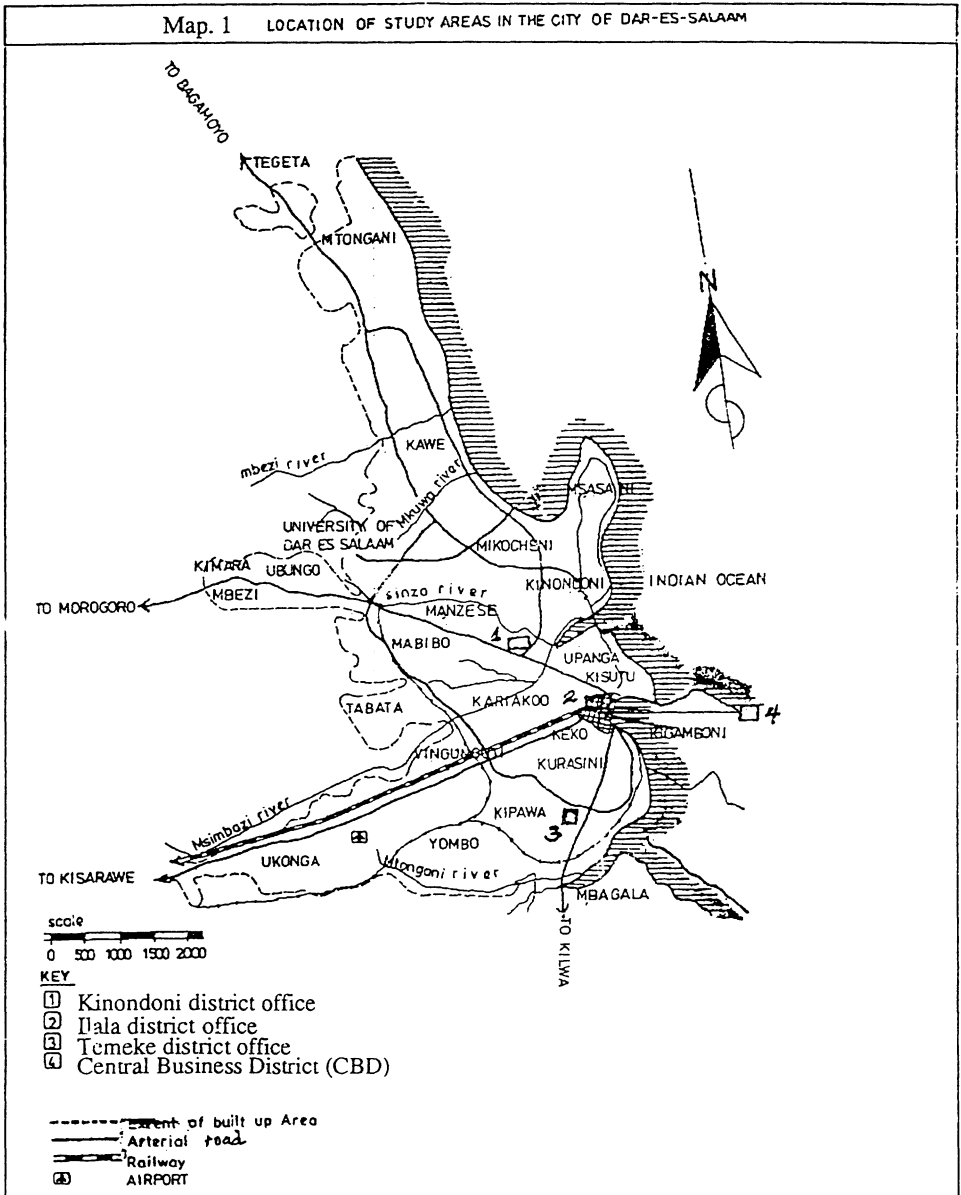
Dar es Salaam had 900 people in 1891, a population of 1.3 million people in 1988 (United Republic of Tanzania 1990) and an estimated 2.2 million in 1992 (Synge 1992). The city is the biggest urban agglomeration in Tanzania and the most dynamic socioeconomically, culturally and geopolitically. It lies 10 meters above sea level and is located around latitude 7' 0" North and 39' 0" East. Administratively, modern Dar es Salaam is both a district and a region comprising Ilala, Kinondoni and Temeke districts (Map 1). All districts have 50 wards of which 35 are urban wards. Of these, 15 are in Ilala, 11 in Kinondoni and 9 in Temeke. The Dar es Salaam City Council (DCC) is responsible for the general administration of the city. Dar es Salaam is not a planned city in the same way as a modern city such as Brasilia, Chandigah or Abuja (Armstrong 1987, 133) and has been subjected to a number of developmental plans since its inception in 1891. Literature contains many accounts that show how, over the past four decades, the State has failed to survey and develop plots for urban development (Kombe 1994; Kaitilla 1992; Kironde 1992). This informal sale of urban land has increased the number of squatter houses and plots bought by people from all SES groups—areas in which cattle are also raised.

A grouping of principal residential areas according to densities in the urban city wards shows four distinct groups:

1) The low density areas such as Masaki, Mikocheni A and B, Msasani, Seaview and Oysterbay, with plot sizes typically measuring 4,640 square meters, live people of highest SES most of whom raise cattle. Most urban farmers in low density areas (about 0.4 or more hectares) in which they carry out booming cattle and chicken rearing enterprises (Sawio 1994; Moshia, 1991; Mvena, Lupanga, and Mlozi 1991; Bongole 1988).

2) The quasi-medium density areas such as Kalenga, "New" Tabata, Shabani Robert, Upanga and Victoria/Regent estates, which measure about 1,750 to 2,400 square meters and are inhabited by people of quasi-medium SES or mid-level status who raise fewer cattle than people in the low density areas.

Map 1



3) The medium density areas such as Chang'ombe, Kinondoni Block 41, Mwananyamala, Ubungo, with plots measuring about 896 square meters, are inhabited by people of medium SES and they raise few cattle compared to people in the quasi-medium and medium density areas.

4) The high density areas such as Gerezani, Kinondoni Block A, Mabibo, Magomeni, Sinza and Vingunguti, are in the majority and measure about 300 square meters. These areas are inhabited by people of lower SES who usually do not raise cattle.

In summary, areas with large plot sizes and the infrastructure compose the low and quasi-medium density areas in which most dairy cattle are raised. It is in these areas that environmental damage is greatest.

Raising Cattle in Dar Es Salaam

In 1984, Tanzania had about 12.5 million cattle, and the region of Dar es Salaam had 0.05 percent (6,158) (Ministry of Agriculture and Livestock Development (MALD) 1988). Of all cattle in the country, 1.1 percent (142,034) were crossbred (improved) dairy cattle, and the region of Dar es Salaam had 1.2 percent (1,763) of these. By the end of 1993, the region had 18,286 cattle, a ninefold increase in the 8 years from 1984. Of 18,286 cattle, 80 percent (14,721) were raised in the urban wards of the city and 19.9 percent (3,565) were kept in the rural wards. At the end of 1993, the estimated worth of all animals in the region was T Shs 3.1 billion or an estimated US \$6.3 million at the 1993 exchange rate of T Shs 480 to 1 US dollar. In the urban wards alone, the cattle were worth T Shs 2.5 billion (US \$5.0 million).

Table 1 shows that of 14,721 dairy cattle, people kept 88.5 (13,031), 8.0 (1,171), and 3.5 percent (519) in the urban wards of the Kinondoni, Ilala and Temeke Districts, respectively. Of 1,937 cattle owners in the urban wards, 82.0 (1,591), 13.7 (265), and 4.2 percent (81) lived in the Kinondoni, Ilala and Temeke Districts, respectively. In all urban wards, most dairy cattle, 83 percent (12,228), were raised in the low and quasi-medium density areas, suggesting that people of highest and quasi-medium SES kept the most cattle. These areas have big plot sizes, water, roads and other infrastructure and some are in salubrious locations in the city.

Ethnicity and Cattle Raising

Table 1 also displays the number of dairy cattle raised in the city based on ethnic backgrounds. In the city, Sawio (1994) found that of 260 urban farmers from different geographical-ethnic clusters, the highest

Table 1

Table 1. Dairy Cattle Raised in the Urban Wards of Dar es Salaam and Their Owners (identified/unidentified ethnicity) Shown in Brackets

District	Density	Identified ethnicity	Unidentified ethnicity	Total	% of total	Av. cattle /person
Ilala:	Low	273 (76)	257 (62)	530 (138)	3.6	3.8
	Quasi medium	406 (75)	96 (18)	502 (93)	3.4	5.4
	High	135 (33)	4 (1)	139 (34)	0.9	4.0
Kinondoni:	Low	3598 (441)	2122 (237)	5720 (678)	38.9	8.4
	Quasi medium	371 (56)	5028 (494)	5399 (550)	36.7	9.8
	Medium	905 (171)	351 (74)	1256 (245)	8.5	10.6
	High	484 (79)	172 (39)	656 (118)	4.5	5.6
Temeke:	Quasi medium	15 (3)	62 (8)	77 (11)	0.5	7.0
	Medium	267 (44)	148 (19)	415 (63)	2.8	6.6
	High	15 (3)	12 (4)	27 (7)	0.2	3.9
Total		6469 (981)	8252 (956)	14721 (1937)		7.6
% of the total		43.9 (50.6)	56.1 (49.4)			
Average cattle per person		6.6	8.6			

Source: Survey data.

Ethnicity, Cattle Raising and Environmental Implications

Table 2

Table 2. Dairy Cattle Raised in the Urban Wards of the Three Districts of the city of Dar es Salaam

District		Geographical area ¹										Total
		1	2	3	4	5	6	7	8	9	10	
Ilala:	Low	131 (29)*	7 (2)	9 (3)	-	106 (36)	-	10 (2)	5 (1)	4 (2)	1 (1)	273 (76)
	Q/Med.	101 (22)	9 (3)	21 (6)	3 (1)	87 (16)	11 (1)	47 (4)	8 (1)	75 (17)	44 (4)	406 (75)
	High	85 (22)	8 (1)	2 (1)	1 (1)	16 (3)	-	-	1 (1)	21 (3)	1 (1)	135 (33)
Kin'doni:	Low	1994 (240)	56 (9)	216 (21)	93 (5)	569 (82)	43 (2)	6 (3)	124 (10)	360 (55)	137 (14)	3598 (441)
	Q/Med.	222 (22)	14 (3)	-	5 (3)	68 (13)	-	19 (3)	8 (3)	35 (9)	-	371 (56)
	Med.	600 (108)	32 (7)	18 (5)	-	183 (34)	-	1 (1)	11 (5)	51 (7)	9 (4)	905 (171)
	High	261 (44)	32 (7)	22 (5)	-	58 (9)	7 (2)	-	-	48 (5)	56 (7)	484 (79)
Temeke:	Q/Med	13 (2)	-	-	-	-	-	-	-	2 (1)	-	15 (3)
	Med.	112 (19)	1 (1)	20 (3)	-	62 (9)	-	1 (1)	42 (5)	8 (3)	21 (3)	267 (44)
	High	-	-	-	-	8 (2)	-	-	-	-	7 (1)	15 (3)
Total		3,519 (508)	159 (33)	308 (44)	102 (10)	1,157 (204)	61 (5)	84 (14)	199 (26)	604 (102)	276 (35)	6,469 (981)
Av. cat/per**		6.9	4.8	7.0	10.2	5.7	12.2	6.0	7.7	5.9	7.9	6.6
% of the tota.		54.4	2.5	4.8	1.6	17.9	0.9	1.3	3.0	9.3	4.3	

Source: Survey data.

¹Table 3 shows the ten geographical areas' names.

*Figures in brackets show cattle owners; **cat/per = cattle per person; Med. = medium; Q/Med. = Quasi medium; Kin'doni = Kinondoni.

percent of 21.9 came from the Kilimanjaro region in the north-eastern region of the country.

Table 1, column three, shows dairy cattle numbers and in brackets are the names of identified owners of the 33 ethnic groups. Further, column four displays cattle numbers and owners that extension staff could not identify belonging to any of the 33 ethnic groups. Of 14,721 cattle, members of the 33 identified ethnic groups raised 42.5 (6,250) with 40.6 percent (5,978) in low and quasi-medium density areas, respectively. People raised the most cattle, 75.5 percent (8,119), in the low and quasi-medium density areas, especially in urban wards of the district of Kinondoni. Here, each person raised an average of nine cattle. Of 14,721 dairy cattle, all 33 members of the identified ethnic groups raised 43.9 percent (6,469), and each raised an average of 6.6 animals. Table 1 also shows that of 6,469 dairy cattle that members of the 33 identified ethnic groups raised, 45 percent (441) of owners lived in the low density areas of the district of Kinondoni and raised 55.6 percent (3,598) cattle. Here, one person raised an average of eight animals. These figures support the notion that people of high SES mostly raise dairy cows in the urban centers. For instance, a crossbreed heifer and a cow were expensive to buy (cost from T Shs 100,000 to 250,000 (US \$208 to 512) and difficult to get. Evidence suggests that people of highest and quasi-medium SES more easily buy cows and raise them in their "islands of affluence" some of which are in the medium and high density areas. In the city, a person kept an average of 7.6 cattle, much higher than the DCC recommendation of four.

Table 2 shows the number of dairy cattle raised in the urban wards of the three districts based on ten geographical areas from which the ethnically identified cattle owners hailed. In the city members who come from the north-eastern geographical area (represented as No. 1 in Table 1) raised the most dairy cattle.

Of 6,469 cattle, urbanites who originated from the north-eastern geographical area raised 54.4 percent (3,519), and one person raised an average of 6.9 animals. Most of their cattle, 55.6 percent (3,598), were raised in the low density areas in the urban wards of the district of Kinondoni. Each person kept an average of 6.6 animals. Table 2 also shows wide variations in the number of cattle kept by these groups. One explanation for this appeared to be due to the number of elite and bureaucrats of a geographical area who bought animals.

Table 3 displays specific ethnic groups in the geographical areas and the number of livestock they raised. Urban agriculturalists from the north-eastern area (Kilimanjaro, Arusha) who comprise the Waarusha, Wachagga, Wamasai, Wameru and Wapare ethnic groups, raised most dairy cattle in the city.

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Table 3

Table 3. The Ten Geographical Areas From Where the Identified Ethnic Groups Originated and the Cattle They Raised

Geographical area	Ethnic groups	Total # of cattle kept	Average cattle per person	% of the total (identified)
1. North-eastern	Waarusha, Wachagga, Wamasai, Wameru, Wapare	3519 (508)*	6.9	54.4
2. Dar es Salaam and surroundings	Wamatumbi, Wandengereko, Wazaramo	159 (33)	4.8	2.5
3. Western/Lake Victoria zone	Waluo, Wakerewe, Wakuria, Wasukuma, Wazanaki	308 (44)	7.0	4.8
4. Far south of Lake Victoria	Wanyamwezi, Wamanyema, Wanyamwanga,	102 (10)	10.2	1.6
5. South-western	Wabena, Wahehe, Wafipa, Wakinga, Wangoni, Wanyakyusa, Wasafwa	1157 (204)	5.7	17.9
6. South-eastern	Wamakonde, Wamakua, Wamwera, Warufiji, Wayao	61 (5)	12.2	0.9
7. Central	Wagogo, Wairaqw, Wambulu, Warangi	84 (14)	6.0	1.3
8. West of Dar es Salaam	Waluguru, Wakaguru, Wapagwa, Wapogoro	199 (26)	7.7	3.0
9. West and north-western	Waha, Wahanganza, Wahaya	604 (102)	5.9	9.3
10. Eastern/Tanga	Wabondei, Wasambaa, Wazigua	276 (35)	7.9	4.3
Total		6469 (981)	6.6	100.0

Source: Survey data. *Figures in brackets show cattle owners.

Of ten geographical areas, ethnic group members (508) from the northeastern areas raised most cattle, 54 percent (3,519) and each person had an average of 6.9 animals. They were followed by those from the Southwest, west and north-western areas. These findings are consistent with Sawio's (1994, 33), "the largest proportion of urban farmers come from the north-eastern, north-western, and south-western regions of the country." Data presented in Table 3 suggest that all urban dwellers who raised cattle, damaged the urban environment. This was so because most people had more cattle than the DCC recommended, and they dispose of dung in the house compounds and in the vicinity.

Examination of cattle figures in Table 3 shows five distinct ethnic groups who kept the majority of cattle. First, 398 members of the Chagga ethnic group kept 40 percent of cattle; each kept an average of 6.5. Second, 297 members of the three ethnic groups each raised from 500 to 700 cattle. The combined total for this group is 1,828 cattle and each raised an average of 10 percent of all cattle. Here, each member raised an average of six animals. Third, were 182 members of the seven ethnic groups who kept from 100 to 250 cattle. This group kept a total of 1,364 cattle—21 percent of all animals; each member kept an average of 7.5 animals. Fourth, 42 members of six ethnic groups raised 380 cattle—only 6 percent of the total and fifth, 62 members of sixteen ethnic groups kept 313 cattle or 5 percent of the total. Table 1 also shows that 82.8 percent (5,358) of cattle were raised in the urban wards of the Kinondoni district; 325 members of the Chagga ethnic group raised 43 percent (2,308) of these cattle.

Explanations for Why People Persist in Raising Cattle Despite its Damaging Effects

The conventional wisdom has it that a city is a dynamic place for industrial, commercial and formal employment activities, and not livestock agriculture. Given this, and given the extent to which raising cattle is damaging the urban environment, several questions arise: Why cattle raising persists, and why does it endure among such a wide range of members of certain ethnic groups of higher status? To explain the reasons why people continue to raise cattle that damage the environment, this study adopts a model in Figure 1 that shows the interplay of factors nested within four levels: government, ministry, City Council and the individual. Factors at these four levels interact with each other and beyond their boundaries. For instance, livestock data show that members of the 33 ethnic groups kept more cattle, although disproportionately. This mostly occurred in the low density areas, and the doers were people of higher SES who had more administrative, economic and political power.

Figure 1

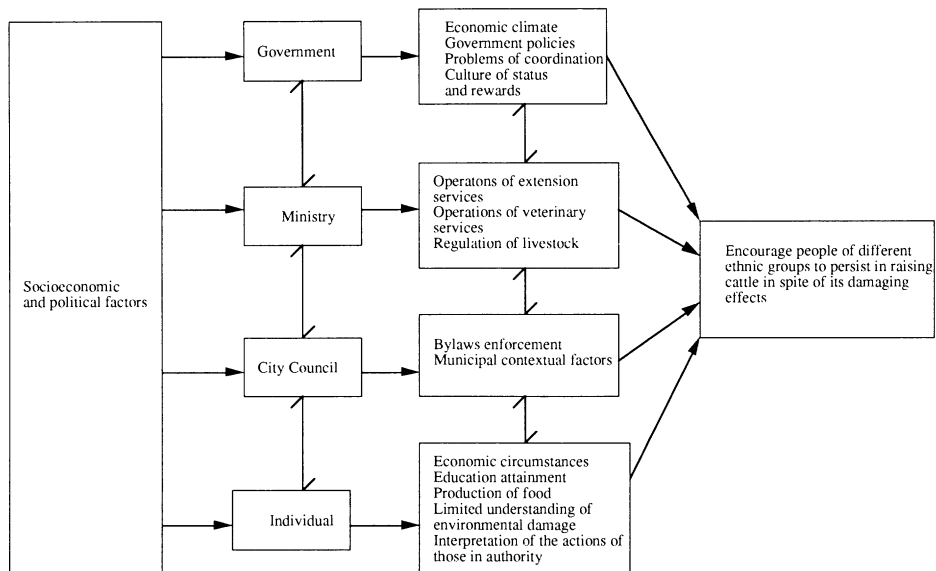


Figure 1: Model Showing Factors Nested at Four Contextual Levels to Explain People of Different Ethnic Groups' Persistence in Raising Cattle in spite of Its Damaging Effects

Government Level Factors

Four factors at the government level encouraged people to persist in keeping cattle in spite of its damaging effects (Figure 1). These were 1) the national economic climate, 2) government policies, 3) problems of coordination and 4) the culture of status and rewards for senior officials and the elite. Each of these factors is discussed below.

Economic Climate

There is much literature to show that Tanzania's economic crises started during the 1970s and have continued through the 1990s (World Bank 1994, 1995; International Monetary Fund (IMF) 1994; Mans 1994; Bukuku 1993; Sarris and van den Brink 1993). In the city, people raise cattle to subsidize their meager income and food supply. Tanzania's inability to adequately remunerate the elite, bureaucrats and other workers, lies in part in its dependence on its main export crops (coffee, cotton, tea, sisal). These crops have been extremely vulnerable to economic fluctuations, and have declined both in quantity exported and in the prices obtained in the world market. In Tanzania, income distribution studies show that urbanites of highest and medium-class households suffered the greatest declines in real income. Hence people raise dairy cattle to solve the lack of money problems. In the city, a recent study of 29 urban agriculturalists revealed that each earned an average total annual net profit of T Shs 1.3 million (US \$2,650) from sales of livestock products (milk, eggs, broiler meat) (Mlozi 1995b). These earnings were on average 15 times more than the net annual salary of a low income worker and six times that of a senior public official. Of 29 interviewees, 16 raised dairy cattle and each earned an annual net profit of T Shs 450,000 (US \$938). In a similar study, all 56 interviewees (29 urban agriculturalists, 27 public officials) said that people did urban agriculture for economic reasons. In the city in August 1993, for instance, Mougeot (1994a, 18) observed that "if we assume that only half of the milk was sold, the equivalent to 4 million U.S. dollars was still accruing to the urban cow owners annually."

Besides, in the city, Mlozi (1995b) found that of 105 cattle that the 29 interviewees raised, half were cows and each produced an average of 5.3 liters of whole milk (3.2 percent butter fat) that was sold for T Shs 200 (US \$0.42). Half of the 6,469 cattle that the 981 members of the 33 ethnic groups raised would have been cows. These would yield 17,143 liters of milk per day, earning people T Shs 3.4 million (US \$7,143); the net profit of this amount less 40 percent for operation costs was T Shs 489.6 million (US \$1 million) per eight months of lactation.

Each ethnic member, therefore, earned T Shs 499,000 (US \$1,040) in a period of eight months. These earnings were 7.7 and 2.9 times more than the net annual salary income of a low income (e.g., T Shs 64,800 (US \$135)) worker and a senior public official (e.g., T Shs 168,000 (US \$350)), respectively. These findings are consistent with other urban agriculture studies in Tanzania, especially in Dar es Salaam that show urban agriculture is mostly done for economic ends. The Tanzanian literature is at variance with those from other cities in Africa, which report that urban agriculture is mostly a preoccupation of poor people who do it for subsistence purposes. In the present study the involvement of higher status people is clearly seen, and, they too, raised dairy cattle for economic reasons.

Government Policies

Members of various ethnic groups persisted in raising dairy cattle in spite of their damaging effects because the government encouraged the practice both directly and indirectly (Figure 1). From the 1970s to the 1980s, the government, faced with a poor economy, issued policies encouraging people to do urban agriculture. The aim was for self-sufficiency in growing food to offset skyrocketing inflation of goods and services in towns and cities. Government and political leaders time and again exhorted urban people to produce food in their backyards and other open spaces. The government directly encouraged urban agriculture through policy promulgation as mentioned in its several documents (i.e., *Politics is agriculture, Agriculture for life and death*). However, the policies are contradictory: the national policies encourage urban agriculture, while that of the DCC regulates it. Relevant government policies that encouraged urban agriculture are the national economic policies and the agricultural policies. Those that regulate it are contained in the Act of 1982 that allowed Local Governments (Urban Authorities) to enact bylaws to regulate urban agriculture in their jurisdictions. During the mid-1980s economic liberalization and privatization policies, the government allowed individuals and groups of people to open animal clinics, most of which are owned by the government-employed veterinary doctors. At the end of 1993, there were three private animal clinics operating in two Districts; two in Kinondoni and one in Temeke. Unlike those in western countries, these clinics treat mostly urban livestock and operate on a part time basis, employing government veterinary doctors and their assistants. Those policies also encouraged privately operated animal drug stores, farm input stores, feed compounding houses and forage vending. Others were sales of animal medications, feed, chemicals, fertilizers and forage to urban agriculturalists. Often, owners of animal clinics, drug stores and farm input stores bought their merchandise from

the government veterinary clinics and stores at subsidized prizes and sold them at higher prices to earn substantial profits. Another encouragement for urban agriculture was that the government appeared to favor urban people over those in rural areas with extension services and livestock supplies. There were three examples of this scenario. First, was the concentration of MALCD agriculture/livestock extension services in the urban areas. Second, was the increased sales of crossbred cattle to senior government and the ruling party officials, and other bureaucrats who mostly raised cattle in the city. Third, was the sale of agricultural and livestock inputs (medications, drugs, supplies) in the city.

Problems of Coordination

A recent study in the city also found that there was a lack of coordination among some government ministries, departments, public institutions, the public and the private sector (Mlozi 1995b) (Figure 1). The lack of coordination occurred because the government did not explicitly support efforts to lessen environmental damage. For instance, the National Environmental Management Council often gave advice to the DCC, the Ministry of Lands, Housing, and Urban Development and MALCD for reducing beach erosion that livestock caused. But the government, through MALCD, was encouraging senior officials and other bureaucrats living along the beaches to raise cattle: it sold them animals and offered advice. Another example was that of the Ministry of Health whose personnel advised urbanites to cut tall grass and remove garbage from their compounds to reduce disease-causing mosquitoes and other disease epidemics. But the government, through MALCD, deployed its extension agents to encourage people to raise more livestock and grow crops to increase their income and produce food. To solve this, in 1992, the United Nations Center for Human Settlements (Habitat) initiated a project in the city of Dar es Salaam called the Sustainable Dar es Salaam Project to both promote city stakeholders participation and co-ordination.

Culture of Status and Rewards

Members of various ethnic groups persisted in raising cattle because there is a particular culture of status and rewards among the elite and senior officials of the government, public institutions, the ruling party and private companies. People of high SES have political clout and enjoy several privileges that the government provides, which can be used in their pursuit of raising cattle. Such people live in high quality housing areas, and the government or their institutions gives them ample rewards or fringe benefits. For instance, senior officers live in houses with large plots in which they raise dairy cattle, chickens

and goats. Here, most houses have the infrastructure, garage courts and servant quarters which people often converted to cattle sheds and chicken units. Mlozi's study (1995b) found that the government often did not enforce regulations that forbid senior officials to raise livestock in its premises. The government also provides senior officials with vehicles for transportation to and from their offices, but most officers used the vehicles for urban agriculture chores. Some officials also intensified their enterprises with the allowances (e.g., travel) that the government and public institutions gave them whenever they were away from their offices on official duties. In the city, cattle keepers with high annual net salary earnings were more likely than others to have high incomes from their cattle enterprises (Mlozi 1995b). These findings are consistent with the national economic literature, and the findings of urban agriculture earnings that the Tanzania National Informal Sector reports (United Republic of Tanzania 1991). They all point out that from the 1970s to the 1980s, in the cities, most high income earners after being hit hard economically, switched their activities to include urban agriculture to maintain their real incomes. Other studies on urban agriculture done in Dar es Salaam and other towns in Tanzania also confirm this. For instance, Mtwewe (1987, 7) writes that "the assumption people make that the low-income urban people are the ones engaged in farming is not true. The high-income people are the majority in the business."

Ministerial Level Factors

Three factors are examined at the Ministry of Agriculture, Livestock and Co-operative Development (MALCD), and they include the operations of extension services, operations of veterinary services and regulation of livestock.

Operations of Extension Services

Tanzania established urban extension services partly because of abundant literature and studies on rural-based agriculture and livestock extension services that show, other factors held constant, extension services can improve farmers productivity because of the education they offer. However, a recent study revealed that the MALCD extension agents were not effective in educating agriculturists in proportion to their numbers (Mlozi 1995b). For instance, this study found that most people relied on personal experience as the bases for most of their beliefs about the environmental damage. Reasons for the agents' ineffectiveness was due to several aspects of MALCD operations: uneven offering of extension services based on urbanite's SES and the inadequate training of agents. The study also found that MALCD

extension agents did not enforce the regulations for lessening environmental damage.

Operations of Veterinary Services

MALCD, through its three district offices operated animal clinics that sold animal medications, supplies, drugs and acaricide to livestock keepers, and treated sick animals. The extension agents at the offices offered advice to livestock keepers on how to use the medications they bought. But, not all the people followed the advice. Here, MALCD veterinary services were construed to contribute to environmental damage. For instance, the unsupervised antibiotics used in treating mastitis in dairy cows might cause the increased incidence of diseases because of bacteria resistance. What might be worse are the damaging effects on the health of persons who might have drunk the contaminated milk because there were no milk testing procedures. Another service is the MALCD efforts to bring dairy cattle in the city from the State's up-country dairy farms and ranches. Dairy cattle were expensive and hard to get and mostly sold to government and ruling party officials. This single factor seems largely responsible for the abundance of cattle among the elite and bureaucrat members of the ethnic groups who lived in low and quasi-medium density areas.

Regulation of Livestock

The government had empowered MALCD, through its extension personnel, to inspect agriculturalists' compounds to see if they were suitable for urban agriculture activities. If the staffs were satisfied that the agriculture practiced did not damage the environment, the agents issued permits to the agriculturalists. Agriculturalists took the permits to the City Council officials as proofs when obtaining licenses to do urban agriculture. In the city, extension agents often did sloppy inspections and issued permits haphazardly thus encouraging people to raise cattle.

City Council Level Factors

There are two City Council factors that encouraged members of different ethnic groups to persist in raising cattle in spite of their damaging effects. These factors are laxity in enforcing the city bylaws, and municipal contextual factors.

Bylaws Enforcement

In Mlozi's study, urban agriculturalists and public officials interviewed agreed that most people persisted in doing urban agriculture in spite of its damaging effects because the City Council did not enforce its bylaws. In the city, enforcing bylaws was problematic.

Most people with cattle had administrative, economic, legal and political power and raised them mainly because of the national economic hardship. As Mvena, Lupanga and Mlozi (1991) found, virtually every bylaw in the city was flouted. In the city, for instance, from 1985 to 1993, dairy cattle had increased by 66 percent, laying hens by 45 percent, broiler chickens by 287 percent and goats by over 2,000 percent.

Municipal Contextual Factors

There were two main municipal contextual factors that encouraged members of different ethnic groups to persist in raising dairy cattle: the presence of markets and the infrastructure (houses, open spaces, water, roads). In the city, the people with cattle responded more to the supply and demand rules, and the elite and bureaucrats were leaders in this. In part, this was due to both a rise in demand for urban agriculture products triggered by an annual 2.8 percent urban population growth from rural-urban migration, and internal growth. Livestock products (milk, eggs, broiler meat) also filled the vacuum that the economically ailing State-run firms (parastatals) had left during the mid-1980s economic reforms. For instance, it was found that of 29 urban agriculturalists interviewed, 21 sold 89 percent of the products daily obtained from their livestock enterprises (Mlozi 1995b). People sold most products to consumers and the city institutions (schools, hotels, hospitals, bars, cafeterias, restaurants, army barracks).

The presence of the infrastructure (houses, open spaces, water, electricity, roads) and labor in the city also encouraged people to raise cattle. There are three types of open spaces in the city. First are those that are legally under the jurisdiction of DCC (parks, playgrounds, unbuilt surveyed plots/areas, river valleys, roadside). The second are open spaces that belong to the government, public institutions and private companies. And the third are open spaces in undeveloped plots that belong to individuals.

Individual Level Factors

There were five fundamental factors at the individual level that encouraged members of different ethnic groups to continue to raise cattle. These were economic circumstances, educational attainment, production of food, limited understanding of environmental damage and the interpretation of actions of those in authority (Figure 1).

Economic Circumstances

As earlier noted, data collected in the city and literature on Tanzania's poor economic performance, all clearly show that economic motivations were the primary reason for raising cattle. The economic crises facing Third World countries are construed as a combination of external (e.g., structural adjustment) and internal (e.g., low export earnings) economic forces. In Tanzania, many studies show that real urban incomes fell throughout the period from 1977 to 1990. For instance, Sarris and van den Brink (1993, 114), wrote that "the minimum wage, for instance, was T Shs 2,500 per month in 1991, and even top civil servants' wages were close to the poverty level." These harsh economic conditions forced most people to resort to informal supplementary income generating activities, of which raising cattle was one.

Education Attainment

Data on cattle that 33 ethnic group members raised suggest that educational attainment largely accounted for the number of cattle people raised. In Africa and elsewhere, high educational attainment (i.e., college level and above) is linked to individuals' high economic productivity (Carnoy and Samoff 1990; Knight and Sabot 1990; Hazzlewood 1989). This, in turn, improves people's demand for superior economic goods and services. In the city, evidence suggests that most people with high educational attainment are elite and bureaucrats, and enjoy most of the privileges. They live in low and quasi-medium density areas, and also raise the most cattle in spite of the environmentally damaging effects that cattle cause. The case of members of the Chagga ethnic group who raised 40 percent of all cattle is illustrative. The Chagga, like most other African communities during the colonial time, was quick to show keen interest in Western education primarily as a way to strengthen their own political position, economic and social well-being (Lawuo 1984, iv; Samoff 1987). This trend is continuing and several studies show that more Chagga attain high formal education which helps them to enter the Tanzanian elite and bureaucrat strata (Baldauf and Lwambuka 1993; Carnoy and Samoff 1990; Malekela, Ndabi, and Cooksey 1990).

Production of Food

Food production was a reason, although small, for members of different ethnic groups to persist in raising dairy cattle in spite of their environmental damaging effects. A recent study found that the "29 agriculturalists interviewed consume only 11 percent of livestock produce in their households" (Mlozi 1995b).

Limited Understanding of Environmental Damage

In a recent study, the author found, on average, less than half agreed with statements related to disease-health issues, suggesting that there was a poor understanding of these environmentally damaging issues. Furthermore, the study showed that most agriculturalists based their beliefs about the issues of environmental damage on their personal experience.

Interpretation of the Actions of Those in Authority

Members of different ethnic groups persisted in raising cattle in spite of its damaging effects because of low and medium income earners' interpretation of the actions of people in authority. In the city, other agriculturalists of low and medium SES continued their damaging practices because they saw the government and ruling party elite and bureaucrats do it without being punished.

Conclusions and Future Actions

In the city, it is important to recognize that raising dairy cattle is commonplace. Members of various ethnic groups of higher SES are most involved, but, this practice causes environmental damage at the household, street and city levels. And potentially predisposes communities to health risks, and destroys the city's aesthetic appearance, fueling some social concerns. Explaining the practice involves consideration of socio-economic and political factors at least at four levels: government, ministry, city council and the individual. In the interplay of these factors, the individual is responding not only to his or her own (largely economic) motivation, but also to a web of other factors. Principal among these are the poor economic climate, government policies which encourage cattle raising as a means of coping with declining economic standards, a system of government status and rewards that enable some people to ignore regulations, and an agricultural extension service that is under-resourced, poorly coordinated and not well-trained.

In Dar es Salaam, people from all levels of society raise cattle, but mostly are owned by the wealthy. They have at least some attachment to the formal sector because they are subject to regulation, and enjoy services that MALCD provides. The issues that need resolution are, first, whether urban agriculture should continue, and second—if it should—how it can be continued without damaging the urban environment. This study has shown that raising cattle in the city is common, and will continue for two reasons. First, is the continuing economic austerity that is eroding urbanites' real income in Tanzania. Second, is the fact that raising cattle has a number of benefits: for

nutrition, for employment, for income generation and poverty reduction, for community well-being, waste management, production of manure and conversion of food items. The question of whether raising cattle should continue seems settled: it will; and even if its continuation were in doubt, there are good reasons for not letting it disappear. But, in the city, regulation is not working, and agriculture/livestock extension education is deficient. There is a need to recognize the interdependence of the government, MALCD, the City Council and the individuals in issues that pertain to lessening environmental damage that urban agriculture causes, especially that is due to livestock raising. All parties should aim for sustainable urban development that encompasses three major points of view: economic, social and ecological.

The government should formulate an Urban Agriculture Policy, clearly showing the respective roles of the Government, MALCD and City Councils. All levels of the government should pledge to enhance co-ordination with respect to raising cattle. Planners should re-examine urban planning ideas to incorporate urban agriculture to minimize the environmental problems that accompany it. The government should also formulate a policy for developing peri-urban areas for urban agriculturalists to move their activities there. There should be policies that promote the development of non agricultural small businesses such as transportation, manufacturing, retailing and hotel management. The Government and MALCD should formulate a clear and firm policy for education of both the public and urban agriculturalists in matters of environmental damage. The aim should be to maintain a clean and healthy urban environment.

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