

Crossbred
cow
checking
waste in
India

Michael W. Fox



Livestock in and around cities

The cobblestones of the streets in the old city of Pompeii near Rome are scarred by the wheels of wagons that used to be drawn by horses and/or oxen, for carrying goods or for supplying the military. The covered bridge in Florence is now the home of goldsmiths and jewellers who replaced butchers and fish traders, supposedly because a "Medici" queen complained of the smell

(A. Scappini, pers. communication 2000)

Editorial

Hans Schiere,
Azage Tegegne,
René van Veenhuizen

Urban livestock keeping has existed in many forms and places. It still exists today, and it may even make a comeback if one considers its various roles: the use of empty plots, cleaning up of garbage, provision of fresh food and income. However, the examples from ancient Italy illustrate several important aspects of the controversial role of livestock in urban environments:

- ❖ Urban livestock is not a new phenomenon;
- ❖ Urban livestock keeping occurs in cities across the globe; it is not confined to the tropics;
- ❖ Livestock in cities can be an unavoidable nuisance, with good and bad aspects;
- ❖ Policy makers such as the "Medici" queen have other perceptions about urban livestock than the common person who wants to make a living.

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Livestock keeping in cities has special problems and opportunities indeed, and they form the topic of this issue of the

Urban Agriculture Magazine. It contains articles and summarised contributions on particular cases that go beyond the general observation that livestock can be important. The contributions describe how different cities and people cope with problems that are sometimes caused by animals, and with other problems that can be solved by animals. The first part of this editorial presents different ways in which various stakeholders view issues in urban livestock. The second part discusses functions, problems and reasons for urban livestock keeping, and the third part suggests ways to classify urban livestock systems. It is thus shown that livestock plays a

**Animals not only
cause pollution but
also help to clean the city**

location-specific but often essential role in cities for the production of food and in terms of social aspects, particularly in small-scale animal production. Moreover, animals not only cause pollution, but they can also help to clean up the city. The last part discusses some points aimed at achieving a better understanding of urban livestock keeping among policy makers.

STAKEHOLDERS AND PERCEPTIONS

The increased interest in urban livestock is evidenced by several programmes and networks and by the authors of papers in this magazine who responded to our call

for papers with a sense of “finally attention” for this type of animal production. Indeed urban agriculture and its livestock component has always been there but it has only recently been rediscovered by “Medicis” who were taught to ignore this sector of urban development. The contribution by Emil Arias for instance illustrates how students were made to see the relevance of urban livestock. Animals do not only cause nuisance such as smell, risk of disease, pollution of waterways, and quarrels. Animals also are a source of income, they provide food, services, they recycle organic waste (as shown in the case study on Montevideo) and they are part of social networks that are only clear to those intimately involved in them.

Any categorisation of literature regarding sub-sectors of, in this case, urban livestock is bound to be incomplete, as the ways in which local stakeholders, scientists and policy makers may view urban livestock differ considerably. However any classification is better than none at all and we shall start by considering the level of the people represented by the owner of a bullock cart. He or she makes a living in this business and he is reluctant to give up such business, the same situation as for the owner of a small dairy. At the same level we also find a mother of a child with dirty clothes due to animal excreta or a father who gets angry at the neighbours’ goat for damaging his vegetable plot. Many reports have been written on these “family-level” concerns. At this system level there is also a wealth of practical publications on how one could raise small livestock “in the backyard”.



LIVESTOCK IN NINETEENTH CENTURY NEW YORK CITY

Not until the first part of the nineteenth century did commercial agriculture emerge as a viable economic activity within the limits of New York City. Two forms of agriculture, both commercial and subsistence oriented, existed in nineteenth century New York City: livestock husbandry and horticulture. By the end of the century, however, urban livestock production had slipped into decline, while urban horticulture continued to thrive into the twentieth century.



THE BEJA URBAN ECONOMY

The Beja are a confederation of tribes united by a common language. This article describes the migration of Beja pastoralist labour to Port Sudan from Halaib Province (NE Sudan), and the different livestock holdings that the Beja have in town. Although most urban-based pastoralists live in great poverty, some manage to successfully exploit urban opportunities whilst continuing to engage in rural-based livelihood strategies.

A second level of stakeholders is represented by the municipal legislator who has no direct interest in livestock but who worries about fights in the neighbourhood, or about a quick buck to be made by fining people who keep animals illegally. Exceptions to this rule exist, e.g. the civil servants of Dar es Salaam are the major suppliers of milk. Many of the administrators who are not involved in this way tend to consider urban livestock as a sign of backwardness. Together with the academic cadre they tend to see only one aspect of reality, that of their own sector or discipline (Ackoff, 1999). Reports from such professionals are therefore bound to only find problems with what they are supposed to regulate or to study. This is an important reason for the often gloomy tone in official reports on urban livestock. (Wilson, 1995; Ho & Chan, 1998)

The third level of stakeholders is represented by the planner (national or international) who is concerned with the production of food to “feed the masses”. These planners tend to stress that urban livestock and agriculture produce only a fraction of the dietary food “requirements” for an urban population. Like the disciplinary oriented specialists they overlook the fact that urban livestock can fulfil many different roles, and that the “fraction” can be substantial for certain groups. Such planners represent the so-called linear thinkers who tend to see the interest of only one section, e.g. food production (Wilson 1995; Ho & Chan, 1998; Schiere, 2000). Non-linear thinkers on the other hand consider several aspects and interests that are found in circles of visionary architects and NGOs. The two lines of thought should not be seen as competing: the “linear thinkers” going for

Dear Readers

The first issue of the Urban Agriculture Magazine presented articles covering the broad spectrum of urban agriculture. This second issue focuses on a specific topic *Urban Livestock*, and this is how the *UA-Magazine* will appear from now on. It will be published three times a year and each time covering a specific topic

This issue comes out a bit later than planned. The amount of articles submitted was high, and we certainly hope we will receive the same kind of enthusiasm for the next issues. We offer you 16 articles in this issue. It was decided to publish almost all of the submitted articles, because the issue of urban livestock appeared to cover many different issues, and only by taking all these contributions together we felt the issue was adequately dealt with. In forthcoming issues we will continue to try to keep the amount of articles to about 10, not going over the 40 pages in the *UA-Magazine*.

The appearance of the *UA-Magazine* has been received very positively, and we received various encouraging reactions on the first issue. As you can see at the back we have put the Editorial Board in place, in which persons of different organisations take a seat, the Regional Focal Points on Urban Agriculture. These organisations will play a major role in the further development and regionalisation

standard and average solutions can supplement the “non-linear thinkers” who go for flexible approaches and methods to work with multiple realities. The table lists typical advantages, and it should be clear that different stakeholders experience the pros and cons differently. It also shows that many so-called drawbacks listed in the second column can have simple solutions (third column).

REASONS FOR AND AGAINST URBAN LIVESTOCK KEEPING

A number of positive and negative roles of urban livestock are listed in the table, and illustrated in this Magazine. Interestingly, there are arguments to do away with livestock in cities because of their pollution, while at the same time city planners, as in the case of Montevideo, are considering the use of pigs to reduce the volume of organic wastes. Mexico city has neighbourhoods that actively recycle their waste through urban dairies and there are programmes in Ghana which re-utilise dung from large-scale poultry farmers (Drechsel et al. this Magazine). All this shows striking parallels with modern city planning around the world: much thinking aims at mutual

adjustment of different kinds of companies into so-called industrial parks. This is done to reduce pollution by recycling waste, a typical case of creative thinking that reshapes problems into opportunities.

CRITERIA TO DISTINGUISH BETWEEN MAJOR URBAN LIVESTOCK SYSTEMS

It is impossible to provide a generally valid classification scheme. However a clear discussion of the pros and cons in urban livestock requires a classification of some sort. Cities like Bombay and Dar-Es-Salaam are too different to be captured under one single scheme of classification. Still, one can say with a degree of certainty that keeping dairy cows is a fairly unrealistic option for the heart of modern Bombay, Tokyo or Amsterdam. Livestock keeping is, however, quite acceptable in urban areas where there is much green space, or even where there are a lot of by-products from agro-industries.

For example, urban dairies were important around beer breweries of 19th century Copenhagen (J. Phelan, pers. comm., 1999) around distilleries in New York (see Tremante in this Magazine), and today in the city of Dar-Es-Salaam

INCREASING USE OF POULTRY MANURE IN GHANA

Livestock production is a vital part of urban and peri-urban agriculture (UPA) in Kumasi, in Ghana, where many crop farmers benefit from cheap poultry manure available in



large quantities. However, with increasing competition for this resource, the manure is seldom stored long enough to prevent the contamination of food and water with pathogens.

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where dairy provides extra income to civil servants. Large poultry businesses may be controversial in and outside the city boundaries, but small livestock such as guinea pigs, goats or poultry may even help to clean refuse from the kitchen or hotels (see the articles on Kumasi in Ghana or Montevideo in Uruguay).

Indeed, an infinite number of classifications is possible; each one with advantages and disadvantages. For example, Waters-Bayer (1995) distinguishes between on-plot and off-plot and between rich or poor. The papers by Bellows et al. and Pantuliano suggest that ethnic background, caste or religion may form the basis for classification of the livestock. Schiere (2000) distinguishes several criteria, of which the classification into the categories 'subsistence small-scale', 'semi-commercial small-scale' and 'large-scale industrialised' is perhaps the most relevant. An example of a standard type of classification is referred to in the paper by Azage et al. In line with a participatory approach used in most RUAF work we suggest that any suggestion for classification criteria should be seen only as a guide to establish locally relevant criteria.

For the purposes of this Magazine we feel that it is best to at least distinguish between intensive and extensive systems, a classification

tion of the *UA-Magazine* in the near future. In the next issue you will receive more information on this.

You will also find information on the subscription policy of the *UA-Magazine*. This policy is under discussion with the RUAF focal points and the editorial board of the *UA-Magazine*. Of course all this information will remain available on the website of RUAF for free.

The guest editors for this issue were Azage Tegegne from ILRI in Addis Abeba, Ethiopia and Hans Schiere, from Ventana Agricultural Systems A&D, The Netherlands. A considerable input was also received by the Urban Livestock group of ETC: Ann Waters Bayer, Katrien van 't Hooft, Sheila Oparachoa and Willem van Weperen. Many thanks to all of them.

Next issues of the *UA-Magazine* will be on Health and Urban Agriculture (articles in before January 1) and Integration of Urban Agriculture in Urban Planning (your contribution expected before April 1). Your contributions are most welcome, not only articles but also abstracts of books and articles, and information on projects and events.

The editor

Positive and negative aspects of urban livestock and a sample of ways to cope with the problems.

Positive	Negative drawbacks	Coping strategies
<ul style="list-style-type: none"> • No problems with traffic jams due to transport of animal produce • Animals as waste cleaners: garbage; hotel waste; agro-industrial waste; sewage-utilisation • Resilience of a city in times of civil unrest • Fresh produce in inner city, little or no packaging / processing required • Income for poor people • Investment for the rich • Educational value, e.g. link between urban people and "nature" 	<ul style="list-style-type: none"> • Public health problems (disease such as parasites) • smell, dust and noise • Pollution (due to manure effluent and wastes e.g. from slaughterhouses) • Competition for space and conflict • Stray animals / traffic problems • Health and welfare problems of animals due to high densities • Low output per animal, not "modern", advanced or productive, form of production 	<ul style="list-style-type: none"> • Good health service and better packaging / treatment and awareness raising • Use of drains, straw, bedding, sheds, tree hedges • Biogas, smaller scale enterprise, dung cakes, integration with vegetables • Reduce numbers, use small animals, involvement of local people to solve problems • Traffic rules: limit speed of cars, animals should be kept off main roads • Redesign housing and/or awareness building and/or change management; go for smaller scale • Not a problem, work on perception, see other parts of the multiple perceptions

Note: the positive aspects in column one are not directly related to the negative drawbacks in the second column; but the issues in the same row over columns two and three are directly related.

that resembles that of Waters-Bayer (1995). The intensive ones tend to be industrial, concentrating the advantages (income, tax benefits, etc) and dispersing the disadvantages (smell, pollution, etc.). The consumers who benefit will also primarily be those who have access to the market, not the poor who keep a few backyard animals

for themselves. The extensive systems are small-scale, commercial, semi-commercial or even subsistence-based. They provide income, but also tend to be important for social relations.

OPTIONS AND PRIORITIES FOR THE FUTURE

We have seen that one view is to regard animals as a source of pollution, a public health hazard, and constrained by urban production conditions that do not allow them to produce enough food for the whole city. However, many of the problems are balanced by advantages. That is

why urban livestock systems continue to exist and are still even emerging. Clear discussions require a distinction between levels of system hierarchy and stakeholders, and the way of looking at urban livestock determines the outcome of the analysis. Those trained in the linear mode of thinking tend to recommend removal of animals if they smell; they will tend to prohibit all livestock even if only a number cause problems. Non-linear thinking is more creative. It distinguishes between stakeholders, functions of animals and urban contexts before deciding whether urban livestock keeping is good, bad or in-between. It also actively invites, through participation, local solutions for local problems. That is perhaps the gist of this issue of the Urban Agriculture Magazine: a decision on the pros and cons of urban livestock depends on who is looking at the problem and on where one is. In places

Non linear thinking is more creative

where urban planners have the creativity to shed their preconceived ideas they have shown that interesting things are possible, making use of animals for urban well-being. On the institutional side this requires a lot of work to (re)orient planners, civil servants and academics towards more creative approaches. There is still much research to be done on the role of urban livestock in the social dynamics of a local community, its role for poorer sections and women in particular, and also regarding the changing role of livestock over time. Development efforts based on local participation can draw on a large arsenal of existing technologies to overcome the many drawbacks of urban livestock and to help it reach its full potential.



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Urban Pig Farming

in Settlements in Uruguay

One of the survival strategies developed by the residents of urban settlements in the department of Montevideo, Uruguay, is the collection and sorting of household, organic and inorganic, solid waste. Due to several factors, including the socio-economic condition of breeders and the urban status of the neighbourhoods where the practice is carried out, pig farming in urban areas is one of the most remarkable aspects of Urban Agriculture developed in Uruguay.

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**“Milkmaids” propping up a sick cow
at a swill
dairy,
Sixteenth
Street,
Manhattan**



Source: Frank Leslie's Illustrated Newspaper 6 (26 June 1858): 61

For two centuries after the Dutch settlement of New Amsterdam agriculture on Manhattan Island remained not all that dissimilar from farming elsewhere in northern North America (Hedrick, 1933). Over the years farm families engaged in both commercial and subsistence production, raising livestock, garden and field crops. They gladly sold surpluses when they existed, but always sought to provide for domestic needs first (Parkerson, 1995).

Livestock in nineteenth-century New York City

By the turn of the nineteenth century, whether in New York or any other American city, it would not have been uncommon for individual families to own a cow and two or three pigs. Cattle ranged on local commons, while the swine foraged in the streets fending for themselves and consuming household garbage. Not until the first part of the nineteenth century did com-

mercial agriculture emerge as a viable economic activity within the limits of New York City.

FACTORS LEADING TO THE EMERGENCE OF COMMERCIAL UA

A combination of economic and social factors, powerful political forces and environmental conditions helped encourage agricultural specialization in New York City. Not surprisingly, the most important of these was population increase.

In 1800 New York City (then only Manhattan Island) with its population of 60,000 was the largest city in America, but miniscule in international terms. The three largest cities in the world exceeded this figure by a factor of ten! Liberal immigration policies welcomed settlers from northern Europe to America, and growing domestic rural-urban migration caused the city to double in size over the next two decades. By 1830 New York's population stood at 202,000. Twenty years later over half a million people

lived on Manhattan Island alone, and by 1900, with its 3.4 million people New York could boast its ranking as the second largest city in the world. Similar healthy growth occurred in the independent village of Brooklyn, located barely 500 metres away on the other side of the East River.

Nineteenth-century population growth influenced agriculture by stimulating demand and creating opportunities for a new class of farmers – horticulturists and urban livestock growers – to produce for the market. These vegetable, milk and pork producers reaped the benefits of urban proximity because they held a comparative advantage in the unregulated urban marketplace over the more distant rural producers.

Economic Growth

Changes in the economy also encouraged development of industrial activity that benefited local farmers. Merchants, bankers, shipbuilders, packet boat companies and other firms located their offices in New York City, which by 1830 had become the mercantile capital of America. Of significance to livestock growers was the coin-

Producers held a comparative advantage in the unregulated urban marketplace

mercial agriculture emerge as a viable economic activity within the limits of New York City.

Two forms of (commercial and subsistence) agriculture existed in nineteenth-century New York City: livestock husbandry and horticulture. While the characteristics of subsistence production remained relatively unchanged, commercial urban agriculture underwent remarkable growth after the year 1800. Commercial agriculture depended on land and location, the availability of low-cost immigrant labour, and on the availability of urban waste prod-

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Livestock production in the nineteenth-century New York City reached extensive proportions

cident establishment of a whiskey distillation industry along Manhattan's eastern and western shores, close to sources of grain, water, fuel, capital, merchants and markets (Albion, 1939).

Whether due to declining profits or the desire for increased revenue, it seems that around 1830 the distillation industry vertically integrated, with profound results for urban agriculture (Hartley, 1842). Historian Richard Wines has described the exchange of food and waste between farms and cities in environmental terms as a "recycling system" (Wines, 1985). This recycling system existed as a critical component in the urban agriculture of New York City. For example, distillers knew that cattle and pigs could survive on the mash by-product of the liquor manufacturing process (Mathias, 1952). Seeking to achieve greater efficiencies, these firms purchased scores of animals to which they subsequently fed (waste) mash. Soon independent dairymen and hog growers, whose operations lay scattered across the city began to purchase mash directly from distillers. In addition hog growers collected household garbage from the streets, which they hauled to the pens (Linder and Zacharias, 1999). Commercial livestock production in nineteenth century New York City, therefore, depended on an ability to obtain and recycle industrial and household waste products.

Immigration

Immigration also encouraged the development of commercial urban agriculture. At any given moment, the vast majority of New York City's agriculturists had

arrived in the United States rather recently. Urban agriculture attracted new immigrant families seeking to gain a foothold in a foreign land (Ernst, 1949). For example, census officials reported in 1850 that in New York's Sixteenth Ward, tenant agriculturists comprised 89 percent of all farm units. Of self-reported dairymen, 93 percent of male heads of household were foreign-born, while 90 percent of adult women in these households also reported foreign birth. The most common place for both was Ireland (Seventh Census, 1850). Similar patterns have been observed for nineteenth-century London (Atkins, 1977). Few of these recent arrivals chose to settle in the vast countryside surrounding New York City. In New York City immigrant men milked cows, but in the countryside this was considered solely women's work up to the middle of the century. One reason for this difference is undoubtedly the conditions of the urban dairies.

Livestock production in nineteenth-century New York City reached extensive proportions. Various reports indicate that thousands of pigs were raised within the city limits (Hartog, 1985). During the cholera epidemic of 1849, for example, New York police officers drove an estimated 20,000 hogs from the built-up portion of the city (Rosenzweig and Blackmar, 1992). Subsistence producers and local butchers owned many of these free ranging animals, but commercial producers also held sizable herds.

Around this same time one observer estimated that enough cattle lived in New York City to produce nearly 13,000 gallons (49,000 litres) of milk per day (Hartley, 1842).

CHARACTERISTICS OF URBAN LIVESTOCK PRODUCTION

Commercial producers raised livestock in outdoor pens and in sheds where they were confined because of the lack of pasture. Distillers also developed ingenious methods to feed hundreds of animals efficiently, for example by piping mash into sheds using gravity-flow systems. Independent dairymen, on the other hand, purchased mash at 10 cents per barrel and carted it, still warm back to their barns (Hartley, 1842). Other estimates indicate that the average Manhattan dairyman owned seventeen head of cattle at mid-century, but this number exhibited considerable variance. For example, James McClusky, a "milkman" in the Sixteenth Ward owned 100 head of cattle, while a Manhattan distillery reported 350 head on site (Seventh Census, 1850). Livestock pens and barns normally occupied the worst areas of the city: industrial areas occupied by factories, cattle yards and tenement houses, and in the less densely populated fringe regions on the edge of town. These places were home to nuisances such as bone boiling and bleach factories (Rosenzweig and Blackmar, 1992). For example, a report issued by New York City's twenty-first sanitary district in 1865 noted that a milk dairy and hog yard shared the immediate neighbourhood with bone boiling plants, distilleries, breweries, rendering plants, manure lots, plus numerous stables, liquor stores, tenement houses and a primary school (Citizen's Association of New York, 1865).

MARKETING MILK

Distilleries initially hired cart men to peddle milk, while independent producers sold it themselves, often to discount grocery stores (Seventh Census, 1850). Yet beginning in the 1840s, city milkmen faced competition from suburban farms located an hour or more by wagon from the city (New York State Agricultural Society, 1844). Suburban producers represented a threat to the city dairies because they offered a better product.

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Pastured outdoors on grass, supplemented with vegetables and sometimes corn, suburban cattle produced higher quality milk. For example, Gouvernor Morris, a wealthy farmer living fifteen miles (25km) north of New York City began selling milk in the late 1820s. Over the years he earned a reputation for selling quality dairy products. This helped him establish regular customers along fixed delivery routes. Although suburban milk soured when carried long distances on warm days, urban consumers soon learned about cream, a substance not usually found in city milk, and that the substance was white, and not blue! Shipments of country milk by rail in the 1850s squeezed urban produces even further, and middle and upper class families who could afford to do so, purchased pure country milk (American Institute of the City of New York, 1846, 1847).



RUAF

The main aim of the Resource centre on Urban Agriculture and Forestry (RUAF) is to facilitate integration of Urban Agriculture in the policies and plans of city authorities and to facilitate the formulation of projects on urban agriculture with active involvement of all local stakeholders.

The RUAF-Programme is administered by IDRC, and implemented by ETC-International, The Netherlands. ETC co-ordinates the activities of TUAN, City Farmer Network and other participants. Regional Focal Points on Urban Agriculture in RUAF are: UMP-LAC in Ecuador, IAGU in Senegal, MDP - East and Southern Africa, Zimbabwe and IBSRAM, Thailand.

RUAF further maintains close working relations with other networks and relevant international programmes. The duration of the RUAF project is five years, and started in October 1999. The Urban Livestock Group, of ETC collaborated with RUAF and the editors in the development of this issue. This group will further assist in developing a resource base; building up a network; organise seminars/workshops/training; contribute with articles; peer review documents and proposals, and further develop research and extension proposals on urban livestock.

Further information: ETC-RUAF

THE DARK SIDE OF URBAN DAIRYING

Yet the urban producers were not to be outdone, and focused instead on producing a low-cost product which catered to a less affluent clientele who shopped at cheap grocery stores. One observer of the business in the early 1850s claimed that in order to do this many of these retailers sought to mislead their customers as to the true origins of their milk. On the production side, producers kept costs down by raising livestock in filthy, unsanitary conditions (Hartley, 1842). Local residents complained of the stench from seldom-cleaned pens and of animals being herded in the streets, but more serious problems existed. Confined in windowless quarters and fed unbalanced (often liquid) diets, cattle seldom survived longer than a year. Besides pneumonia, epidemic diseases periodically swept through the barns. Cattle also suffered from hair and tooth fallout, and sometimes even the loss of their tails, as well as from severe vitamin deficiencies. Recognising this, dairymen milked their animals, even ones taken ill, for as long as possible, taking care to send them off to the butcher just before death.

Nevertheless, reports circulated that unscrupulous butchers accepted dead animals from dairymen (Mullaly, 1853). A task force charged to investigate the “swill milk dairies” after epidemic cattle disease rocked the city reported in 1848 that: “We understand that the cows died suddenly, sometimes even while being milked; that in one instance a cow died and fell over on the man milking her.” (American Institute of the City of New York, 1848). It was also alleged that urban dairymen secretly added flour, chalk, egg whites, plaster and other whitening substances to hide the unwholesomeness of their milk (Gates, 1960). Similarly awful conditions existed in large scale piggeries located along the edge of the city (*Daily Guardian*, 1857).

REGULATION OF URBAN LIVESTOCK PRODUCTION

Although temperance advocate Robert Hartley’s 1842 exposé of “swill milk” dairies made a connection between New York’s high infant mortality rate and tainted foodstuffs, not until the 1850s did the general public begin to show much interest in keeping people and livestock separate (Hartley, 1842; Mullaly, 1853; Gates, 1960). Before this time attempts to regu-

late dairies, or to round up the city’s numerous free ranging hogs failed, serving only to incite class conflict (Gilje, 1987).

After the cholera epidemics of 1832 and 1849, cities like New York and Brooklyn began to conduct inspections and pass local legislation that related to the public health issues (Hartog, 1985). The New York State legislature failed to pass a milk adulteration law until 1862, and when it did the ordinance was unspecific and was difficult to enforce (Gates, 1960).

Shipments of country milk by rail squeezed urban produces

Establishment of a Dairy Commission (later the state Department of Agriculture) in 1884 provided an important step toward improving the quality of milk through regulation. At roughly the same time, scientists were unravelling the secrets of bacteria, which eventually resulted in tougher inspection guidelines. Mandatory pasteurisation, the most important of these laws occurred in the 1890s (Hedrick, 1933).

Neighbouring Brooklyn was more successful than New York in eliminating its livestock nuisances (Linder and Zacharias, 1999). Yet Brooklyn’s success, and the disappearance of debate over hogs in that city by the 1870s likely reflects other changes which have little to do with government. Rising land values and increasing prosperity gradually pushed commercial livestock production beyond the city limits, out into the urban fringe. The decline of the distillery industry also reduced local availability of a cheap supply of feed (critical to the urban-rural recycling system). Finally, changing attitudes among New Yorkers who, with each passing year became more removed from the farm, foreshadowed the ultimate fate of the urban livestock industry. Middle-class men and women in post-bellum America regarded swill milk producers and pigs in the street as improper and unacceptable. Whereas a previous generation had battled for the right to raise hogs and manufacture milk, urban Americans from the 1880s forward preferred that their provisions come from the countryside. Urban horticulturists survived on well into the twentieth century for as long as vacant land remained available because their activities did not violate these Victorian standards of propriety.

Urban livestock agriculture in the State of New Jersey, USA

Urban livestock agriculture (ULA) in the USA is a constructive, yet largely unknown, underground, and unevenly regulated activity. Livestock encompasses multiple meanings for practitioners in the urban environments: economic buttress, tradition, cultural and/or religious endurance, and community cohesiveness. Research on and policy development for urban livestock (as for community food security generally) is lacking and needed. However, because livestock in the city is kept under diverse legal, illegal, and quasi-legal conditions, and because practitioners tend not to be part of the dominant culture, care must be taken to raise the issues under circumstances of support. It is argued here that issues of invisibility, distrust, and/or animosity between regulators and practitioners of urban livestock are founded more in the lack of attention paid by policy makers to food systems and food security generally than in insurmountable challenges of urban livestock as a positive urban land use.

While urban livestock is recognized in the “hemispheric South”, in the “hemispheric North” it exists as largely unpaid labour for food production, and is undocumented. In the older industrial cities in the State of New Jersey, some neighbourhoods retain an ULA infrastructure. Successive waves of immigrants from all over the world, as well as from rural set-

mainstream USA: marginal, primitive, dangerous, and dirty. There are, however, opportunities as well as barriers to urban livestock (see Table 1).

Learning about and promoting livestock in urban USA begins with recognition of the compromised legal and social conditions under which it most often exists. Because the practice is often illegal or quasi-illegal, practitioners are justly reluctant to talk with “outsiders”. Because recent immigrants compose a large portion of the practitioners, “outsider-insid-

er” status is marked by some combination of ethnicity, race, language, visa status, residential neighbourhood, class, and family structure. These markers represent powerful barriers in small towns and large cities alike and help to clarify why a practice like urban livestock can flourish and yet remain invisible.

CASE STUDY: MIDDLESEX COUNTY, NEW JERSEY

In the East Coast State of New Jersey, there is tremendous discontinuity in urban livestock-related regulations. An example are the 25 contiguous municipalities in Middlesex County. The County lies across from Staten Island, a borough of New York City. Land use varies between high-density urban space and landscape that has been losing its small farm character to suburban sprawl over the last 20-40 years. According to standards being established within urban agriculture literature, Middlesex County would qualify as urban or peri-urban (UNDP, 1996:100-101; Mougeot, 2000:6).

Little has been written about urban livestock in the USA

tings in the USA, have brought the knowledge and sometimes the practices of keeping rabbits, chickens, and occasionally goats and other animals for domestic use.

Little has been written about urban livestock in the USA. When referred to in newspapers it is in terms of nuisance, disease, or culture clash (e.g. immigrants bring “unbefitting” practices). They personify how it is perceived in

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Photo by V. Robinson

Outbuildings in residential neighbourhood of Perth Amboy, NJ originally designed for urban livestock.

Table 1. Barriers and Opportunities for Urban Livestock Agriculture in USA Urban Environments (with reference to New Jersey)

Barriers	Opportunities
<ul style="list-style-type: none"> • Little, unknown, and/or illegal experience in, which make research difficult. 	<ul style="list-style-type: none"> • Survives because of economic need, cultural endurance, and social resistance. • Fungible resource practice. • Fresher and tastier meat produced.
<ul style="list-style-type: none"> • Little existing professional or popular literature on urban livestock practice in North America. 	<ul style="list-style-type: none"> • Critical and growing literature in other countries, especially in the "South." • Immigrant and rural migrant communities bring experience to the U.S.
<ul style="list-style-type: none"> • Disparate and un-coordinated legal codes at municipal level on urban livestock. 	<ul style="list-style-type: none"> • Local dialogue between practitioners and regulators can proceed in tandem with new developments at international level.
<ul style="list-style-type: none"> • Space restrictions. 	<ul style="list-style-type: none"> • Small, space tolerant species like fish, guinea pigs, rabbits, and chickens.
<ul style="list-style-type: none"> • Inadequate knowledge and/or unsafe (e.g. unsanitary) practices. 	<ul style="list-style-type: none"> • Technical training; workshops; community engagement in urban livestock.
<ul style="list-style-type: none"> • Cultural resistance to raising animals for food and other economic purpose. 	<ul style="list-style-type: none"> • Community-wide food systems education
<ul style="list-style-type: none"> • Often practiced by less elite groups and regulated by more elite groups. 	<ul style="list-style-type: none"> • Community dialogue on food security needs.

Interviews with practitioners indicate that urban livestock can be an economically sound way to increase families' protein consumption, especially in low-income households. These claims were tested with a four-stage hypothetical model that measures the costs of household meat consumption (chicken only) from both household production and retail market food sources. The results should be re-tested, but they hypothetically confirm the economic viability of ULA.

The findings were grouped into three categories of municipal regulation in Middlesex County. In the first category, municipal code exists to specifically prohibit urban livestock (3 municipalities). In the second category, municipal code exists in various forms to allow some forms of urban livestock (12 municipalities). In some cases, urban livestock is permitted specifically on agriculturally zoned land, but might or might not be allowed on residential land. In the third category, no municipal code regulates urban livestock in residential areas (10 municipalities).

Urban livestock is rare enough not to have pro-active regulation. In other words, intervention generally takes place in response to complaints, usually of noise, smell, neglect, or animal litter. In the absence of clear codes, regulation by zoning, health, or animal control officers takes place according to local custom and available expertise.

Most often, social reasons instigate regulation and enforcement, while official code violations justify the charges. The official reasons are violations of urban livestock code, if existing, or of nuisance laws, if no codes are available, e.g., noise, smell, neglect, etc. Yet, the officers described two groups of unofficial social conditions that motivate the official complaints. The first represents "cultural clash", where complaints are registered by one ethnic group against another. Members of the same cultural group, especially low income or "visa-vulnerable" groups, rarely lodge complaints against someone in the same group, even if they disapprove of the practice. The second complaint group originates from

higher income residents who are worried that urban livestock in their neighbourhood drives property values down. This group registers complaints against "insiders" and "outsiders" alike.

Regulation of urban livestock is viewed by practitioners as an institutional tool to eradicate them - *the residents* - from the gentrifying neighbourhoods because of their class, race, and ethnicity rather than a practice to remove urban livestock, per

Urban livestock can be an economically sound way to increase protein consumption

se. ULA practice not only helps practitioners economically, but also in terms of social and cultural identity, and stronger presence vis-à-vis more elite groups in a municipality.

BRIDGING INTERNATIONAL EXPERIENCE AND LOCAL DIVERSITY

The growing international awareness of urban livestock experience and related literature offer much technical, theoretical, and practical policy development strategies. A small but dynamic US movement promoting community food security, provides an ideal opening to address ULA at the educational, policy, activist, and research levels. Increasing information on plant-based and livestock urban agriculture augments the opportunity to build constructive dialogue on community development and food security that can bring together urban policy makers and residents who, until now, have had little interaction.

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A review of dairies and pig-keeping in the twin-city of Hubli-Dharwad, in the State of Karnataka, illustrates the role of livestock in household livelihood strategies in Indian cities. Small urban dairies and roaming pigs are a common sight in Hubli-Dharwad and make an important contribution to household livelihoods and urban food supplies. However, the future of livestock keeping in urban centres can be questioned, given public concerns at city and national level and recent moves by city authorities to evict pigs.

Photo by F. Nunan



Urban Dairy in Hubli-Dharwad

Livestock and livelihoods in Hubli-Dharwad, India

Roaming livestock is a common sight in most urban areas of India.

Livestock keeping, particularly of buffaloes, is a tradition, but buffalo, cattle, pigs and chickens are also kept in towns and cities to contribute to household livelihoods and food security.

Urban centres provide a number of incentives for keeping livestock, such as foodstuffs (food waste from hotels and vegetable waste from markets and homes) and

opportunities for using a mix of income generating opportunities, which urban centres provide, make livestock an attractive option, providing space and fodder can be obtained.

URBAN DAIRIES

In and around the city there are large and small dairies. About twenty commercial enterprises keep between ten and twenty buffaloes and crossbred cows, while a number (30–40) of smaller dairies keep crossbred cattle. By far the largest number of urban dairies belong to traditional buffalo keepers, known as *gowlies*. Some of these households rely solely on the milk produced by buffaloes as their source of income, others may rely more on urban-based work, but keep one or two buffaloes as a source of milk for their family and as an additional source of income. Keeping buffaloes is also part of tradition. Animals may be impounded in a *vada* or *go-shala*, which are cattle shelters, including pounds where roaming cattle are taken. Owners of cattle have to pay a fine for the latter.

The main source of fodder for the urban dairies is from the adjoining rural areas. The urban dairies purchase sorghum and grasses during the harvest season and store it for use during the year. The owners of large urban dairies have their own resources for growing fodder,

including cereals and legumes. Additionally, food waste from hotels and cafés and vegetable waste is fed to the buffaloes.

Milk is sold once or twice a day in Hubli-Dharwad, depending on demand. There are several different methods of marketing the milk. *Gowlies* sell their milk directly to hotels, boarding houses and households. Some *gowlies* milk the buffaloes in front of the consumers, to assure them of the freshness of the milk, which is also carried out in certain locations, for example at fixed hours in the morning and evening. A premium price is paid for such fresh milk. Sometimes loans are given to the *gowlies* for the purchase of buffaloes, with the loan repaid in the form of milk. A further marketing route involves vendors collecting milk directly from dairy owners and delivering the milk to organised milk booths in Hubli-Dharwad.

The milk collected by the Karnataka Milk Federation (KMF) from the rural areas, along with dried milk, poses a significant source of competition to the traditional urban dairies. People can obtain milk when they want it, rather than wait for it to be delivered, and its sale appears to be increasing, despite the fact that, in some cases, it is a little more expensive than buffalo milk,

Families who keep a small number of livestock in urban centres often rely on additional sources of income

easily accessible markets, particularly for fresh milk from urban dairies. There are also, however, a number of problems with keeping livestock in urban centres, including access to grazing land and water (both for drinking and washing buffaloes and cows) and storing dung for sale. The difficulties for the urban authorities include roaming and herded animals contributing to traffic chaos, dung and fodder in storm drains, complaints about smell and concerns about health hazards.

Families who keep a small number of livestock in urban centres often rely on additional sources of income, from construction work to cleaning and laundry. The

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retailing at around Rs. 11 a litre (exchange rate is approximately Rs 41: US\$ 1).

Milk produced in the urban areas is, however, not a substantial source of supply to the city. From livestock census data, it is possible to estimate approximately how much urban dairies contribute to the milk supply of the city, working out at 0.03 – 0.06 litres per person per day in 1997. Although these figures are estimates, and the numbers of cows and buffaloes given in the census may not be entirely reliable, the figures are quite low. Milk from KMF and more commercial dairies dominate the market, and these dairies are likely to increase their dominant position if the constraints on urban dairies are not reduced, and if consumers increasingly prefer pasteurised milk and modern forms of purchasing.

URBAN SCAVENGING PIGS

Hubli-Dharwad also has a significant number of scavenging pigs, owned by quite distinct communities within the city. These communities include the Hindi ‘Gollar’ communities and the Bhils community from the Punjab, whose main occupation is hammering scraps of metal into utensils. As with buffalo keeping, pig owning is a tradition, handed down from generation to generation. Pig owning communities can be found in several areas of Hubli-Dharwad, depending on tradition, but also on proximity to areas where pigs can roam for food. There does not appear to be a significant amount of co-ordination between the pig-owning communities, though the areas are marked out between them. Although there is little co-ordination, there have not been reports of conflict between the communities either. In fact, collaboration would seem a more appropriate response to recent constraints on their source of livelihood.

The pigs represent a source of cheap protein, for certain social groups which consume pork, as they rely on low cost sources of feed - street rubbish, waste from hotels and restaurants, soil and vegetation. The pigs, or pork, are transported to the consuming markets in Goa and at Hassan, Mangalore and Bangalore, in Karnataka. The pre-Christmas period is the busiest for sales.

The perception dominates that pigs are a nuisance and pose a threat to health, despite the role they play in consuming

nightsoil and other organic wastes. The degree to which they constitute a health hazard, however, varies considerably and is unclear. For instance, Japanese encephalopathy - a disease carried by pigs but transmitted by a mosquito, which lives in irrigated rice paddies - is not a problem in the city, as there are no paddy fields. Public safety is at times at risk due to pigs dashing out into traffic on the roads, though this is obviously a danger for the pigs as well.

In response to complaints about roaming pigs and potential health threats, the Hubli-Dharwad Municipal Corporation

The urban dairies illustrate important rural-urban linkages

(HDMC) has been rounding up pigs and sending them out of the city. The Corporation announces in the local newspapers beforehand when such a pig clearance is going to take place. The Environmental Health officers of HDMC have been attempting to shift hundreds of pigs out of the city for about ten years. The pig owners’ association went to the High Court and obtained a

“stay”, but in 1997 the High Court revised its decision in favour of the Municipal Corporation. The municipality began catching 50-60 pigs per week in 1997. This has prompted some pig owners to sell their pigs before they are seized. The police have stopped owners from going into the forest areas to look for their pigs and return them to the city.

There does not appear to be any obvious resolution to this conflict, unless the pig owners can restrict the movement of their pigs, perhaps by limiting the number of pigs. This would have income implications. Stall feeding pigs appears on the surface to be an option in which use of wastes could continue. It would, however, involve more labour as waste would have to be brought to the pigs, which would have a cost. Pig owners also believe that the variety of pigs would not thrive if they were stall-fed. The market prefers local pigs, as the taste of pigs suitable for stall-feeding is considered inferior, so a change in the types of pigs bred could have income implications. Stall-feeding, however, is not being pursued as an option either privately or by the public authorities.

Table: Issues associated with livestock keeping in Hubli-Dharwad

Main Advantages	Main Problems	Possible Solutions
Cows and buffaloes Farm level	<ul style="list-style-type: none">income (milk and dung)statusmaintaining tradition	<ul style="list-style-type: none">diseasespacefodder shortagevaccinationsgreater support and recognition by authoritiesdialogue to agree on locations where animals could be kept
Cows and buffaloes City level	<ul style="list-style-type: none">certain consumer groups are happydung cakes reduce demand for fuelwood,cows have spiritual significance	<ul style="list-style-type: none">traffic congestingpublic healthban stray animalswork with owners to prevent dung from entering drains and animals from disrupting traffic
Pigs and Chickens Farm level	<ul style="list-style-type: none">food securityeasy access to food (scavenging)income	<ul style="list-style-type: none">pigs being evicted from citydialogue and compromise between owners and authoritiescollaboration between pig-owning communities
Pigs and Chickens City level	<ul style="list-style-type: none">food sourceconsumption of nightsoil along roads by pigsconsumption of organic waste in streets	<ul style="list-style-type: none">traffic chaospublic perception of pigs as a nuisance and health hazardban stray animalsofficial assistance in penning animals

PROBLEMS AND OPPORTUNITIES ASSOCIATED WITH URBAN LIVESTOCK

Examples of the types of problems and opportunities associated with keeping livestock in Hubli-Dharwad city are noted in the table.

The urban dairies illustrate important rural-urban linkages, where fodder is brought into the city and dung and poultry manure are taken from the city to the rural and peri-urban areas. Although these resource flows may not be substantial, dung and manure is always in demand by farmers and there is never enough in the peri-urban and rural areas, so the urban supply is a welcome contribution.

THE FUTURE OF LIVESTOCK IN HUBLI-DHARWAD

The future of livestock keeping in urban centres is questioned, given concerns about roaming cattle at city and national level and because of moves to evict pigs. Legislation on keeping livestock in urban areas is set out in the Karnataka Municipal Corporations Act 1976, which states that permission is required to keep more than ten animals within a corporation area. The annual fee for permission to keep animals is a minimum of

Rs.200, which is paid by poultry and commercial dairy owners. There are very few permitted dairies or poultry farms in Hubli-Dharwad, and most small-scale livestock keeping remains informal.

There is concern within the Urban Authorities that the presence of livestock in the urban areas obstructs their responsibilities regarding maintaining the infrastructure of the urban area, including keeping streets clean and delivering drinking water supplies to urban dwellers. There are a number of indications that measures will be taken that further discourage urban livestock keeping, or even make it illegal.

For instance, the HDMC is evicting pigs from many areas of Hubli-Dharwad, and the Supreme Court Interim Report (1998) states that cattle should not be allowed to roam freely and that cattle sheds should be phased out in cities with a population of more than 500,000.

The Interim Report is largely concerned with recommendations for improving solid waste management in cities. There is one section, however, that refers to the 'cattle nuisance' in cities:

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"No stray cattle should be allowed in cities above 5 lac (500,000) population. All existing cattle sheds, vadas and go-shalas should be removed in phased manner from such cities. Until then no animals should be allowed to move around the streets. They should be stall-fed and the waste produced in such stables should be disposed of by the cattle owner on daily basis at the community storage sites. Owners of these animals should be suitably charged for the disposal of such trade waste in the municipal system" (1998:66).

The future for livestock keeping in urban centres in India appears uncertain. Banning animals is not the answer, as this would deprive many urban families of a vital source of livelihood. In the case of Hubli-Dharwad, there could, however, be room for compromise, if all stakeholders could be involved in decision-making processes to find ways of addressing health and environmental concerns.

The stray-cattle controversy in Delhi

In the streets of urban India, many cows can be seen scavenging around. At first glance it may appear as though the cattle are an undisputed part of city life, but the case of Delhi shows that the issue is surrounded by controversy. The persistence of dairy farming in the city is related to how villages and their people become urbanised. Since 1951, about 140 villages have become completely incorporated into the city of Delhi (Census of India, 1991). Caste-specific economic traditions and constraints cause certain households to continue dairy farming despite the spatial constraints.

As the villages on Delhi's fringe undergo a radical transformation in land use, the sources of livelihood 'urbanise' as well (Bentinck, 2000). So why does dairy farming persist? One of the factors that contribute to this situation is the Indian caste system.

Most villages in India have one dominant caste group, both in numbers and in terms of local power. In the rural areas around Delhi these are usually the cultivating castes such as the *Jats*, *Rajputs* and *Tyagis*, or the *Gujjars*, who are small landowners and particularly



Photo by J. Bentinck

Woman washing a buffalo

involved in dairy farming. The more resource-poor groups, mostly low caste people with no land, often do not possess cattle. The influence of castes on occupation has changed considerably, to a large extent due to urbanisation. Much diversification has

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The influence of castes on occupation has changed considerably,

to a large extent due to urbanisation. Much diversification has taken place in the fringes of the city. About half of all workers presently commute to the city for their employment. Many among the local low castes have also progressed a fair amount through better access to urban jobs. With the sale of agricultural land to the municipal authorities and private parties, large sums of money enter the villages. Some former landowners quickly become wealthy and invest the money in urban-type activities (e.g. running a bus or truck, property dealing, or in a shop). They usually stop their dairy farming, due to land and labour shortages, but also because dairy is perceived as 'backward'.

Migrants flock into the villages in search of employment and cheap housing. In the more urbanised villages, the migrants outnumber the local villagers, and have taken over most of the agricultural labour. But migrants hardly ever keep cows. They have too little space and resources, and their households do not have spare labour available for milking and maintaining cattle.

In the villages where the *Gujjars* dominated, the cattle have remained after the villages have become urbanised. The cows that remain are increasingly dependent on space and food on the streets, due to increase in pressure on the village common lands as a result of urbanisation.

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Transporting
cowdung

Photo by J. Bentinck



DAIRY IN THE CITY

Cattle in Indian cities is a controversial issue; there are different interests at stake and subsequent views among city authorities, villagers and other involved residents.

For instance, contrary to general belief, the stray cows have not all been abandoned by their owners. Although there are a considerable number of abandoned cows, most cows in the city are owned by people who milk them daily. Many of these cows however are old and no longer give sufficient milk for the farmer to bother about them. Since they cannot be slaughtered, what can be done about them?

Public hygiene is a reason for banning cattle in the city. But although the net positive effect that such a ban would have on city health would seem to be obvious, this cannot easily be assessed. For instance, in the present situation dung does not remain on the streets for long, but is used as fuel. Cows eat most of the green vegetable residues from households, which certainly reduces the volume of municipal waste. There is the case of a power plant that was supposed to run on municipal waste, funded with money from the Danish development cooperation organisation DANIDA. This plant never worked though, because the organic content had been reduced too

much by the cows, while the dung and other inflammable materials were collected by individuals. A further concern is related to traffic problems with cattle. Although overcrowding and traffic misbehaviour by humans are undoubtedly bigger contributors to traffic obstructions and accidents, cattle are also a real concern. Cows can frequently be seen lying undisturbed on the busiest of roads. An additional argument against cattle in the city is based on the embarrassment about the 'backward' impression it gives to urban India.

On the other hand, dairy is an important source of income. Although the city's cows contribute only a small part of the total supply of milk to the city, it is not unimportant. There is often a shortage of supply, and the government subsidised distribution of milk to Delhi's citizens is neither efficient nor reliable. Furthermore, there is some compensation for the land, but this is limited to those owning land. Training aimed at acquiring "urban labour skills" is practically non-existent.

POLICY MEASURES

The authorities formally favour the removal of the cattle from the urban areas, but have been quite passive in doing so. Subsidised sites at the city's fringes have been made available so that the cattle owners can relocate their animals, but

these have had very limited success. Some dairy farmers refused, indicating that they are a sizeable political force. Some manipulate the policies, selling the assigned plots outside the city and moving back to their original place. These plots are now used for industrial or residential purposes. State-run cattle sheds

Cattle in Indian cities is a controversial issue

have been set up, but this programme is also plagued with corruption: the farmer who brings his cows there can bag the monetary compensation, and buy back the cattle for a much smaller fee from the civil servant administering the place.

The presence of dairy farming in the city is clearly connected with spatial expansion and socio-economic transformation in general. The villages become incorporated into the city, sometimes at a faster rate than the inhabitants change their form of livelihood. If cows are successfully removed, the municipal waste collection will have to be much more efficient.

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The Beja are a confederation of tribes united by a common language, TuBedawiye, and a common segmentary structure, each of which is linked to a common ownership and use of land. The three main tribes are the Amar'ar/Atmaan, the Bishariyyin and the Hadendowa, who mostly live in North-Eastern Sudan between the Egyptian and the Eritrean borders, and all speak similar versions of TuBedawiye. Other minor related groups include the Arteiga, the Ashraf, the Kemeilab, the Halanga and the Shayaab. This article describes the migration of Beja pastoralist labour to Port Sudan from Halaib Province (NE Sudan). It reviews the different livestock holdings that the Beja have in town and shows that, although most urban-based pastoralists live in great poverty, some manage to successfully exploit urban opportunities whilst continuing to engage in rural-based livelihood strategies.

Photo by A. Waters-Bayer



Urban Camel

The Beja urban economy

Understanding and responding to an evolving reality

Economic diversification has always been an important strategy for Beja pastoralists, as a means to complement family income at certain times of the year or during periods of crisis. Some of the subsidiary activities of the Beja are agriculture, fishing, mining, firewood collection and charcoal making as well as sale of rural products like milk, ghee, mats, baskets and leather

Today the number of Beja in the city has reached approximately 50-60% of the overall town population

goods. Labour migration to town, especially to Port Sudan as cash labourers on the docks, was also a constant feature of the Beja economy throughout the 20th century.

However, the scope of the involvement in these non-pastoral activities has dramatically changed over the years. The result

is a more permanent shift to alternative sources of livelihoods as opposed to seasonal or crisis-related moves to increase family income.

LIVESTOCK KEEPING IN TOWN

One of the most notable changes to livelihood strategies has seen the Beja, particularly the Amar'ar/Atmaan, starting to move to Port Sudan in large numbers since 1931. From being a tiny minority for most of the first half of the century, it is estimated that today the number of Beja in the city has reached 400,000–500,000, i.e. approximately 50–60% of the overall town population according to recent unofficial estimates (Port Sudan has approx. 800,000 inhabitants).

The patterns of migration of the Beja are of several types. Perhaps the most dominant one has been the short migration of young men, taking turns to make sure that there is always somebody to herd the livestock in the hills. The regularity of these patterns has altered and the number of young men who moved to Port Sudan

increased significantly during times of crises.

For many of the migrants livestock are still an important livelihood resource. Holdings vary quite significantly between the different households, but the majority of them own a few small ruminants, mostly between one and three goats. Animals are kept both to obtain milk for family consumption and to be sold in times of need when there is no work available. In some *deims* (suburbs), camels and cattle are also kept. The animals normally graze in the more rural outskirts of the city, where the social and cultural atmosphere of the rural areas has been “recreated” by the Beja migrants.

Small ruminants, especially goats, are also kept in central areas of Port Sudan, where they usually are reared in the courtyard of the homestead, browsing on the garbage in back streets. Although livestock are less apparent in central town, a relatively large number of livestock owners live in this area. In most cases they hire young herders to take the animals to graze in the rural areas around town.

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The survey of Forman (1992) showed that in all *deims* significant differences in livestock holdings exist. A majority (63.7%) claims not to own any livestock in town, although 1/3 of this group state that they possess animals in Halaib Province.

Among the 36.3% who say they have livestock in Port Sudan, the vast majority (87%) say they have between one or four goats from which they obtain milk for the family. Very few are in a position to sell surplus milk. However, many of them, especially those who have recently arrived in town, hope to be able to rebuild the family herd through their urban earnings and return to Halaib Province in a short time. This possibility appears very unlikely though, since families in Port Sudan frequently come under pressure to sell livestock assets. Most Beja in Port Sudan actually live in conditions of great poverty as the economic activities in which they are mostly engaged are precarious, fragmented and do not offer the Beja a reliable alternative to their traditional pastoral livelihoods.

It is worth mentioning though that among the migrants from Halaib Province sampled in Port Sudan there is a small group (4.6% of the total) who declared they owned large herds of sheep and goats and camels in and around town. Part of this group is composed of urban dwellers who have been able to invest in livestock when the price was low (i.e. in time of drought), seizing large numbers of livestock from other herders, in some cases Beja from the same subgroup. They are in most cases government employees or former pastoralists who have been involved in animal trading in town for a long time. The other major livestock holders are still transhumant pastoralists who own large camel herds and use wage labour in Port Sudan to complement their earnings, e.g. the 'Aliab Beja of El Wihda.

For most Beja who have moved to town, livestock have retained their importance both in cultural (bridewealth payment), dietary (milk and meat) and economic terms (assets not eroded by inflation). It is interesting to note that the majority of them still describe themselves as pastoralists, even if they do not now own animals. From the above analysis of the survey findings, it is possible to identify three main types of "town pastoralists".

First, those whose main goal is to regain the lost viability of their pastoral household unit in Halaib Province. Secondly, those for whom livestock-keeping is only a subsidiary activity supporting a mainly urban-oriented unit (Hjort af Ornäs and Dahl, 1991:148). The third is the case of transhumant herders, such as the above mentioned 'Aliab Beja. This group offers an example of how pastoralists can take advantage of urban opportunities to diversify their income sources in order to strengthen the security of their livelihood system centred on livestock keeping

DEVELOPMENT INTERVENTIONS AND THE URBAN BEJA

So far very little has been done to address the specific condition of pastoralists in urban contexts. In the case of the Beja in Port Sudan, many development agencies have concentrated their work on supporting and experimenting with the viability of a range of conventional income generating activities outside the pastoral sector. This has often stemmed from the widespread belief amongst local practitioners as well as international agencies that pastoralists' livelihoods are no longer viable and that alternative solutions need to be found.

An example can be found in the experience of the ACORD Small Scale Enterprise Programme in Port Sudan, which started in 1984. In overall terms the programme was relatively successful in reaching the urban poor and in remaining ostensibly financially sustainable in a very difficult economic context. However, it never devised specific measures or enterprise development packages that could be relevant for people with a pastoralist background. The only targeted support was the provision of loans to buy small stock (namely goats). The loans followed the same criteria applied to other kinds of businesses: a loan ceiling with repayment periods up to a maximum of six months, a mark up rate, and 25% immediate payment for loans of a certain

size. Impact flow charts drawn in two Port Sudan *deims* with Beja clients who had applied for a goat purchasing loan showed how difficult it was for them to repay the debt in such a short time frame. This was due to the high cost of fodder and drugs needed for the animals as well as to the fact that the milk obtained was often used for family consumption rather than for sale. As a result, clients were often forced to sell the goats to repay the loan. In other cases the clients returned to the rural areas with the livestock purchased through the loan without repaying the debt. As a consequence, ACORD staff started to perceive Beja clients as unreliable. In the case of the goat loans,

For most Beja who moved to town livestock have retained their importance

longer time-frames would have allowed the Beja to sell the offspring and recover the original cost. A different approach more focused on community dynamics could have also helped people to reactivate redistributive mechanisms that are endogenous to Beja society.

POLICY RECOMMENDATIONS

The experience of ACORD is not unique. Interventions of other agencies working in the region show equally ill-informed analysis and planning (Pantuliano, 2000). Certain agencies such as ACORD and Oxfam made serious attempts though to address local complexities through research and responsive programming in the late 1990s. Research has revealed a range of under-explored programming alternatives for urban pastoralists in the region, which could also prove applicable elsewhere in the Sahelian context.

Agencies involved in promoting development with Beja pastoralists in town, could focus on improving access to non-farm opportunities so as to strengthen livelihoods through a diversified resource

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base. A variety of inputs could be extended to those who are in town. Credit, training and marketing support are of relevance to both those who intend to remain in Port Sudan, amongst whom women are prominent, and those who are looking for a way of returning to Halaib Province.

Opportunities exist for promoting rural-urban linkages. Support strategies could prioritise town-based activities, which draw on rural resources and/or people's skills as pastoralists. These include dairy produce making and leather processing which are traditionally practised by women. Since there is a finite number of opportunities of this nature, clearly some urban Beja will have to be supported to pursue alternative livelihood options not linked to the pastoral sector. Agencies could plan for the provision of initial marketing support for both pastoral related and non-pastoral activities, such as fisheries. It is important that the philosophy underpinning such kinds of intervention is informed by "*credit policies for livelihoods*" (Scoones, 1998:14), which would allow the Beja access to a wide number of livelihood strategies according to the options available and people's own priorities and aspirations.

Other possibilities include supporting the productive investment of remittances, especially for the benefit of rural women

A crucial element is the issue of land tenure

who are the wives of town-based migrants. Such work would be facilitated by initiatives aimed at assisting women who are currently restricted in their access to markets. Enhancing economic opportunities should be accompanied by efforts to increase access to basic services in rural areas.

A crucial element to any attempt to try to promote investment or return to rural areas is the issue of land tenure in Halaib Province. Efforts need to be made to mobilise government support for developing land tenure regulations that recognise pastoralists' rights. Urban-based Beja who are closer to the centres of power can be effective in advocating for partnerships with government and other actors that can secure the Beja's basic rights and in so doing will work towards achieving sus-

tainable development. This interaction is predicated on a degree of openness on the part of government as well as the efficient functioning of Beja institutions. There is clearly scope for strengthening established organisations and institutions as well as for creating new ones that are knowledgeable of both urban and rural dynamics.

There is potential and need for a broadening of the development agenda if the Beja are to be assisted in achieving sustainable livelihoods across their new

found contexts. Failure to distinguish the large community of the Beja from the other urban poor and to design appropriate support strategies is likely to result in inappropriate measures. The external constraints to carry out such an agenda cannot be underestimated but there is much that can be gained from agencies coming together to undertake a more profound assessment of the wider contemporary Beja reality and working in concert to respond to the challenges that this presents.

THEMES FOR NEXT ISSUES

You are invited to contribute to the Urban Agriculture Magazine with an article, description of best (or bad) practices, photo's and information on interesting publications, websites, and forthcoming events.

An article contribution should give a clear description of the urban aspects and policy implications of your experiences and include recommendations for local policy makers and planners.

Articles should be written in such a way that those working with farmers could readily understand them. We would like to receive articles of up to 3000 words long (This is about 5-6 pages A4). Articles should preferably be accompanied by illustrations (digital if possible) and references. The availability of a good abstract is appreciated. Articles will be examined for selection by the editorial team consisting of the RUAF-editor and the external scientific advisor/co-editor.

THE PLANNING FOR THE NEXT ISSUES IS:

- No. 3. *Health Aspects of Urban Agriculture* : Contributions in before January 1, 2001.
- No. 4. *Integration of UPA in Urban Planning* : Contributions in before April 1, 2001.
- No. 5. *Methodologies for UA research, Policy Development, Planning and Implementation* ; Contributions in before August 1, 2001.

Other issues that you mentioned in the questionnaires are:

- ❖ Transition to ecological urban farming
- ❖ Economic and marketing aspects of Urban Agriculture
- ❖ Re-use of waste and wastewater in urban agriculture; rural-urban nutrient cycles
- ❖ Training in urban agriculture



Urban livestock systems in the Niayes zone in Senegal



Goats in Kumasi

Photo by Dennis Fielding

The main agricultural cities of Senegal are located in the Niayes Zone. Production in this zone accounts for more than two thirds of the total horticultural production, and urban livestock is also well represented. Livestock keeping is well integrated into the production systems, in the form of waste recycling and animal traction. Considerable efforts are being made to restructure the production system in order to meet increasing demand for animal products. An exploratory study of the main agricultural systems in the Niayes Zone indicated that there is great diversity in farm products (fruit and vegetables as well as livestock) and also potential for further development. The main constraints to further development are the land tenure system, deterioration of natural resources, lack of organisation of farmers and minimal access to credit.

The current crisis in rural agriculture and increasing urban food insecurity is stimulating the development of urban agriculture in Senegal. In the Niayes zone urban agriculture, in the form of both crops and livestock, is increasingly contributing to urban food security. The development of livestock keeping in and around the main urban centres in the Niayes zone is making an important contribution to milk, meat and egg production, all of which are key elements in the diets of women and children and women. Livestock product marketing also contributes to income generation for women.

Under the IDRC funded project 'Integrated peri-urban systems: horticulture and livestock in West African cities', a diagnostic survey was carried out by the Senegalese

Institute of Agricultural Research (ISRA) and Dakar University (-UCAD). The systems were characterised according to location, farm size and products.

Investigations were carried out in three cities: Dakar, Thiès and Saint-Louis.

The Niayes zone is the Atlantic coastal stretch between Dakar and Saint-Louis. It comprises the four administrative regions of Dakar, Thiès, Louga and Saint-Louis. The Niayes zone is characterised by sand dunes and depressions which are often flooded, and a climate that favours agriculture. Average annual rainfall is 500 mm, and most of it falls during the three-month wet season from July to October.

Over half of the Senegalese population live in this area, which

make it the most highly urbanised zone in the country. Population density is more than 1000/km² in Dakar and 100/km² in Thiès (compared with a national average of 35 /km²). Forty five per cent of the Senegalese urban population now live in Dakar, which is the main destination for migrants from the countryside and neighbouring countries. Most urban agriculture activities take place in Dakar City and its surroundings and to a lesser extent in other cities like Thiès and Saint-Louis. The higher population density, and greater market and economic strength offer more marketing possibilities to urban and sub-urban farmers in Dakar than in other locations in Senegal.

The survey distinguishes two main systems: urban and sub-urban livestock systems. The sub-urban system is further divided into Dior, Niayes and N'Diouky according to soil and climatic characteristics.

THE URBAN SYSTEM

Production networks are predominantly family based in the urban system. Most Senegalese families keep some domestic animals such as (traditional) poultry or a few small ruminants. Although sheep production pre-

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dominates in Dakar, the cattle population is on the increase.

Economic objectives do not prevail in this production system. Rather there is a mystical dimension to keeping animals, as it is believed that “an animal will protect human beings from calamity”. Animals are housed in backyard paddocks or on rooftops. Animals are predominantly fed on domestic waste, supplemented with concentrates and good quality by-products like groundnut or green bean by-products. Grasses from horticultural farms are also given to the urban-based ruminants. These feed resources are not enough and animals scavenge freely in the towns. Within this urban family based system there are a few sheep-fattening and intensive poultry farms which produce livestock especially for sale at religious events.

THE SUB-URBAN SYSTEM

The sub-urban area is characterised by a wide range of production sites. Three sub-systems can be distinguished, according to soil type, topography and water availability: Dior, Niayes and N'Diourou.

The *Dior Sub-System* predominates in the sand dunes, which cover 70% of the Niayes area. The major part of the Dakar dairy belt is located in the Dior. Poultry farming (meat and egg production) is present, as are orchards and flower production.

The *Niayes Sub-System* is found in the inter-dune depressions. Niayes is not a suitable area for livestock due to high parasite load and animal diseases. The *N'Diourou Sub-System* located in depressions as well as in the dried lakes, is characterised by the presence of market gar-

dening, but livestock is not yet very well developed.

Integrated systems predominate in the sub-urban system, with about 97% of the farmers being agro-pastoral (Fall et al., 1993). The mean farm size is 4.5 ha, while 83% of the farms are less than 3 ha, and only 8% are more than 10 ha. About 72% of the properties are owned, while 27% are on communal lands. The average herd size is 5 sheep, 32 cattle, 25 goats, 2 horses, 1 donkey and 48 poultry per household (Fall et al., 1993). Feeding is based on crop residues and agro-industrial by-products from Dakar.

Trends and constraints

Intensification is an observed trend, which is mainly due to space constraints. Livestock is particularly affected by this intensification, as pasture areas in the sub-urban system are declining. Another trend is that traditional production systems are rapidly modernising. This has led to an increase in animal survival rate and performances. Water management is a key constraint as natural watering points are only available to grazing herds

during and after the rainy season. Livestock therefore competes with horticulture and households for running water. Major farm products are meat, milk, poultry, hide and skin and honey. There is a more diversified production in the Niayes sub-system compared with other the sites. The choice of farm products is dictated by soil type, climate and farm size (see Table 1).

Economic constraints compromise the present and future sustainability of intensive milk and poultry production. Urban markets are not sufficient to sustain livestock production in the city. New institutional orientations, involving clear options in local market protection and better input availability are expected to consolidate the milk production belt and poultry production in the Niayes.

OPPORTUNITIES AND CHALLENGES FACING URBAN LIVESTOCK PRODUCTION SYSTEMS

Livestock in the Niayes zone is one the activities which has been identified by policy makers to be stimulated in order to improve urban employment opportunities and food



Roaming sheep in Bolgatanga

Photo by S.Y. Apiga

Table 1: Production profile in urban and peri-urban systems

SYSTEM	PRODUCTS
Urban system	<p>Small ruminant meat</p> <p>Small-scale poultry production (meat and eggs)</p> <p>Hide and skin (from slaughterhouse)</p>
Peri-urban systems	
<i>Dior sub-system</i>	<p>Dairy industrial (milk and cheese)</p> <p>Dairy traditional (milk, butter and cheese)</p> <p>Poultry industrial (meat and eggs)</p> <p>Beef</p> <p>Small scale rabbit and turkey production</p>
<i>Niayes sub-system</i>	<p>Small ruminant and small scale poultry production</p>

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security. Citizens look upon the expansion of livestock in the city and the sub-urban areas as an activity that enhances family life.

Opportunities
Urban livestock in Dakar accounts for 3% of small ruminants, 1% of cattle and 30% of poultry production (Direl, 1998). Currently, 7% of the total cattle and 4% of small ruminants in Senegal are located in the Thiès region. Poultry is the most important activity of the zone, involving some 70,000 entrepreneurs. Poultry and milk production in particular are favoured for their marketing potential and contribution to income generation. However, further livestock expansion is constrained by lack of space and feed resources. Grassland development in the

Land tenure is a major constraint to further expansion of livestock

sub-urban system seems to be a promising way to support the increasing intensification. Cattle and sheep fattening is on the increase in all administrative regions of the Niayes zone. Non-conventional species like rabbit, ostrich, pigeon and turkey are also being raised under the diversification process.

In the sub-urban areas, there is a wide spectrum of farm types, with around 85% being small-scale enterprises. Livestock intensification in dairy and poultry industries is a current trend with emphasis on the improvement of livestock production techniques, like cross-breeding. However, the profitability of intensive livestock systems is still questionable as market limitations compromise economic sustainability. Feed resources are very scarce; grasslands are not well developed in the Niayes due to space constraints, as land is allocated for housing or horticulture around main cities. See Table 2 for an overview of constraints and opportunities.

Integration of livestock with horticulture is risky as pesticides and chemical fertilis-

Table 2: Constraints and opportunities in different livestock systems

SYSTEM	Constraints	Opportunities
Urban system		
	Poor space availability	Marketing
	Waste management	Good climatic conditions
	Poor organisation of farmers	Availability of wastes for recycling
	Lack of credit	
Peri-urban systems		
Dior	Low soil fertility	Space
	Poor access to inputs (seeds, fertilisers and pesticides)	Market
	Poor water availability	Good climatic conditions
	Poor organisation of farmers	Availability of horticultural by-products for recycling
	Lack of credit	Forage cropping
	Lack of feed resources	
Niayes	High humidity stimulating parasites	Good soil fertility
	Poor space availability	Water available
N'Diouky	High humidity stimulating parasites	Good soil fertility
	Water available	

ers are generally used by farmers without respect to withdrawal time, resulting in high chemical residues in underground and surface water as well as in crop by-products (Fall et al., 2000).

Farmers' organisation
To facilitate access to credit and livestock inputs in urban and sub-urban systems, farmers are organised in economic interest groups. Various initiatives have been developed in different regions of the Niayes, and Thiès has up to 123 such groups. These organisations are a tentative response to poor government assistance which in the past has left the producer open to the rough realities of the market. Government support for the stimulation of self-management in urban agriculture systems should be encouraged.

Structural constraints in the urban livestock system
The land tenure system is a major constraint to further expansion of livestock in the urban areas of the Niayes. Human housing and welfare are given priority in land allocation. Other constraints are salinity of the soil and poor access to land. These constraints especially limit young and poor people.

Several research centres near the production sites offer technical assistance to farmers trying to modernise. Research focuses on genetic improvement of local breeds by artificial insemination or

embryo transfer, improvement of animal feed, based on locally available resources (for milk, meat and poultry production) and prevention and treatment of the main diseases. Milk and meat processing trials are currently being carried out in Thiès.

Development of the livestock system also requires improvements to the distribution network. It is advantageous to base all technologies on locally available resources, but good collection and distribution systems also require the appropriate decisions at both the political and farm level.

CONCLUSION
Despite climatic and land tenure constraints, urban agriculture is an important sector in the major cities in Senegal. Not all stakeholders may favour the development of urban livestock, as it competes with “regular” urbanisation for space.

The growing population and subsequent space constraints, however, seem to find a balance in the dynamics of the whole system. The potential of urban livestock to contribute to food security and income generation suggests that animal agriculture should not be marginalized. However, the development of the urban and sub-urban livestock sector can only be achieved by overcoming economic and environmental constraints.

Cow shed
in Nairobi

Photo by René van Veenhuizen



Livestock in a middle-sized East-African town: Nakuru

In a survey done in 1999, basic information was collected on urban farming practices in Nakuru, Kenya. The main aim was to obtain a general overview of urban agriculture in this town for the local authorities in the context of their town planning exercises. Part of the survey covered several aspects of livestock keeping.

Nakuru is located in the heart of the Great East African Rift Valley, 160 km north-west of Nairobi. It is the fourth largest town in Kenya, with a population of 240,000. The annual growth rate between the censuses of 1989 and 1999 was 4.3%, which was much lower than the 6.5% during the previous decade. The major economic sectors of Nakuru are commerce, industry, tourism, agriculture and tertiary services. Because of the rich agricultural hinterland, Nakuru is called the “farmers’ capital” of Kenya and is famous for its agro-based industries. There are over 100 agro-industrial establishments ranging from food processing to farm machinery assembly.

Within the boundaries of Nakuru town, three forms of urban agriculture can be distinguished. First, there are a few large farms located on the fringes of the town. Second, there is a lot of small-scale farming in the *peri-urban* areas (i.e. the areas between the built-up area and the town boundaries), which came to be included after the boundary extension of 1992. With the growth of the town’s population, many of these small farms have been subdivided into small-holder portions and urban residential plots. Farming is still the dominant activity there. Third, there is the usually less visible form of *intra-urban* agriculture, i.e. within the built-up area. Though very common, compared with the farming activities in the peri-urban areas, intra-urban farming is generally a much more modest activity (‘micro farming’) mainly due to lack of space. This does not necessarily mean that intra-urban farming is a marginal activity in terms of household income: for many it constitutes a significant

element in the household’s food supply and/or income. The results presented in this article concern the population in the built-up area only.

LIVESTOCK KEEPERS IN TOWN

Twenty percent of all the Nakuru households could be classified as livestock keepers in town. Although livestock is kept by all urban income categories, the activity becomes more common as incomes rise.

For instance, in the survey it was found that among the poor households (with a monthly income of less than 5,000 Kenyan Shillings per month, 14% kept livestock, while among the more well-to-do (over 20,000 shillings per month) this was 38%. Not surprisingly, livestock keeping was also more common in the areas with lower housing densities.

For the large majority of the Nakuru livestock keepers, the livestock meant an additional source of food. For one third, it was also a source of income, while one quarter of the households tried to diversify their income sources in this way. Livestock keeping appeared to be more of an income source than crop cultivation, which is more for self-consumption.

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TYPES OF ANIMALS

As in many other towns, chickens are by far the most common type of livestock kept by the Nakurians. The percentages of households keeping large livestock (cattle, sheep, goats and pigs) did not exceed 5%, while other small livestock than chicken (ducks, rabbits, doves and turkeys) were even less common.

Nevertheless, we can roughly estimate the numbers of livestock in Nakuru town by the end of 1998 to be 12,000 head of cattle, 6,600 sheep, 6,800 goats, 360,000 chicken, 13,500 ducks, 3,000 rabbits, 1,400 doves and 600 turkeys (built-up area only).

Of the lower-income households, only 19% kept one or more of the larger livestock types (Table 1). For the higher income group, this figure is 46%. This difference is undoubtedly related to the costs of buying a large animal, cattle in particular. Small livestock is very common among all livestock-keeping households.

Animals are either kept within the livestock keeper’s own compound or are herded outside (“free range”) or a combination of the two. In one-third of the households with large livestock, all animals grazed freely in the neighbourhood, while small livestock (this concerns largely chicken) were even more often left freely roaming around.

Keeping livestock, either large or small, solely for commercial purposes is very rare in Nakuru. Small livestock is kept first of all for own consumption: almost 60% of those who keep these animals slaughter and consume most or all of them, while another third consumes part of the animals and sells the rest. Large livestock is less consumed by the keepers

themselves: almost three-quarters sell at least part of the animals. There are no clear differences between richer and poorer households as far as the purpose for rearing livestock in town is concerned.

INPUTS

Thirteen (11%) of the livestock-keeping households had not used any external inputs. These were all small-livestock keepers. In general, large livestock received more attention than small livestock. This applied to almost all types of inputs.

All cattle holders gave their animals for instance veterinary drugs and feed supplements, while improved breeds/artificial insemination and feeding with crop residues were also very common (for both inputs 77% of the cattle holders).

The use of inputs was more common among the richer households than among the poorer ones. This applied particularly to the more expensive inputs, such as veterinary drugs, feed supplements and improved breeds/artificial insemination.

Livestock meant an additional source of food

Also assistance for large livestock was much more common than for small livestock, which has to do with the higher value attached to larger animals. Assistance was mostly provided by an extension officer (39%), a neighbour (25%) or a combination of an officer, neighbour and/or relative (17%). Interestingly, there appeared to be no relationship between receiving technical assistance, on the one hand, and the occurrence of deaths of the animals, on the other. This can be explained by the fact that usually animals are only vaccinated after an outbreak of a disease. Preventive measures are hardly taken.

LABOUR

In most cases, it was either the head of the household (38%) or the spouse (56%), spouses are always women, responsible for rearing the animals. For large livestock the responsibility was equally distributed between the head and the spouse, while for small livestock the spouses formed the majority. In 16% of the livestock-keeping households, taking care of the animals was a full-

time job for the person involved. Higher-income and lower-income households did not differ in this respect. They did, however, in terms of hiring additional labour: 43% of the higher-income households did so, against only 13% of the lower-income households. Money constraints undoubtedly explain this difference.

PROBLEMS

Table 2 lists the constraints most frequently mentioned in the survey. It is clear from the table that the animals’ health was by far the greatest concern for the farmers. Theft, lack of feed and lack of funds/capital were constraints mentioned by at least 10% of the livestock-keeping population. Two respondents mentioned ‘nuisance’, a problem that differs from the other constraints in that it refers more to the farmer’s neighbour(s) than to the farmer him/herself. It probably shows that these two respondents had problems with their neighbour(s) because of the latter’s problem with the farmer’s livestock.

Although, generally speaking, the keepers of large livestock and those of small livestock were unanimous regarding the various problems, there are some problems which were more specific to large than to small livestock and vice versa (Table 2). Lack of feed and safe drinking water was much more of a problem for large livestock keepers, probably simply because these animals eat and drink



Photo by René van Veenhuizen

Table1: Types of livestock by household income

type of livestock	household income (Kenyan shillings/month)	
	lower (<10,000)	higher (>10,000)
large	5	8
small	67	20
both	11	9

much more than small animals. Harassment, though not frequently mentioned, was also a constraint specific to large livestock. This may be related to the regulation saying that it is forbidden to let large animals freely roam around. One problem more frequently mentioned by

It is important to distinguish between large and small livestock

the small livestock keepers concerned the threat of predators. This is logical, since a chicken or a duck is much more likely to fall prey to a wild animal (or dog) than a goat or a pig.

WASTE DISPOSAL

None of the livestock-keeping respondents mentioned the disposal of the animals' waste as a constraint, even though this is generally considered as one of the major nuisances of keeping animals in town. One-third of the farmers said that they dump part or all of the waste in the street. The large majority of them (92%) dumped the whole lot in that way. However, this practice was more common among the keepers of small livestock than among those with large animals. It was also more common among the poorest households (49%), most likely because these people often have no compound. On the other hand, many more (62%) of the livestock keepers were able to utilise part or all of the waste productively, namely for crop cultivation purposes, either by themselves (on a plot in town or in the rural area) or by their neighbours. The dung of the larger animals in particular appeared not to be wasted in Nakuru town.

CONCLUSIONS AND POLICY IMPLICATIONS

Livestock keeping is a neglected subject in the urban agriculture literature. The results of the Nakuru survey show that although a minority of the households are engaged in livestock keeping, the total number of animals is considerable. For the large majority of these people, the produce forms an important food source and for many an income source as well. Moreover, it provides employment for a number of people, which is a factor that should not be neglected by policy makers.

At the same time (according to the municipal by-laws which date from the colonial period) urban agriculture is an illegal activity. Particularly the keeping of large livestock is generally seen as a nuisance. When there are complaints or when the health risks are considered to be too high, action is undertaken, such as confiscation of the animals. Animals freely roaming around in the streets can cause dangerous situations, as the authors have seen more than once.

Hence, there is a need for regulations, the more so because municipal authorities of Nakuru are presently undertaking an urban planning exercise in the context of the Localising Agenda 21 programme. This involves environmentally-friendly planning, of which urban agriculture is an inevitable part. This is recognised by the municipal authorities.

The first step would be to designate zones where certain types of animals, or broader, certain types of urban agriculture, are allowed under certain conditions. For example, that the number of cattle should be bound to a certain maximum and should only be kept under zero-grazing in the peri-urban areas and/or in compounds of a certain minimum size in the built-up area.

An important issue in terms of environmentally-friendly planning concerns the "closing of the nutrients cycle", i.e. the re-use of animal waste for crop cultivation as well as the use of crop residues and other organic waste as feed for the animals. To some extent, this is being practised already by the Nakuru livestock keepers, but more can and has to be done.

One way of developing the sector is by providing more and better technical assistance, as pests and diseases and the related high death rates among the animals are the most serious problems the livestock keepers are facing. Here lies a task for the extension officers of the Ministry of Agriculture. Although they do visit farmers within the municipality, they usually do so only on request.

Table 2 Most frequently mentioned problems with livestock keeping by type of livestock (%)

	large livestock	small livestock
N (h'holds) =	33	108
<i>no problem</i>	9.1	11.1
<i>diseases</i>	75.8	71.3
<i>theft</i>	24.2	20.4
<i>lack of feed</i>	27.3	12.0
<i>lack of funds/capital</i>	15.2	10.2
<i>lack of safe drinking water</i>	24.2	6.5
<i>predators</i>	3.0	10.2
<i>lack of space</i>	3.3	7.4
<i>harassment</i>	12.1	2.8

The results of the survey show that in creating policies, it is important to distinguish between large and small livestock. For instance, large livestock is usually more of a nuisance (traffic accidents, waste disposal, diseases) than small livestock. Small livestock can more easily be allowed in the built-up area than large livestock. On the other hand, large livestock can play a more important role in the "nutrient cycle" than small livestock.

A major constraint, as in many other African towns and cities, concerns the lack of enforcement of the existing laws, by-laws and regulations, partly related to a shortage of manpower. Formulating new regulations without the necessary will and power to enforce these regulations is thus a useless exercise.



Photo by D. Foeken

Goats and Cattle roaming for food

Prerequisites for any policy regarding the integration of urban agriculture in urban planning include the recognition that urban agriculture is not only a rural activity but an accepted form of urban land use as well, the understanding that urban agriculture is an important economic activity for many urban dwellers, the conviction that urban agriculture has to be incorporated in any future town planning exercise, and a fruitful working relationship between the municipal authorities and community-based organisations.

The very positive thing about Nakuru is that, unlike many other African towns and cities, these prerequisites are all met.

Market-oriented Urban and Peri-Urban Dairy Systems

Urban and peri-urban dairy production systems are among the many forms of dairy production systems in the tropics and sub-tropics. The systems involve the production, processing and marketing of milk and milk products that are channelled to consumers in urban centres (Rey et al., 1993; Staal and Shapiro, 1996). These urban and peri-urban dairy production systems evolved to satisfy the increasing demand for milk in urban centres as a consequence of increasing urbanisation, rising per capita income and increasing cost of imported milk and milk products. They contribute to overall development through income and employment generation, food security, asset accumulation, poverty alleviation and improving human nutrition and health.

The development and sustainability of urban and peri-urban dairy production systems requires a relatively large initial investment and long-term commitment. In addition, the major technical and non-technical constraints associated with these dairy production systems such as availability and cost of genetic materials, breeding systems, feed resources, feeding systems, animal health, processing, marketing, public health, waste handling, management and handling, and policy issues need to be addressed. In this case study, the characteristics of the production systems, feed resources and feeding systems, genetic resource and breeding systems in urban and peri-urban dairy production in Ethiopia is assessed.

A study on market-oriented urban and peri-urban dairy production systems in the Addis Ababa milk shed was undertaken, to test a conceptual framework, developed by ILRI for general characterisation of dairy systems, characterisation of specific sub-systems and identification of major constraints. A total of 147 dairy farms (market-oriented smallholder and commercial) were selected for characterisation, and of the three urban systems 49 farms for a further detailed study.

PRODUCTION SYSTEMS

Seven, market-oriented, dairy production sub-systems were characterised. The 'milk

shed' approach, was considered, referring to systems that supply fluid milk to the city. The rural and urban systems develop in a dynamic way and shifts between them occur. All these systems are basically market driven due to the large urban demand for milk. In fact they have developed in response to the market demand and have emerged depending on available resources (land, labour, feed, capital, etc).

Traditional crop/livestock farms in rural areas: These farms are located between 25 and 130 km from Addis Ababa, the average distance being 68 km from the capital. They are small farms with an average of four dairy cows, and provide very little or no specialised inputs (improved breeds, supplementary feed, housing, veterinary care, etc) to their dairy enterprise. They sell fresh milk on a daily basis to the government owned Dairy Development Enterprise (DDE). Excess milk is processed into butter and a local cottage cheese (known as *Ayib*) and sold in local markets.

Intensified dairy/crop livestock farms: These are smallholder farms located around Addis Ababa and exercise some form of intensive dairy production system. These farms have had experiences with dairy development projects under the Ministry of Agriculture. Projects such as the Selale dairy development project and the smallholder dairy development project have been operational in these areas and have influenced the production system. Improved genotypes, artificial insemination, improved forages, concentrate feeding, housing, calf bucket feeding and early weaning are common

practices by farmers. Compared to those traditional crop/livestock farmers, land holding is about half the size and milk production is 15% higher, but the number of cows per household is similar.

Crop/livestock farms with intensive cropping: These farms are located relatively closer to Addis Ababa city, between 25 and 60 km. The farms and herds are 25% larger than the traditional crop/livestock farmers. The cropping system is more intensive, particularly with a frequent use of fertilisers. They provide supplementary feeds to their animals. Fresh milk is sold to the DDE and they seldom practice making dairy products.

Specialized dairy farms: These farms are located between 15 and 60 km from Addis Ababa. They are large farms with an average holding of 8.9 ha and 17 cows. They widely use specialised inputs such as improved genotypes, artificial insemination, forage production, improved housing, concentrate feeding, veterinary



Photo by René van Veenhuizen

Milking shed in Nairobi

care, etc. They sell fresh milk in relatively large quantities of over 30 litres per day primarily to local informal markets or to the DDE. Most farm owners have additional off-farm activities often generating more income than livestock.

Peri-urban farms in secondary towns: These farms are located in and around secondary towns within 25 to 50 km from Addis Ababa. Cattle are grazed on owned or rented land. Special inputs are linked to the type of genotype and involve artificial insemination and supplementary feeds to grazing and stall-fed roughages. These

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farmers, on average, own five dairy cows. The primary outlet for milk is either the DDE or local informal markets.

Intra-urban dairy farms in Addis Ababa:

These dairy farms are specialised and intensive production units based on zero grazing of crossbred and high grade cows. There is little or no grazing within the city and stall-feeding is based on purchased hay and concentrates. The level of exotic blood in the herd is among the highest found in the sample. Annual milk production per cows is high and milk is directly sold to the local market.

Urban dairy in secondary towns: These are specialised dairy farms found in most secondary towns within the milk shed. In these small towns, farmers have more access to grazing; stall-feeding is therefore less intensive. The level of exotic blood in the herd is high, but herd size is the smallest of all types and averages about two cows per farm. Milk is sold fresh to local markets or the DDE, or processed into butter and *ayib* and sold. Most farm owners have off-farm activities representing about two-thirds of their income.

Detailed study conducted on three production sub-systems showed that 76%, 22% and 54% of the farms in secondary towns, peri-urban and intra-urban areas respectively are owned by female farmers. The percentage of illiterate farmers (owners) was highest in intra-urban (50%) farms followed by those in secondary town (37.5%) and peri-urban (12.5%) areas.

Conserved hay, agro-industrial by-products and commercial concentrate rations are the major feed resources used by urban and peri-urban dairy farmers. Hay makes up almost the entire basal diet of the peri-urban dairy farms. Agro-industrial by-products are fed as supplement to roughage based diets, and are mainly accessed by peri-urban production systems, due to the

Photo by René van Veenhuizen



Raw milk brought directly to the consumer

fact that most of the by-product processing industries are located around cities and towns where the demand for the edible major products is high. The use of commercial concentrates is restricted to institutional farms and certain large peri-urban dairy farms. Non-conventional feed resources like hulls of pulse and other crops, traditional brewery and alcohol residues, poultry waste, vegetable and fruit wastes (Yoseph Mekasha, 1999) are cheaper and play a significant role in peri-urban dairy production system.

Crossbred and grade animals are preferred by 85%, 67% and 44% of farmers, while pure temperate breeds are preferred by 10%, 33% and 56% of farmers in secondary towns, peri-urban and urban areas, respectively. Among the temperate dairy breeds, the Friesian is the most preferred one. About 92% of urban farmers produce their own animals through crossbreeding zebu cows with exotic bulls. Purchase of heifers or cows from other dairy farms is the main source for 29% of the farmers in secondary towns and 17% in peri-urban areas. The criteria for selection of animals are variable. Milk yield potential, reproductive efficiency, disease resistance, breed or size are the most important criteria for bull selection.

Cash income from sale of milk and/or breeding animals and utilisation of available resources (land, feed, labour, capital) are the most important reasons for keeping dairy animals in urban and peri-urban dairy production systems.

CONSTRAINTS AND OPPORTUNITIES FOR DEVELOPMENT

Market-oriented urban and peri-urban dairy production systems are emerging as important components of the milk production systems in Ethiopia. These systems are contributing immensely towards filling in the large demand-supply gap for milk and milk products in urban centres, where consumption of milk and milk pro-

ducts is remarkably high.

A recent survey undertaken by the Addis Ababa Agricultural Bureau shows that there are a total of 5,167 small, medium and large dairy farms in and around Addis Ababa city. The total milk production from these dairy farms amounts to 34,649,450 litres per annum. Of this, 73% is sold, 10% is left for household consumption, 9.4% goes to calves and 7.6% is processed mainly into butter and *ayib* (Azage Tegegne and Alemu Gebrewold, 1998). The total amount of milk available to Addis Ababa is 43,849,675 litres per annum.

The large demand for milk on the one hand and the small supply of milk and milk products for the major urban centres in Ethiopia on the other hand shows the untapped potential for development of urban and peri-urban dairy farms. Market-oriented smallholder peri-urban dairy production systems have tremendous potential for development and could play a significant role in minimising the acute shortage of dairy products in urban centres. Current increases in economic pressure, competition for limited resources and market forces have led to an increase in the level of intensification in these production systems.

In order to sustain high productivity and profitability, high levels of management in appropriate feeding, health care, and reproductive management are essential. These urban and peri-urban dairy farms are currently facing new challenges associated with intensive production systems. Availability of land, management skills, labour force, feeding resources and systems, genetic improvement, control of diseases and parasites, udder health and mastitis, calf mortality, reproductive problems, waste management, quality control, processing and marketing and other socio-economic considerations are becoming important factors influencing and determining the survival of these production systems.

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Livestock production is a vital part of urban and peri-urban agriculture (UPA) in Kumasi, where many crop farmers benefit from cheap poultry manure available in large quantities. However, with increasing competition for this resource, the manure is seldom stored long enough to prevent the contamination of food and water with pathogens. While the actual incidence of disease related to this contamination has not yet been assessed, interventions to prevent the spread of infection should focus first of all on the consumer household. Farmers' access to clean irrigation water is another important step but only makes sense if farmers' own practices do not contribute to water pollution.



poultry manure. Rain washes the manure into the hand-dug well at the lowest point of the field.

Photo: IBSRAM

Increasing use of *Is farmers' race consumers' fate?* **poultry manure** in Ghana

Kumasi, the capital of the Ashanti Region in Ghana, has a population of approximately one million. Due to its strategic location in the national road network Kumasi has gained a pivotal role in the vast and profitable distribution of goods within West Africa. Trading and the commuter transport business are significant economic sectors.

The most profitable form of livestock farming is poultry and egg production

There are also about 1,470 registered commercial farms in the city as well as some 30,000 backyard farms (MOFA, 1999; KNRMP, 1999). The most striking feature of a recent survey on urban farming systems was that on all plots surveyed there was some form of food crop cultivation taking place, even in areas with high housing density

(KNRMP, 1999). Nsiah-Gyabaah and Adam (2000) concluded that if "gardening" is synonymous with food crop production, then Kumasi is still the "garden city" it was once envisaged to be.

The survey by the Kumasi Natural Resources Management Project (KNRMP) also addressed urban livestock. This was no easy task, since it was difficult to obtain realistic figures on urban herd sizes and cattle owners especially from the farmers' side (KNRMP, 1999). This was mainly due to increasing pressure from the Kumasi Metropolitan Assembly (KMA) on cattle owners to move their animals outside the KMA perimeter

The study estimated that there are up to 500 regular cattle owners in the metropolis and up to 2000 speculators or short-term cattle owners. The Veterinary Department of the Ministry of Food and Agriculture, on the other hand, counted a total number of about 3000 cattle in the metropolitan area. In addition, the department recorded about 30,000 sheep and 26,000 goats in the city (MOFA, 1999). Most live-

stock are kept for cash income either on a full or supplementary basis, and provide meat for more than 13,000 "chop bars" (street restaurants) in the city. Thus the urban livestock sector provides a livelihood for many people in the metropolis, including migrants from northern Ghana specialized in cattle keeping. In only a minority of cases are livestock kept for subsistence (KNRMP, 1999).

The most profitable and attractive forms of livestock farming - especially in and around the city - is probably poultry and egg production. Between 1986 and 1995 Ghana's poultry population doubled from 6.4 m to 13.1 m. Poultry farming is practised by people from all social sectors. However, the establishment of larger poultry farms requires an initial investment. Data from different farmer associations indicate that there are nearly 100 registered poultry farms in the KMA area and its vicinity, and about 200 more which are not registered. The majority of the registered ones have 5000 - 10,000 birds, mostly layers. The bird numbers rise as high as 250,000 to 350,000

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Table 1. Disposal of animal manures by urban livestock keepers

Disposal method	Respondents reporting disposal method (%)			
	Cattle	Sheep & goats	Pigs ¹	Poultry ²
Thrown away/not collected	98	100	97.5	5-55
Used as soil ameliorant	2	0	45	45-95

¹ Some respondents mentioned that they used part of the pig manure for soil amelioration and part was thrown away. Also 5% said that they used it in fish ponds.

² About 45% of the farmers indicated that they give the manure regularly to vegetable farmers, and 50% do so occasionally on request (otherwise, the litter is dumped and often burnt).

Source: KNRMP 1999.

birds in Kumasi's two largest poultry farms at the city boundary. On the registered farms, poultry are mostly kept by men: 40% of them are specialized poultry farmers, 60% do it as a side job (businessmen, traders, teachers, accountants, etc.). Among the non-registered poultry farms bird numbers mostly vary between 50 and 1000 birds, not counting those thousands of households with some free-running chickens.

Urban pig production is still a comparatively small but growing sector in contrast to the number of "urban" cattle, which are suffering from the rapid decline of grazing land in the metropolis. Finally, there is a range of farmers specialising in small animals such as grass cutter (agouti), rabbit, or snails, as well as a certain number of fish farmers

(aquaculture). However, these are mostly located in the peri-urban area (KNRMP, 1999)

MANURE PRODUCTION AND USE

There are no data available on the quantity of manure produced in the metropolitan area, but estimations including peri-urban Kumasi indicate an annual (dry matter) production of about 34,000 t poultry manure, 54,000 t sheep and goat manure and about 12,000 t pig manure on the basis of livestock data from 1996 (Kindness, 1999). A large proportion of the manure produced in and around Kumasi is lost. This is the case not only for droppings of free grazing sheep and goats, but also for poultry litter, which is dumped (and burnt) along roadsides (Drechsel, 1996). This is a significant loss of a valuable resource as poultry litter analysed around Kumasi shows a high nitrogen content of 2.0-3.8% (Amoah, 2000). In terms of available plant nutrients (t yr⁻¹), the amount of poultry manure currently wasted is larger than the total quantity of inorganic fertiliser actually applied in urban and peri-urban Kumasi (Nsiah-Gyabaah and Adam, 2000).

There was little interest observed in manure marketing by the livestock keepers surveyed by KNRMP (1999). Many poultry farmers consider the litter as waste and give it away for free to crop farmers who do, however, have to pay for the transport or litter replacement. According to KNRMP (1999), 45% of the poultry farmers in Kumasi generally make the manure available, as do an additional 50% on request (otherwise they dump/burn it: see Table 1).

Poultry manure is mostly used by vegetable farmers, but also about 68% of the 94 fish farmers around Kumasi manure their ponds with the poultry litter (which "closes" a separate nutrient cycle as poultry are generally co-fed with fish meal). Different PRA studies showed that farm-

ers in and around Kumasi have a general awareness of the benefits of organic manures for soil improvement but lack detailed knowledge on their applicability and handling for different crops. This situation is peculiar to poultry manure, which, as a new source of nutrients, is insufficiently addressed by both traditional knowledge and extension material.

To improve the situation, NRI and IBSRAM have in recent years supported a range of on-farm trials around Kumasi which verified the fertiliser value and

Farm gate samples still contain high levels of total and faecal coliforms

profitability of poultry manure use not only on vegetables but also on the traditional cassava-maize inter-crop. Corresponding guidelines for extensionists and farmers are being produced and impact assessment studies showed an increasing interest and a high probability of technology adoption (Drechsel and Gyiele, 1998; KNRMP, 2000).

However, poultry manure has not only advantages but is also a carrier of pathogens¹ and appropriate handling of the manure and crops is necessary to reduce any potential health hazard.

FOOD CONTAMINATION

Urban livestock production can affect its environment in various ways. It can lead to noise, odour or uncontrolled grazing in neighbours' gardens. A more serious disadvantage, however, is the contamination of food and water with pathogens if fresh manure is applied, as it is the case with poultry manure.

With increasing demand for inputs, vegetable farmers are competing for poultry manure. They started to offer poultry-farmers fresh bedding material (usually wood shavings) in exchange for manure-enriched litter fresh from the coop. Thus, the majority of poultry farmers who give the litter to crop farmers do not store it before it leaves the farm. Also almost no crop farmers who asked for litter enquired about its maturity. After collection, about 60% apply the poultry litter directly without further composting while 40% heap the litter for some weeks or more depending on the date they need it on their fields (Mensah et al., 2000).

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There is no conscious manure heaping for adequate composting (Amoah, 2000). The potential food contamination concerns leafy vegetables in particular, as every second farmer broadcasts the litter over the already established crops (see photo).

During irrigation, the litter is largely washed away. However, farm gate samples of lettuce, cabbage and onions from poultry manure treated fields still contained high levels of total and faecal coliforms (Table 2).

All vegetable samples not treated with poultry manure had lower coliform counts, but were still affected due to contaminated irrigation water. The farms studied used water from ponds, wells, streams or drains with up to 35×10^4 counts of faecal coliforms per 100 ml. The tolerated irrigation water level for crops likely to be eaten raw is 1×10^3 counts (Westcot, 1997). This source of contamination can be important but might be - at

least in part - homemade through excessive application of poultry manure.

Vegetables analysed at major markets in Kumasi did not show significantly different coliform counts than the farm gate samples, although there were significant differences between the various markets in Kumasi. The presence of coliforms from manure application depends on the frequency of manure application and the survival time of faecal coliforms on crops (<30 but usually <15 days; Westcot, 1997). While many lettuce farmers apply the manure only once, cabbage and onions receive their first treatment 1-2 weeks after planting and another treatment 3-4 weeks before harvest. In these cases a carry-over of coliforms is possible. The finding that the market samples did not show significantly different coliform counts than the farm gate samples indicates that although there was no additional contamination through market

Table 2 Faecal coliform counts of vegetable samples from various farms in Kumasi (MPN 100 ml⁻¹)

Sample	Average (x 10 ⁴)	Range (x 10 ⁴)
Lettuce	22.7	2.9 - 50.0
Cabbage	8.8	1.9 - 17.5
Onion	4.1	1.5 - 7.8

MPN=Most probable number

related handling, there was also no impact of on-market vegetable washing. In a comparable study carried out in Accra, Armar-Klemesu et al. (1998) found slightly higher coliform contamination of market samples than of farm gate samples. This indicated additional contamination through transport/handling but the major source of contamination remained the farm and irrigation water.

CONCLUSIONS

Livestock production is a vital part of Kumasi's UPA and contributes significantly to its agro-industrial sector. Farmers in and around Kumasi benefit from the large amounts of poultry manure generated, as this offers them access to a high quality fertiliser for little money. The potential of this resource is increasingly being realised. There are reports of trucks transporting the manure from Kumasi to the northern parts of the country and even to Burkina Faso.

With regard to the accompanying potential health hazard through the use of insufficiently composted manure and/or irrigation water, corresponding extension guidelines for vegetable farmers are needed. Many more epidemiological studies are also required to determine the actual incidence of disease occurring as a consequence of this transmission route. Prevention of the possible spread of gastro-intestinal infections should focus on the consumer household, its awareness of the problem of food contamination and access to piped water because a certain part of the population does not wash vegetables regularly and/or has no access to in-house piped water. In a further step, farmers' access to clean water has to be assured, also paying attention to the contribution of urban and peri-urban agriculture to water contamination through manure application or the hazardous disposal of animal waste.

ARTICLE CONTRIBUTIONS IN THE UA MAGAZINE NUMBER 1



❖ Urban Agriculture, Concepts and Definitions

Luc Mougeot

❖ Urban Food Security; urban agriculture a response to crisis

Petra Jacobi, Jürgen Amend and Axel Drescher

❖ Urban Agriculture and Biodiversity

Jac Smit

❖ The Integration of Agriculture in Urban Policies

Henk deZeeuw, Sabine Gündel and Hermann Waibel

❖ Living with Livestock in Town

Ann Waters-Bayer

❖ Dynamics in Tropical Homegardens

Raul Boncodin, Dindo Campilan, and Gordon Prain

❖ The Greening of Ahmedabad

Liliana Marulanda

❖ The Urban Farmers of St. Petersburg

Oleg Moldakov

❖ Urban Agriculture in Havana

Martin Bourque and Kristina Cañizares

These articles can be found on the RUAF website:

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Or you can request a copy of the first issue.



¹) Poultry manure can also be a carrier of pesticides: 65% of the poultry farmers in urban and peri-urban Kumasi, confirmed that they spray their birds and the litter with pesticides or dip the birds in pesticides when pests are detected on them (Amoah, 2000).

Kumasi is Ghana's second largest city after Accra and is the capital of the Ashanti Region.

Kumasi is located in the south-central part of the country 100 miles inland from the coast and the Kumasi Metropolitan Assembly (KMA) is responsible for a population of some 700,000 to 1 million people.



Small cattle farm in Accra

Photo by D. Fielding

Findings of a Survey into Urban livestock in Kumasi, Ghana

This survey was undertaken in 1999 with the aim of characterising urban livestock keeping in Kumasi and identifying the problems encountered by livestock keepers. The survey was carried out in association with the Institute of Renewable Natural Resources, University of Science and Technology, Kumasi. The following criteria were used to define the 'urban' setting: high density housing with few undeveloped areas remaining; piped water supply with few wells or boreholes; electricity supplied from the national grid; regular transport to and from the city centre; and presence of many small kiosks selling everyday items such as bread, sugar etc. Two urban areas were selected – Anloga and Aboabo, approximately 4km from the city centre. A pre-tested semi-structured questionnaire via an interpreter was used to gather information from 30 randomly selected households in each of the two areas – a total of 60 interviewees.

SURVEY FINDINGS

Twenty-eight (47%) of those interviewed mentioned that they were livestock keepers. Almost all owned their own houses whilst for non-livestock keepers only half were in this fortunate position. Of the livestock keepers 68% were male.

Half of those keeping livestock had chick-

ens whilst only one person kept ducks. Eighty-six percent of livestock enterprises were on-plot, i.e. at the house of the owner. Whilst income generation and household food production were the main reasons given for livestock keeping, only 14% of livestock keepers secured more than half their total income from livestock. The majority of animals had originally been purchased locally in and around Kumasi.

The major types of food used to feed livestock in descending order of popularity were: kitchen waste (cassava and plantain peelings), animal scavenged food, brewers' grains, maize chaff, maize grains, fishmeal, cut grass, pito mash (- local beer making by-product) rice grains, and fodder tree leaves. Ninety-six percent of livestock keepers disposed of animal waste on the local refuse tip and the carcasses of dead animals were in evidence on these same tips.

The problems reported by the urban livestock keepers interviewed in Kumasi, in descending order of importance, are shown in Table 1. The data in Table 1 suggest that animal keepers are keen to increase both their number of animals and the productivity of these animals. Thirty-nine percent of livestock keepers reported that they used the government veterinary service for animal health problems but they also carried out many treatments themselves.

Half the livestock keepers accepted that livestock were a cause of conflict with non-livestock keepers as a result of food (when

laid out for drying) and property damage. Livestock owners also accepted that livestock were associated with problems such as pollution, risks to human health, 'cattle mauling people' and traffic accidents.

Not surprisingly perhaps over 80 % of the non-livestock keepers saw livestock as a problem and a cause of conflict. The lowest level of objection was associated with the keeping of chickens and the use of confinement methods of housing as compared to freely roaming goats and cows.

DISCUSSION

It is clear that urban livestock keeping is an important activity in Kumasi. Roughly half of the poorest urban households in Kumasi appear to keep some type of livestock in either confined or free-ranging systems. Chickens were by far the most numerous, both in terms of

Table 1: Problems of urban livestock keepers in Kumasi

Problems	Number of respondents	%
<i>Animal diseases</i>	11	39
<i>No money to buy more animals</i>	10	36
<i>Insufficient space for animals</i>	8	28
<i>Theft</i>	7	25
<i>High cost of veterinary assistance/drug</i>	3	11
<i>KMA harassment</i>	3	11
<i>Animals eating plastic bags</i>	1	3
<i>No problems</i>	1	3
Total	44*	156*

* multiple response

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The survey reported here was undertaken as an MSc project by the main author

households keeping them and in actual numbers. The presence of cattle, sheep and goats was strongly correlated with owners who were Muslim. Sheep, and goats in particular, are required for various Muslim festivals and this explains their relatively high number amongst the Muslim community.

Surprisingly this survey did not find evidence of urban-rural linkages. Respondents mentioned little or no inflow of food or animals from rural areas and no outflow of manure to even peri-urban farmers. However, the encouragement of such links e.g. providing peri-urban market sites could be beneficial for all concerned.

'Trespassing', the uncontrolled movement of animals into other people's houses was the main cause of conflict between livestock and non-livestock owners.

The Kumasi Metropolitan Assembly does not object to chickens but does object to free roaming larger animals such as sheep, goats and cattle. Some owners of large livestock reported harassment by the authorities, who were trying to relocate their animals outside the city area. Although the authorities claimed that they would impound large animals found wandering in the streets the authors believe that such an act would lead to significant civil unrest in the survey areas.

Urban livestock farming in Kumasi is a community-tolerated phenomenon. Rules and regulations relating to livestock will only work with community acceptance and if this is not present then people will do whatever is necessary to try to secure their livelihoods.

It is difficult to imagine that the Ghana government or the Kumasi Authority will ever see the promotion and support of improved urban livestock keeping as a high enough priority to justify financial investment. Any changes that do occur are likely to result from changes in the overall level of poverty and availability of alternative employment opportunities. If people secure employment and become less poor then livestock keeping will tend to reduce as a result of community pressure from non-livestock keepers. If poverty increases for whatever reason then urban livestock keeping is likely to continue and even increase.

Urban pig farming

in irregular settlements in Uruguay

At the end of the 19th century, Sansón Carrasco (nom de plume of Daniel Muñoz, 1849-1930), reported on pigs being bred with household wastes. His chronicles are still valid today. For instance, in his article "Trash" (1883), he writes "...and in the depressions, and on the beach, pigs and more pigs, and always pigs everywhere you look, some of them feeding, some stretched out without a care in the world, others grunting as they get a glimpse of me, as if upset by my intrusion in their domain...".

One of the survival strategies developed by the residents of urban settlements in the department of Montevideo, is the collection and sorting of household solid waste (organic and

breeders constitute a distinct group. This explains the high incidence of health problems (transmission of diseases from animals to people) and environmental impacts (people living next to pigsties, inadequate final disposal of waste, food preparing systems) that are worse in the case of pig farming in urban and peri-urban areas. Due to several factors, including the socio-economic conditions of breeders and the urban status of the neighbourhoods where the practice is carried out, pig farming in urban areas is one of the most remarkable aspects of Urban Agriculture developed in our country.

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**Livestock at
dumpsite
in Nakuru,
Kenya**



Photo by D. Foeken

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ularly since 1970 (Moreira, 1997). There are two types of pig farming: in the rural areas, both allowed and regulated by the Municipal Intendency of Montevideo (-IMM) and in the urban areas, carried out in settlements and not controlled by the municipality. Both types are clearly differentiated and have distinctive features.

Ninety percent of plots dedicated to pig farming in rural areas are managed by small farmers. The largest environmental impacts caused by raising pigs in the rural environments are the final disposal of liquid and solid effluents typical of the practice, and to a lesser degree the final disposal of solid inorganic, non-saleable waste gathered during food sorting (Barlocco et al., 1998).

In urban areas, pig farming is mainly concentrated in the so-called slums or *cantegriles*, which are located in marginal areas, and are characterised by sub-standard housing and the lack of urban services. Here the sorters-breeders and their families carry out their activities. In this sense pig raising in urban areas is a peculiar type of urban agriculture, although similarities are shared such as socio-economic circumstances (poverty) and dependency of intermediaries.

THE SORTERS OF URBAN SOLID WASTES

Marginal neighbourhoods are a growing phenomenon in Latin America. Known by many different names in Spanish (tugurios, villas miserias, favelas, callampas, pueblos jóvenes or cantegriles), these urban settlements are located on the

periphery of cities and concentrate large contingents of labour that the productive system cannot absorb.

By definition, the marginal neighbourhoods include a large variety of human situations concerning origin, land tenure, infrastructure, quality of housing and population density. According to data from the Ministry of Housing, Territorial Management and the Environment, towards the end of 1995 there were 111 irregular settlements in the Department of Montevideo, with a total of 53,803 residents. The background of the residents of these settlements has shifted. In the 1950s, 65% were of rural origin, while by the 1980s 76% of the residents were born in Montevideo.

In the city of Montevideo, sorters live in slums and squatter settlements. Although the term "settlement" is used in many cases as a synonym for slum, each term refers to a different urban phenomenon. The slow and fairly logical growth of slums differs from the spontaneous and explosive emergence of squatter settlements. Particularly dramatic is the speed

Pig farming implies a significant reuse of household solid waste as feed

at which the phenomenon of squatter settlements is growing, shifting towards the metropolitan area and other secondary cities, the result of a strategy of large segments of the population for securing a place to live.

As the inhabitants of these settlements have problems finding jobs, many develop other strategies for family survival. The most widespread is the collection and sorting of household solid waste. Many sorters divide their time between animal husbandry activities and performing other occupations, as street vendors or in the construction sector. Sorting is an economic activity based on the collection of household solid waste (organic and inorganic) which is then sorted and sold to the local recycling industry.

Typically, the sorting is performed by several members of the family who scour the city's middle- and upper-class neighbourhoods, gathering household solid wastes in hand- or horse-drawn carts. If the sorters do not raise pigs, organic

waste is used to feed the horses, or discarded along the river banks or public roads, while inorganic waste is sold as raw material to the local recycling industry (mainly paper, cardboard and metal).

SORTERS-BREEDERS

Within the group of sorters of urban solid waste, pig breeders represent a group with distinctive characteristics. Many of the more than 2,900 sorters raise pigs in urban areas to supplement their household income. Sorting household solid waste is the main activity for the sorters-breeders (50% considered sorting the main source of income), while pig raising is a supplementary activity. Studies show that only 8% of surveyed sorters consider pig raising as their only source of income, others being fruit markets (18%) and construction work and pensions (both 8%). For most sorters-breeders, animals fill the role of a "piggy-bank", to which they can have access in order to cope with unforeseen expenses (Vitale et al., 1996; Moreira, 1997; Tommasino et al., 1998).

The development of this activity is strongly linked with strategies aimed at lowering the costs charged by cold storage houses and pork butcheries. The process whereby a sorter becomes a breeder can be outlined as follows. Typically, a supplier provides a sorter with pigs to fatten up. By selling them the sorter earns extra income, and this motivates him to continue production; gradually, he becomes a sorter-breeder.

MAIN FEATURES OF THE PIG RAISING SYSTEM IN URBAN SQUATTER SETTLEMENTS

According Vitale et al. (1996) most sorters-breeders are small producers who are responsible for the full cycle. In this case, it is not only the actual breeding but also the selling of the pigs that supplements their household income. The term full cycle encompasses the process from birth to fattening prior to slaughtering. Sorters-breeders who perform this practice typically have 1 or 2 sows. On the other hand, raising refers to practice of raising the animal from its birth until it is weaned from the mother and sold to fatteners, slaughtered, or sold as suckling pigs. Finally, finishers or fatteners only fatten the animals until they are sold for slaughter (Vitale et al. 1996). In third-party production forms, "capitalists" (term used by sorters-breeders to

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refer to intermediaries or suppliers) provide the pigs to be fattened. Typically the “capitalist” provides sorters–breeders with pigs weighing between 20 and 50 kg. As this is an illegal activity carried out by the low-income population in marginal areas, the suppliers often lend money or help the breeders in the event of health or other problems. This leads to an implicit relationship of fidelity that may hinder the regularisation of this practice.

After the pigs enter the squatter settlement, the entire process of raising and eventually slaughtering, processing and selling them takes place within the city. Pig farming in squatter settlements implies a significant reuse of household solid waste as feed, although commercial (bakery leftovers) and industrial waste (remnants of slaughtered animals from cold storage houses) are also used. Most settlement breeders buy their animals in the town of Canelones, or in the rural area around Montevideo.

The final product sold by the breeders depends on the productive cycle they develop. Thus, breeders sell suckling pigs (both alive and slaughtered) to intermediaries, to slaughterhouses, or directly to consumers. Fatteners sell fattened pigs (90–120 kg) to be slaughtered or slaughter them themselves. Those who perform the full cycle may sell both categories of animals. Thus, consumers (who may be people from the same settlement) have access to the various types of products (cured or fresh meat) from several sources.

HEALTH AND ENVIRONMENTAL PROBLEMS CAUSED BY PIG FARMING IN URBAN SETTLEMENTS

Pig farming in the city is a survival strategy developed with the efforts of the entire family, and performed in the place where they live. For this reason, transmission of diseases from animals to humans (see Table 1) and the environ-



mental impacts (houses located next to pigsties, inadequate final disposal of waste and food preparation systems) of this activity are significant.

Health problems are ranked among the primary concerns of those who work with sorters–pig breeders. Squatter settlements where pig farming is carried out are faced with problems such as overcrowding and lack of services (sewage and potable water). It should be remembered that pig farming still is a clandestine activity.

Health problems are ranked among the primary concerns

Most sorters–breeders gather both organic and inorganic waste. Ninety-two percent of sorters–breeders surveyed sell part of the inorganic waste collected and throw away refuse in areas located close to the settlements, on the banks of the streams and/or along public roads (Vitale et al., 1996). Organic waste, on the other hand, is composed by remnants of foods discarded by households and commercial establishments such as bakeries, supermarkets, restaurants, fish scraps, fruits and vegetables. According to a recent study, 96% of sorters–breeders do the sorting at home (Vitale et al., 1996).

Although the organic matter is perishable, 83% of urban pig breeders do not treat the food they feed their animals in any way, and only 28% add some type of food supplement, while the percentage of

sorters–breeders who store food is significant. If any form of treatment occurs it is usually cooking, using part of the waste that cannot be sold (e.g. car covers, plastic remains and wood to light fires) and causing high levels of environmental pollution. To make matters worse, as large amounts of food are involved, the temperature reached is not high enough to ensure uniform cooking, leaving part of the mass untreated. The transmission of diseases from animals to humans, for example trichinosis or cysticercosis, can occur when pigs are fed with untreated waste (Anchieri et al., 1998).

CONCLUSIONS

Pig farming in urban areas constitutes a significant practice developed within the city of Montevideo. Pig raising in urban areas is a family-type activity, involving children, youngsters and women in a permanent fashion. The role of women is highly relevant, both in sorting household waste and in taking care of the pigs. Although the practice is mainly a family activity, organised groups such as co-operatives are starting to develop and are worth considering.

Although no cost-benefit studies have been made, pig raising in squatter settlements allows households to generate supplementary income to cope with unforeseen expenses. However, the activity poses serious food safety and health problems, as many sorters–breeders share the food they collect with their pigs and raise them in their homes.

The activities of sorters–breeders generate significant adverse environmental impacts, both in the sorting of inorganic solid waste and organic solid waste. Food stored in unstable conditions can cause problems with rodents and insects; this is compounded by the urban characteristics of the squatter settlements where the activity is developed. These characteristics form a limitation to the possible benefits arising from the re-use of household solid waste as pig feed.

Table 1 – Main diseases that humans can catch from pig farming

Bacterial	Viral	Parasitic	Mycotic
<i>Anthrax (Carbuncle)</i>	<i>Vesicular stomatitis</i>	<i>Trichinosis</i>	<i>Dermatomycosis</i>
<i>Brucellosis</i>		<i>Cysticercosis</i>	
<i>Erysipelas</i>		<i>Toxoplasmosis</i>	
<i>Leptospirosis</i>		<i>Sarcotic scab</i>	
<i>Tuberculosis</i>			
<i>Salmonellosis</i>			
<i>Staphylococcia</i>			

Source: Prepared by Castro, G. (1999) based on Ghirotti, M. (1999).



Photo by A. Mantovani

Veterinary urban hygiene in developing countries

Zoonosis

Zoonoses have been defined by WHO (1959) as *“Those disease and infections (the agents of) which are naturally transmitted between (other) vertebrate animals and man”*. Recently the concept has been enlarged with the following proposal: *“Any detriment to the health and/or quality of human life deriving from relationships with (other) vertebrate or edible or toxic invertebrate animals”*, Mantovani 2000).

In general, little attention is paid to animal-connected problems in developing countries, unless they are linked with the export of animals or animal products. For example, brucellosis is widespread in many countries, but it is often overlooked when it affects humans (confused in the “malaria complex”), or not considered important in animals unless they have to be exported to other countries that do not accept positive animals, or because

they have controlled brucellosis, or because brucellosis is absent. Other zoonoses that are sometimes of economic importance include anthrax, bovine tuberculosis, glanders, taeniasis/cysticercosis and trichinellosis. Infections which cause important pandemics in animals, such as foot and mouth disease and rinderpest, are not considered zoonoses in the classical sense, but must be considered important public health problems because of their consequences on human nutrition, economy and quality of life.

LOCAL FACTORS

Local factors, including cultural background, economic conditions and relig-

ious beliefs influence specific conditions, especially in developing countries. Consequently, a list of the zoonoses, which may be important in an urban area must take different factors into consideration, for instance:

- ❖ Close proximity of humans to different species of animals kept together with little or no distinction between companion or utility functions (dogs, cats, farm and barnyard animals).
- ❖ Trade and barter of animals facilitates the exchange of pathogenic agents with poor surveillance over the provenance and health status of individual animals and stocks.
- ❖ Pigs, cattle, sheep, goats, horses, camels and poultry may be left to graze freely along the roadsides and any suitable place, feed on available vegetables, garbage and drinking water.
- ❖ Animals or large groups of animals often cross or rest in urban areas and may disseminate their pathogens and vectors. Pigs, cattle, dogs and other animals may have free access to human faeces and feed on them, while humans and other animals

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are often exposed to dog and cat faeces.

- ❖ Animal waste and possibly infected materials are left to dogs, cats, pigs, domestic ruminants and scavenger species which roam among dwelling places and human communities.
- ❖ Small or family abattoirs are often located close to human dwellings. Slaughtering is often carried out in the open air in the absence of controls; butchers and abattoir workers are exposed to zoonoses and occupational accidents.
- ❖ In some towns there are large flocks of pigeons, starlings, seagulls, vultures and other birds that are in close contact with the population. The same applies to rodents, monkeys and other animals.
- ❖ Lack of inspection of meat and other products.
- ❖ The use of animal manure for cooking (fuel source) is risky as it may introduce pathogens into the cooking area such as salmonellae, and create the same problems as solid fuel.
- ❖ Where human malnutrition, AIDS and other immunodepressive conditions are widespread, these constitute a predisposing factor for zoonoses.
- ❖ Where (urban) rabies is present, it generally constitutes the first priority for veterinary public health and influences the relationship between persons and dogs and sometimes with animals in general. Stray and free roaming dogs constitute a potential danger for the transmission of zoonoses (leishmaniasis, echinococcosis/hydatidosis etc.) and other problems (e.g. bites).

Conditions such as very hot and/or damp (or dry) climates, and emergencies (famine, drought, etc.) may favour the circulation of infections through increased virulence of pathogens and activity of vectors, and decreased resistance of human and animal populations. These factors may also result in the transmission of infection becoming continuous throughout the year without any seasonal resting spells.

Another crucial issue is the removal and disposal of animal waste from cities.

Whenever possible and convenient, recycling should be recommended. Too many materials which could be used as fertilizers, animal feed or in other ways are lost as a result of lack of organization and/or of public education. On the other hand, any sort of garbage that is left to animals facilitates the lifecycle of zoonoses (e.g. echinococcosis/hydatidosis, taeniasis/cysticercosis, salmonellosis).

VETERINARY URBAN HYGIENE

The World Health Organization (WHO) and its branch, Veterinary Public Health (VPH) started to show specific interest in the problems of urban areas in 1977, and developed a series of activities under the title Veterinary Urban Hygiene (VUH). These activities have evolved mainly in developed countries, as they require considerable resources, adequate veterinary organization and political support. In developing countries the VUH activities are often very limited, performed by governmental agencies (ministries of health, agriculture, interior) and sometimes supported by international organizations (WHO, FAO, OIE: World Animal Health Organisation, etc.) by foreign governments (bilateral and multilateral agreements) and by non governmental organizations. In the Mediterranean these activities are co-ordinated by the Mediterranean Zoonoses Control Centre. The activities of VUH may be divided into different categories, which to some extent overlap:

- ❖ Rabies control and connected activities (dog population control, etc.);
- ❖ Control of other infections transmitted by animals (e.g. leishmaniasis, brucellosis, etc.);
- ❖ Control of economically important animal diseases (e.g. rinderpest, foot and mouth disease, sheep pox, parasitoses etc.);
- ❖ Hygienic control of food of animal origin ("from the farm to the table") in slaughterhouses, markets, food stores, restaurants etc.;
- ❖ Control of economically important animals in urban areas (situation *rus in urbe*: countryside in the city);
- ❖ Controls in rural areas which have acquired characters (and problems) of urban areas (situation *urbs in rure*: city in the countryside);
- ❖ Control of populations of synanthropic animals (e.g. pigeons, cats, rodents,

monkeys) creating problems in urban areas.

International and national agencies interested in health, nutrition, the environment and economies of developing countries are inclined to employ the modern methods which are applied in high income countries, such as HACCP (Health Analysis Critical Control Points) and HSR (Health System Research). Often, however, the local technical and economic bases are not strong enough to permit the application of these methods. In almost all cases it is necessary to pay attention to numerous prerequisites concerning applicability of VUH to the local situation. Priority establishment is unavoidable. Where political support and adequate resources are provided, research and training will furnish the cultural and human background needed. Collaboration with the medical and other existing services has to be established, as VUH is a multidisciplinary practice, encompassing all sectors involved in urban policy and management.

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The control of **Cysticercosis** in rural and urban areas

Cysticercosis is one of the most dangerous diseases caused by a parasite that passes from animals to human beings. It is most prevalent in the rural areas of developing countries, from where it can become a threat in urban areas too. Cysticercosis is closely related to economic standards, culture and aspects of hygiene. Latin America, non-Islamic parts of Africa and South East Asia and especially India face major problems with this disease. In this article the author describes cysticercosis that originates from pigs (*Cysticercosis cellulosae*) in Bolivia, South America.

When talking with people in the village of Punata, near Cochabamba, one notices that 'triquina' is something that they are worried about. This parasite, that one can see as small nodules, or cysts, on the pig's tongue, is renowned for its ability to cause disease in humans. The exact symptoms of this disease are not generally known, whereas everyone knows that the price one can fetch for a pig with 'triquina' is considerably lower than the price of one without cysts. In the weekly Punata market there is a specific site where every pig on sale is reviewed by traditional 'triquina

controllers', usually older women, who receive a small fee for each pig. With great skill, these women immobilise each pig and check its tongue.

There is less general knowledge about the ways to prevent the pig from getting the 'triquina', and even professional people are often confused, though many of them know that the name 'triquina' is not right. The parasite is actually called 'cysticercus'. Triquina is another, much smaller, zoonotic parasite in the meat of pigs and other animals (*Triquinella spiralis*). Some pig owners indicate that, in order to prevent cysticercosis, it is better to buy white pigs from the larger farms; others assume that one should give the pig special food before taking it to the market. Most people know, however, that once a pig has the cysts in its muscles, no medicine can get it out.

The municipality, responsible for the market, does not really know what to do

about the problem, and leaves the control to the traditional structures, without enforcement. There is no compensation for the pigs found 'positive', so these animals are used for meat anyway. Most pigs in the region are slaughtered in backyards without formal meat inspection. Traditional pork dishes, however, usually include deep frying or long cooking of the meat, which considerably diminishes the danger of transmission of the parasite.

REAL PROBLEM

One of the reasons for the confusion about cysticercosis is that the life cycle of this parasite is very complicated. Cysticercosis occurs in both pigs and cattle, and represents a problem for humans.

Studies indicate that the incidence of cysticercosis is quite alarming, especially of *Cysticercosis cellulosae*, which derives from pigs. It affects, to varying degrees, some 19 countries in Latin America and is of real significance in 15 of them. In some regions, between 15 and 60 % of the pigs kept in traditional systems have antibodies against the parasite, indicating that they have been in contact with it during their lifetime. Other studies have indicated that around 30% of the pigs have cysticercus nodules on their tongues. In Bolivia between 1.4 and 2% of the people in rural areas have the *Taenia solium* parasite in their intestines; the WHO considers it a serious problem when the level of people infected with *Taenia solium* is above 1%.

LIFE CYCLE OF CYSTICERCOSIS

The parasite's primary host is the human being. In humans it is found as a white tapeworm, up to several metres in length, built up of small segments, called proglottides. The person generally is not aware of the tapeworm, other than small white spots (the proglottides that have been released) in the excrement. The proglottides are full of eggs, that can infect the animal. The tapeworm that can infect pigs is called *Taenia solium*; the one that can infect cattle is considerably longer – up to 12 metres – and is called *Taenia saginata*.

When human excrement is consumed by pigs, the cysts of the intermediate parasite, called *Cysticercus cellulosae*, are formed in the meat and other parts of the pig. These cysts are transparent/white, between 0.5 and 1 cm. in diameter. Only in the case of intensive infection the cysts are found in the tongue. The cysts generally do not result in any other visual abnormalities in the living animal. Again, when people eat meat containing the cysts, which is uncooked, or undercooked, and get infected, the *Taenia solium* tapeworm develops in their intestines. This general life cycle of the tapeworm is similar in bovines, but it is far more dangerous in pigs because a parallel cycle occurs.

Where human excrement containing the eggs of *Taenia solium* infects waste water, which is then used to grow vegetables and other products for human consumption, the situation becomes very dangerous. If a person drinks this water or consumes raw vegetables (e.g. lettuce) or fruits that are not peeled (e.g. strawberries), he or she can ingest the *Taenia solium* eggs. In this case the cycle that normally takes place in the pig, now starts in the human body. The cysts are formed in different parts of the body, in some cases in the eye or the brain. In this latter case the disease is called neurocysticercosis, and symptoms are severe, similar to those of a brain tumour or epilepsy. In Bolivia many cases diagnosed as epilepsy are, in fact, neurocysticercosis. There is no cure for this once the cysts have been formed, and the impact on the patient and the family is enormous.

URBAN AND RURAL SETTING

The problem of cyst infection from pig meat is closely related to the way the pigs

CALL FOR CONTRIBUTIONS

The third issue of the Urban Agriculture Magazine will focus on "*Health related aspects of urban agriculture*". The publication is planned for February 2001.

City authorities have often been reluctant to accept urban agriculture because of perceived health risks. Nevertheless, urban agriculture can have both negative and positive effects on the health and environmental conditions of an urban population.

We invite you to report and discuss both positive and negative relationships between urban agriculture and health.

Article contributions could be in the form of integrated case-studies or more specifically deal with a certain issue. The following issues are suggested:

1. Clarification of concepts and definitions; Debunking of persistent myths regarding the relation between urban agriculture and health
2. Strategies to enhance the positive effects of urban agriculture on health of the urban population (enhanced access to food, improved food security, better nutrition)
3. Strategies to mitigate effectively the health risks associated with urban agriculture, like:

- ❖ communicable diseases associated with urban agriculture (e.g. malaria)
- ❖ health risks associated with the reuse of (untreated or poorly treated) waste and waste water in agriculture

- ❖ health risks related with keeping livestock in densely populated areas
 - ❖ health risks related with the agricultural use of water and soils that have been contaminated by industry and urban traffic (e.g. heavy metals)
 - ❖ health risks related with the intensive use of agrochemicals
4. Gender and Poverty aspects
 5. Institutional aspects

You and/or your colleague(s) are invited to contribute to this issue of the Urban Agriculture Magazine with an article, further suggestions, description of best (or bad) practices in general, photo's and information on interesting publications, websites, and forthcoming events.

Your article should give a clear description of the experiences gained in practice with certain aspects of the relation between urban agriculture and health, either positive or negative aspects or both. The article should address the policy implications of your experiences and include recommendations for local policy makers and planners. Articles should be written in such a way that those working with farmers could readily understand them.

If you are interested in writing an article, please send a full draft before **1 January 2001**, to:
The Editor of Urban Agriculture Magazine,
RUAf, fax: + 31 33 4940791,
P.O. Box 64, 3830 AB Leusden,
The Netherlands,
ruaf@etcnl.nl

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Photo by Katrien van 't Hoogt



Traditional cisticercosis control

on the weekly market in Punatra, Bolivia

are kept. It does not occur in intensive pig-keeping, where the animals are raised in an enclosed space. The problem arises when the pigs are raised in small-scale extensive systems, where contact between humans and animals is far more intense. Free roaming pigs, in combination with absence or non-use of latrines, are the major conditions under which humans become infected with the tapeworm. These conditions occur most frequently in the marginal rural and urban areas. The infected pigs live in, or can be transported from rural to urban areas. People with a tapeworm in their body move back and forth from rural to urban areas and can infest the waste waters. The possibility of consuming water, or products contaminated with infected human excrement, is far higher in urban than in rural areas. Hence, the control of this parasites requires activities in both the urban and rural settings.

CONTROL METHODS

The control of this parasite is extremely difficult. In the case of pigs it involves for example personal hygiene, waste waters, latrines, meat control, cooking traditions and the way the pigs are kept. Cysticercosis is related to the most burning problems in the world today: poverty in the marginal rural regions, and migration from rural to urban areas. Simply suggesting that the pigs should be locked up does not provide the answer. Although the life cycle of the parasite can be successfully broken by eliminating the contact between human excrements and pigs, this is not that easily achieved. Extensive

pig keeping has been part of rural people's survival strategy for ages, and will continue to remain so.

An interdisciplinary approach is necessary, which involves farmers, representatives from the medical field and the veterinarian/zootechnical field, as well as people from both rural and urban municipalities.

The problem of human infection with cysticercosis is related to the way the pigs are kept

The control methods mentioned most frequently in literature are listed here.
In people: Emphasis is placed on education and general awareness about the zoonosis: the ways to prevent excrement from being deposited in places where pigs can gain access to it; to use latrines and general hygiene measures, especially related to washing hands; to cook or fry all pig meat before consumption; to use an anthelmintic treatment whenever white spots are noticed on excrement. Treatment with iodine or another disinfectant, of raw vegetables and fruits that cannot be peeled, should happen whenever there is doubt about the origin of the food.

For pig keepers: Education and general awareness on the role of pigs in maintaining the life cycle of the parasite; to keep pigs in a separate place; not to use pigs as cleaners of human dirt.

For municipalities: The traditional control methods in the markets are not enough,

they should be complemented and enforced; introduce strict measures related to meat control, especially in backyard slaughtering. Control of the use of waste water.

THE WAY AHEAD

The problem is considerable and the questions arise: who is responsible and who controls? An increased general awareness in both urban and rural settings about the problem may well be one of the keys to this issue, as well as measures from the municipalities. NGOs, school teachers and extension workers should all be well aware of the problem and methods of prevention. Radio programmes can involve women, one of the most important groups where awareness needs to be improved.

An interdisciplinary approach is needed, that includes the efforts of the medical and veterinary scientists, as well as municipalities and farmers' organisations. Government commitment to controlling this disease is also a major factor. As long as the legislative basis for enforcing the work of the veterinary inspectors is lacking, it is not possible to set up a reliable meat control system. Both the ministries of health and agriculture should be involved. The control of cysticercosis is truly a methodological challenge!

Vermiculture

Mini-livestock in Rosario Argentina for organic waste processing

Rosario City in the province of Santa Fe, Argentina is an urban centre of more than 1,200,000 inhabitants. Over 20% of the population live in conditions of extreme poverty. Unemployment and marginality leads them to live in the marginal areas, without adequate sanitary services and under limited social and economic conditions. There are many examples of social welfare interventions which can help to alleviate these conditions of dire poverty.

A project was started in 1991 in the neighbourhood of Empalme Graneros, in Rosario City. It is an area where some 1,300 poor families have built their houses, of different materials, on the banks of the Ludueña stream, which for years has been subject to flooding. The project focused on organic waste recycling for red-earthworm production (*Eisenia foetida*) and vermicompost used as a fertiliser on family and community farms. Vermiculture has a high potential for organic waste degradation, while at the same time providing by-products for immediate and commercial use.

The project was designed as an experiment to set up vermicultural production at the family and community level in urban areas. The aim was to commercialise the production of earthworms, enabling the humus (vermicompost, VC) produced by them to be used as a fertiliser on organic vegetable farms. (Biasatti et al, 1999).

VERMICULTURE

Vermiculture uses the "red Californian" (*Eisenia foetida*) earthworm species as a "biological machine" to metabolise complex compounds and transform them into simpler chemicals and much more stable forms. Two main products can be obtained: earthworm meat and earthworm humus or vermicompost (Schuldt, 1994; Rivero Hernández, 1993). Earthworm meat production offers some commercial opportu-

nities to this social sector where income levels are generally extremely low. Its commercial value is derived from its suitability as fishing bait, and its high protein content makes earthworm meat an excellent supplementary feed source, which can be integrated into farm animal diets, e.g. in poultry feed.

Vermicompost has also become an interesting prospect during the course of the project as it is a high-quality fertiliser, which is stable and has excellent physical-chemical organic fertiliser properties. Its potential has still to be realised in its application to local crops. The conditions for vermicompost production are relatively simple: inputs are low cost, and maintenance requirements are also low.

DEVELOPMENT

The work that has been carried out is part of a urban agriculture community development programme, aimed at providing social training and organization to promote and spread productive activities and self-manageable resources.

Vermiculture training was given to a group involving 50 families. After completion of the training the participants were provided with genetic material, consisting of modules of about 5,000 earthworms together with substrate. Further field training was then given to individuals, family or community groups, and after this

the "pioneer" producers then became the "multiplying agents" of the project.

RESULTS

The project succeeded in obtaining a high degree of training in vermiculture techniques, which enabled family and community earthworm breeding to become well established. Producers were able to earn income from the vermiculture products: fish bait and earthworms for animal feed. The humus produced was used to improve soil conditions where vegetables are grown, both for domestic consumption and for selling. After 18 months, 26 people had been trained, and 15 production modules had been established. There is also continued interest of newcomers to the neighbourhood, who wish to join the enterprise.

Vermiculture has shown to be a practice that is quickly adopted. After adequate training, a first harvest of products was obtained within three months. The work not only provides an opportunity to learn management techniques for a specific animal species but also introduces a practice of integrated resource management. In other city sectors it has been widely adopted on balconies and terraces. In the future this process may contribute to a decrease in the amounts of domestic organic waste for disposal as families process their own waste.

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Photo by M. Dubbeling

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Improved feed

for pig raising in Vietnam



Small
scale
piggery
in Hanoi

Photo by J.B. Schiere

In recent years, as incomes have risen, meat has become a much more important part of the diet in Asia, particularly in urban centres (Pezo et al, 2000). In Hanoi, Vietnam, total meat production increased from 31,000 t in 1997 to 33,000 t in 1999. This production meets only 50% of the total demand of the city and the other half is produced in neighbouring provinces and rural areas (Tinh, 2000). Meat demand is expected to increase to a further 119,600 t by 2010, with 80% of the production coming from peri-urban farmers close to the city market (Anh, 2000).

Pig-raising in urban areas has become important in meeting the growing pork demand. Meat production in Vietnam is constrained by shortages of feed (local or imported). The profitability of the current pig-raising practice of feeding

Meat production in Vietnam is constrained by shortages of feed

farm crops in an unsystematic manner is low. This presents a serious constraint to the farmers, because pigs often provide the only source of cash income.

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Sweetpotato (*pomoea batatas*) is a valuable pig feed: and both roots and leaves can be used fresh, dried or fermented into silage (Woolfe, 1992). It is a common feed for pigs, and other livestock, in many countries in Asia. In Vietnam, feeding sweetpotato roots and vines to pigs, along with rice bran, corn and sometimes cassava roots, is common in the north and central parts of the country.

The main constraints to using sweetpotato vines as pig feed are labour and storage. Regardless of how they are fed to the animals, the vines must first be chopped into small pieces, a daunting and time-consuming task, mainly undertaken by women. If the vines are fed fresh, the women

must allocate time each day for this task, even during the busy field season.

SILAGE OF SWEETPOTATO VINES

Silage offers a potential alternative. Use of vine silage overcomes both main constraints: the women are able to process the vines during the off-season when labour is more abundant, and store the silage for use when feed is limited. Moreover, there is also the economic advantage of processing and storing the vines during the harvest season when they are relatively cheap and feeding them to pigs during the off-season when the vines are expensive. Furthermore, ensiling may increase nutritional value and feed efficiency if it involves a

fermentation process, which converts nitrogen into protein.

A trial with 12 fermented mixtures of sweetpotato vines and various combinations of additives was conducted in a village in Ha Tay Province in the Red River Delta (details are available from the author and will be published elsewhere). The combinations of additives included corn meal, cassava meal, rice bran, and sun-dried chicken manure, all locally available and affordable material. The results showed that fermenting sweetpotato vines with chicken manure increased the crude protein content. However, because high crude protein content does not necessarily guarantee better quality feed (Gerpacio et al, 1967), a subsequent on-farm pig-feeding trial was conducted to examine the effects of sweetpotato vines

lowest cost of feed per unit of gain in weight. In other words, replacing fresh vines with chicken manure-fermented vines will lead to improved growth, but the extent of the growth depends on the combination of the base feed.

It also became clear that, based on the current market price of pigs, farmers would suffer a loss by feeding fresh vines and would make only a small profit by feeding with non-chicken-manure treated vines. The chicken manure treatment would provide farmers with a substantial profit, as well as the highest weight gain.

CONCLUSIONS

Fermentation is a simple process that requires little investment or equipment. Chicken manure is readily available and cheap especially since only small quantities are required. The only equipment needed is a set of scales for weighing the ingredients, and bags for storing the ferment. The chicken manure treatment would provide farmers with a substantial profit, as well as the highest weight gain

among pig farmers in north and central Vietnam where sweet-potato vines are an important component of the pig feed. The Department of Agricultural and Rural Development of the district and organisations at community level should be encouraged to disseminate the information and demonstrate the processing and feeding method to farmers. Instead of encouraging the use of commercial protein supplement, which is mainly imported, favourable conditions should be created for farmers to experiment and use locally available materials to increase the necessary protein for pig feed.

The fermentation method can easily be adopted and adapted by farmers

fermented with chicken manure on pig growth and economic efficiency.

This trial showed that a treatment of the sweetpotato vines with chicken manure achieved the highest feed and dry matter conversion rates (i.e. lowest feed or DM input for per kilo weight gain), and consequently, the

The fermentation method can easily be adopted, or even adapted, by farmers. During the meeting held soon after the trial, forty women showed great interest and enthusiastically copied the suggested method. Along with the profitability, these women considered the labour-saving and storage potential very significant. These results may be disseminated and experimented with widely

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Linking students to urban livestock producers in Mexico City

A model for integrated higher education for training veterinary medical-animal husbandry students is discussed. In this model, students analyse local seasonal foodstuffs and immunisation and parasitism, while learning about marginal livestock producer needs. Both the University and the livestock producing families benefit. The former because it uses local resources, and the latter because they increase their knowledge, and use of foodstuffs, and reduce parasitism and, presumably, public health problems too.

Since 1974 the Autonomous Metropolitan University, Xochimilco Campus (UAM-X), has offered a four-year veterinary medical-animal husbandry degree programme, in which students relate practice to theory. The modular-integrated educational system, or programme-

based-learning research assists teachers to determine areas of knowledge that should be taught and services that professionals will need to offer in the future. Students are made aware of problems and needs of Mexican producers, especially marginal livestock producers. Each academic quarter terminates with student-team presentations in which producers participate. Since the start, other knowledge areas have been incorporated i.e. protection against disease, parasitism and clinical cases on the veterinary medi-

cal-biological side and history, culture and family on the social side.

Mexico City's southern edge is an extensive semi-rural/semi-urban agricultural zone, having a large number of backyard-rooftop family livestock units. Such peri-urban livestock may include varying populations of animals ranging from two to nine animal species per household. Interestingly and despite livestock activity in the marginal sector, neither local, nor national censuses have shown interest in urban livestock producers. This lack of interest is unfortunate as family urban livestock production means self-reliance and support to the general economy. Producers do not beg, do not wait for handouts or subsidies, and hunger is not a menace. Experiences of the training programme

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Photos by E. Arias

have offered opportunities to direct students towards local foodstuffs and also towards theoretical and practical nutritional and anatomical differences in the animals kept in urban areas. Findings showed up to nine animal species per household for self provisioning, sale and special events, which form excellent niches for a variety of forms of training.

Table 1 shows species and purposes for keeping them. The dog, for instance, originally eliminated from the programme because it was not considered a food-producing animal, resulted as an exceptional species because of: i) high family esteem; ii) its role as transmitter of disease. Urban livestock production in the backyard and on rooftops has been character-

ised as inefficient, making little use of modern technology and having little interest in profit. Factors like space, time, protection, family economy, whether the animals are to be consumed or sold, are considered before animals are purchased. Vaccination is rare, only carried out if government deems it necessary to vaccinate all animals within a certain area and against a specific disease. Worming is carried out occasionally and veterinary services are sought only as a last resort. Backyard animals are fed with locally grown feeds, tortillas and other leftovers found to be the most common. Interest lies more in energy than in nutritive value.

The producing family consists of up to three generations, each member having specific farm chores depending on age, gender, and off-farm activities. Plots vary in size from 50 to 200 m² with additional land rented as needed. Where the man of the family is absent, the wife handles both family and farm activities. Livestock production is a family activity keeping family members busy and united until

children get married, and start to earn an income and/or leave the homestead. Formal schooling among adults does not presently exceed primary level, although younger generations are now given opportunities to advance to higher educational levels.

The modular-integrated educational system has made students aware of

The integrated educational system has made students aware

Mexican marginal urban livestock producer needs in Mexico City's southern edge, while being trained in the use of available feedstuffs and future problems the professionals will have to face. Urban livestock families benefited from a continuous university connection and, some, if not all, their questions are responded to.

The educational integrated system is complicated, but worth all efforts, needing nevertheless a balance between teacher and student autonomy, and creativity balanced with a degree of consensus and supervision.

Photographs have been taken by the author of this article and have been exhibited in eleven photo expositions in public and private institutions, as well as in the communities where the students were being trained. To the author the photographs represent an extension of what he has observed, a pedagogical tool so-to-speak to make his students and audiences a little more conscious of a neglected Mexican sector located in the periphery of one the most populous cities in the world.

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Table 1. Findings concerning principle purposes of backyard animal species in Milpa Alta, Tláhuac and Xochimilco, Mexico City's Federal District (1995-2000).

Animal species	Principle purposes
Beef	For sale and/or special family events
Cats	To maintain mice and rat population low
Chickens	The principle food item on the table
Dairy	Sale of milk to supplement daily income and/or family diet
Dogs	Protectors of family members, livestock and the homestead
Donkeys	Transport
Horses	Transport, work, rent-out and sale
Pigs	Fattened for special family events, reproductive stock, sale
Rabbits	Food for the family, reproductive stock and/or sale
Sheep	Fatten for special family events and/or sale
Turkeys	Raised for special holidays and for sale

NEW PUBLICATIONS on Urban Agriculture



You will find here a selection of recent publications on urban agriculture.

A bibliography on urban agriculture, partly annotated, can be found at www.ruaf.org. Please send information on new publications to us.

The next issue will focus on Urban Health. Suggestions and descriptions of related books and articles, are welcome and can be sent to the editor.

VEGETABLE PRODUCTION ON OPEN SPACES IN DAR ES SALAAM: SPATIAL CHANGES FROM 1992 TO 1999

Dongus, Stefan. 2000.

Urban Vegetable Promotion Project : Ministry of Agriculture and Cooperatives (MoA&C) and Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ). 32, 12 p.

This paper can be found at

<http://www.cityfarmer.org/daressalaam.html>

Until recently only estimates have been available about the extent of agricultural open spaces in the urban areas of Dar Es Salaam. The author describes the results of a research project, in which an interesting method was developed using existing maps, other information and Geographical Information Systems (GIS), to assist planners and to provide decision-makers with more accurate data. Aerial photographs dating from 1992 were analysed to identify productive open spaces. The results of this exercise were used as a base for field visits to compare the size and current use. The results then were processed using Geographical Information Systems (GIS), to finally present a full inventory of agricultural open spaces including location and size for planning purposes (RvV).

FARMING INSIDE CITIES: ENTREPRENEURIAL URBAN AGRICULTURE IN THE UNITED STATES

Kaufman, J. and M. Bailkey. 2000

Department of Urban and Regional Planning, University of Wisconsin-Madison

The report investigates the nature and characteristics of 'for-market-city-farming', obstacles to such activities, and ways of overcoming these obstacles. It also offers proponents of urban agriculture suggestions for advancing the cause of city farming in environments where many are either uninformed of the multiple benefits of entrepreneurial urban agriculture disinterested, or sceptical about its durability and longer lasting significance. It describes 70 entrepreneurial urban agriculture projects in cities in the USA, of which 25 are described in detail. Cases in Chicago, Boston and Philadelphia are presented in which the obstacles to entrepreneurial urban agriculture, or 'for-market-city-farming', and ways to overcome this are discussed. The study found both supporters and critics of entrepreneurial urban agriculture. Obstacles to such activities were identified from the interviews conducted. These are discussed under four broad categories - site-related, government-related, procedure-related and perception-related. Among the more prominent obstacles mentioned were site contamination, site vandalism, government and non-profit community development group scepticism, inadequate financing, and staffing problems. Ways of overcoming these obstacles are discussed, based on the possibility that governments at all levels, local and national philanthropic foundations, and community development corporations can offer stronger support for entrepreneurial urban agriculture. Actions are presented that specific groups could initiate to be more proactive towards the nascent movement of for-market urban agriculture (abstract by authors).

FOOD PRODUCTION IN URBAN AREAS

Kwaku Obosu-Mensah. 1999

University of Toronto, Canada. 246 pages. Ordered at Ashgate, www.ashgate.com or info@ashgate.com.

This book explores the emergence of contemporary urban agriculture as well as official attitudes towards it. Using three theoretical models, the author explains which group in Accra, Ghana is more likely to become involved in urban agriculture. In line with this, he explains why, contrary to expectations, in Ghana there are more males than females involved in urban agriculture. The author also addresses issues such as the influence of social inequality and the effects of social networks on urban agriculture. Furthermore, he identifies the problems urban cultivators encounter as city farmers and how they cope with such problems. Finally the author predicts the future trend.

ANALYSING FOOD SUPPLY AND DISTRIBUTION SYSTEMS OF CITIES IN DEVELOPING COUNTRIES. METHODOLOGICAL AND OPERATIONAL GUIDE

Aragrande, M. and Agenti, O: Food into Cities Collection (DT/36-99E), FAO, Rome. It is also available in French and will soon also be available in Spanish.

This document can be freely downloaded from the website:

<http://www.fao.org/ag/ags/agism/sada/pages/dt/dt3699e.htm>

It is estimated that by 2025, between 60 and 85 per cent of the population of developing countries will be concentrated in cities. Urbanisation brings changes in consumption patterns and urban consumers' location. The problem is that the food supply and distribution systems in cities are often poorly organized and inefficient. The situation with regard to food availability and accessibility in cities is growing alarmingly, mainly as a result of increasing poverty levels. The challenge is to improve the efficiency and dynamism of food supply and distribution systems, bearing in mind that the rapidity with which the problems arise and grow calls for quick, effective and concerted action. This guide is aimed at researchers, technicians and administrators concerned with the food security of urban populations. It proposes an interdisciplinary approach.

ach to the analysis of complex food supply and distribution systems, the identification of their present and expected constraints as well as sustainable solutions, and shows how this approach can be used in practical terms. The guide also deals with the preparation of a case study and ends with a framework for formulating urban FSD policies, strategies and action plans. (FAO).

URBAN LIVELIHOODS AND FOOD AND NUTRITION SECURITY IN GREATER ACCRA, GHANA

Maxwell, Daniel et al. 2000. IFPRI Research Report no. 112. 172 p.
International Food Policy Research Institute (IFPRI), 2033 K Street, N.W., Washington, DC 20006-1002, USA

This report is the outcome of the Accra Urban Food and Nutrition Study, a collaborative effort of the International Food Policy Research Institute (IFPRI), the Noguchi Memorial Institute of Medical Research in Accra, and the World Health Organization. It examines the nature of urban poverty and how it relates to food insecurity and malnutrition in Accra, Ghana, especially among children. By exploring the major determinants of food security and nutritional status, it develops indicators that are appropriate in an urban context, identifies vulnerable groups within the city, and suggests policies and programmes to improve the lives of the urban poor. With regard to the importance of urban agriculture in food security strategies of the poor in Accra, the authors found it to be less important than in some other African cities, but it is of critical importance in the peri-urban areas around the city. Agriculture as a source of livelihood is increasingly vulnerable as the city physically expands, destroying farmland. Street vendors in Accra play an important role in food distribution: their role should be acknowledged by city authorities. This major study has important consequences for policy making: governments have to accept the fact that urban poverty is real and must be addressed, especially where vulnerable groups, such as female-headed households, are concerned. (WB - adapted from the original summary).

URBAN FORESTRY IN EUROPE: A COMPARATIVE STUDY OF CONCEPTS, POLICIES AND PLANNING FOR FOREST CONSERVATION, MANAGEMENT AND DEVELOPMENT IN AND AROUND MAJOR EUROPEAN CITIES

Konijnendijk, Cecil C. 1999. University of Joensuu Research Notes no. 90. 182 p.
Faculty of Forestry, University of Joensuu, Finland

Analyses the role of urban forestry in and around 16 cities in 9 European countries, focusing on the conservation, management and development of forests as a central element of urban green structures. There is an interesting section on the emergence of urban forestry in and around cities, revealing the close relationship that always existed between city inhabitants and local forests. The author presents a typology of urban forests setting these apart from forestry at large, by highlighting ownership, location and level of recreational facilities, the latter overriding their importance for wood production. The study specifically examines the existing variety in concepts, policies, programmes, plans, processes, networks of actors, conflicts and problems related to urban forests. The rapidly changing and often conflicting demands on urban forestry in Europe place considerable pressure on urban forest planners and managers. To meet these challenges, the author argues, an innovative mix of policy and management approaches is required, including an emphasis on extension and social participation. (WB - adapted from original summary)

BRIEFING GUIDE FOR MAYORS, CITY EXECUTIVES AND URBAN PLANNERS – FOOD FOR THE CITIES. FOOD SUPPLY AND DISTRIBUTION POLICIES TO REDUCE URBAN FOOD INSECURITY

FAO (2000): *Food into Cities Collection (DT/43-00E)*, FAO, Rome

Also available in French, Spanish and Arabic and can be freely downloaded from the website:

<http://www.fao.org/ag/ags/AGSM/SADA/pages/dt/dt4300e.htm>

This guide is intended to brief mayors, city executives and urban planners, including specialists in food production, market development, public health, environment, forestry and agroforestry on the compelling need for food supply and distribution policies and programmes. These would lower the cost of access to food for low-income households in their cities and stimulate private investment. It reviews the role of city and local authorities in food supply and distribution at regional, metropolitan, urban and local level and outlines the key steps for the formulation, implementation and monitoring of required interventions. This guide stresses the need for a proper understanding of local conditions, an interdisciplinary, intersectoral and participatory approach to finding sustainable solutions, forecasting urban food security and collaboration between institutions and organizations. The direct involvement of the private sector is essential for sustainable planning decisions. (FAO).

ACHIEVING FOOD AND NUTRITION SECURITY IN THE DEVELOPING WORLD

Garrett, James L.; Ruel, Marie T. (eds). 2000. 2020 Vision, Focus 3

International Food Policy Research Institute (IFPRI), 2033 K Street, N.W., Washington, DC 20006-1002, USA. Collection of 10 loose sheets.

If you would like to receive a hardcopy of the collection of briefs, contact Jenna Kryszczun at j.kryszczun@cgiar.org.

A collection of ten 2-page policy briefs on a number of hot topics in connection with urban food security, presented in a convenient format. A few figures to map the importance and timeliness of this topic: by 2020, the number of people living in developing countries will grow from 4.9 billion to 6.8 billion. Ninety percent of this increase will be in rapidly expanding cities and towns. More than half of the population of Africa and Asia will live in urban areas by 2020. More than three-quarters of Latin Americans already do. This rural-urban migration will go hand-in-hand with a growth in urban poverty and urban food insecurity, as is already apparent from the increase in the urban proportion of malnourished children. (WB)

URBAN FARMERS IN NAKURU, KENYA

Foeken, D. W.J. and S.O. Owuor. 2000. *ASC Working Paper 45/2000. Afrika Studie Centrum, Leiden The Netherlands and Centre for Urban Research, Univeristy of Nairobi, Kenya.*

This report, on which an article in this Magazine is based, contains the result of a general survey, carried out in 1999, on farming practices performed by the inhabitants of Nakuru Town. The survey is the first part of a larger research project on farming by urban dwellers in Nakuru. Major objectives were to collect basic data on farming and provide the Municipality of Nakuru with adequate information. (Abstract from the publication.)

LIVESTOCK AND THE ENVIRONMENT : FINDING A BALANCE

Haan, Cees (de); Steinfeld, Henning; Blackburn, Harvey 1997. 115 p. *Food and Agriculture Organization of the United Nations (FAO); United States Agency for International Development; World Bank*

This report, and the accompanying booklet, list findings of a multi-donor study co-ordinated by the FAO on livestock-environment interactions conducted between 1994 and 1996. Within the framework of the study, a number of activities were launched dealing with information gathering and exchange focusing on environmental hotspots, and with the provision of decision-making support. (WB)

UNRULY URBANISATION ON DELHI'S FRINGE : CHANGING PATTERNS OF LAND USE AND LIVELIHOOD

Bentinck, Johan. 2000 190 p. *Netherlands Geographical Studies. ISBN 90-367-1260-2. ISSN 0169-4839.*

This thesis discusses changes in land use, the actors related to the land use, the changing employment and income situation for the village residents and the quality of the living environment. The influence of the incorporation of villages in the city is demonstrated through a case study. The strong dynamics of the land use pattern are characteristic of the rural urban fringes of metropolises such as Delhi. (NB)

FARMING IN THE CITY OF NAIROBI

Dick Foeken & Alice M. Mwangi. 1998. *Leiden: African Studies Centre, ASC Working Paper 30. Also available on the website of the African Studies Centre (<http://asc.leidenuniv.nl>)*

An overview of urban agriculture in Nairobi, based on all the studies that have been carried out to date (45 pp).

SELECTED PUBLICATIONS on Urban Livestock

PEOPLE AT THE CENTRE OF URBAN LIVESTOCK PROJECTS

Meares Cohen, Alison. 1999. In: *For hunger-proof cities : sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 90-94. ISBN 0-88936-882-1 : CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9*

Promoting urban agriculture is an important means of ensuring sustainability of regional community food security and human settlements. Too often the focus is exclusively on technology and agricultural production methods. In its urban animal-agriculture initiative in Chicago, Heifer Project International promotes a method of participatory development that enables low-income neighbourhood groups to reach beyond the goals of beautification and environmental improvement and become a vehicle for social and economic development in their communities. The elements of this model include the interdependence of the landscape and lifescape, full participation of intended beneficiaries, values-based planning, and "passing on the gift". When approached as a vehicle for community development, urban agriculture can bring multiple benefits: economic benefits, by providing opportunities to earn income; educational benefits, by teaching technical and job skills; environmental benefits, and, finally, empowerment. (Abstract adapted from original)

PERI-URBAN LIVESTOCK PRODUCTION SYSTEMS IN SUB-SAHARAN AFRICA

Smith, O.B., and E.A. Olaloku, 1999. *IDRC, Dakar, Senegal, ILRI, Addis Ababa, Ethiopia. http://www.idrc.ca/cfp/rep24_e.html*

This paper presents statistics that demonstrate the importance of the currently expanding urban and peri-urban livestock production sector. It suggests that the observed growth is a response to market demands arising from rapid urbanization. A variety of urban and peri-urban livestock production systems are described, and technical, institutional and policy related constraints responsible for the less than optimum performance of the systems as well as opportunities for alleviating the constraints are reviewed. The authors conclude that the many peri-urban livestock production systems contribute substantially to meeting the specialised food requirements of city dwellers, and have the potential to contribute to meeting national food security goals. (IDRC)

LIVING WITH LIVESTOCK IN TOWN: URBAN ANIMAL HUSBANDRY AND HUMAN WELFARE

Waters-Bayer, Ann 1995. 9 p. *ETC International, PO Box 64, 3830 AB Leusden, the Netherlands*

Small-scale raising of animals by families inside cities is often ignored or even forbidden. However, urban livestock keeping is more widespread than most city authorities would like to admit. It consists mainly of low-input production of poultry, small ruminants, pigs, rabbits, guinea pigs or milk buffalo or cattle, usually indigenous breeds. With deteriorating economic conditions and rapid urbanization, small-scale urban farming, including animal husbandry, is being practised by a growing number of families in all income groups in the tropics. An indication of growth trends, a classification of the various types of

livestock systems and an outline of the functions of livestock for urban dwellers and for cities as a whole are presented, as well as problems associated with urban livestock. Lastly, suggestions for action to improve animal husbandry and human welfare in cities to be taken by government and development agencies are provided. (NB - abstract adapted from original)

LIVESTOCK PRODUCTION IN PERI-URBAN AREAS OF AFRICA: an analysis of Dar es Salaam, Mwanza and Shinyanga, Tanzania

Sumberg, James. 1996. 79 p. Overseas Development Group, School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK

Describes and characterises livestock production in and around urban areas in Tanzania, focusing specifically on dairy, broiler and egg production. Contains a bibliography with nearly 450 references. The enclosed paper critically examines the large number of publications extolling virtues of urban agriculture for urban food security and poverty reduction. The authors stress the importance of rural-urban linkages in resource and output markets. At the same time, they issue a warning against attaching exaggerated weight to the contribution of urban farming to food security of the majority of urban dwellers. Very detailed, very sound and very complete. (WB)

SUBURBAN LIVESTOCK REARING BY SMALLHOLDERS IN THE BACKYARDS OF XOCHIMILCO in the south-east of Mexico City as an important strategy for sustainable urban agriculture

Losada, Hermenegildo [et al.] 1999. <http://www.cityfarmer.org/livestock.html>, 8 p. Department of Biology of Reproduction, Universidad Autónoma Metropolitana, Iztapalapa, Mexico

Describes backyard poultry and pig keeping in the suburban area of Xochimilco, Mexico City. Motives for rearing animals are mainly subsistence and money saving for emergency expenses. In the case of pig raising this is also done to supplement the household budget. Animal feed is based on household waste, stale tortilla, alfalfa and other feeds. The number of pigs kept ranges from 1-5 and the number of chickens from 1-50. (NB)

PERI-URBAN LIVESTOCK SYSTEMS; PROBLEMS, APPROACHES AND OPPORTUNITIES

J.B.Schiere, Ventana Agricultural Systems A&D. FAO (Rome) and International Agricultural Centre (IAC). Wageningen. The Netherlands

Some ten years ago the FAO saw the need to base livestock development on differences between production systems. One such a system was the peri-urban livestock system and case studies were commissioned in places ranging from Ho-Chi-Minh City, via Karachi and Dar-Es-Salaam to Quito and Mexico City. This report reviews information from those case studies, additional references and interviews with consultants. It suggests ways to classify the systems and their problems, it explains the rationale behind peri-urban livestock systems and it distinguishes between so-called linear and non-linear approaches to deal with the issues. Linear approaches focus on "average" solutions and disciplinary concerns (public health, efficient meat production, direct quality control of the produce etc.). Non-linear approaches stress variation between stakeholders and production systems, as well as the multiple goals of livestock, particularly in small systems. The report stresses that many simple technologies are available for the benefit of urban livestock keepers and that small- to medium-scale systems are likely to be important in urban agriculture for some time to come. Setting of policies and priorities in urban livestock development for the long term has to recognise differences between systems and a broader function of livestock than only for food production. (Abstract by the author)

LIVESTOCK PRODUCTION IN PERI-URBAN URBAN AND DENSELY SETTLED RURAL AREAS IN SUB-SAHARAN AFRICA : A BIBLIOGRAPHY

Scott, James; Okali, Christine 1993. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK

Contains 45 annotated references ranging from studies of particular livestock enterprises and comparative studies of the involvement of different pastoral groups in markets to historical and systems studies of urban centres and their hinterlands. The aim was to identify research needs of particular types of livestock systems. (WB)

URBANISATION: VETERINARY PUBLIC HEALTH CONSEQUENCES. PROGRAMME AND ABSTRACTS OF THE 7TH ANNUAL SYMPOSIUM OF THE TROPICAL ANIMAL HEALTH AND PRODUCTION GROUP

Edited by J.H.A. de Gooijer and R.W. Paling. Faculty of Veterinary Medicine. Utrecht. The Netherlands.

This symposium was organised at least a few years before the present surge regarding the role of livestock in urban food production. The papers show, however, that the concern about animal and human health aspects of livestock around human settlements is not new. In that, predominantly veterinarian, tradition the emphasis of the publication is very much on technical aspects regarding epidemiology of diseases and parasites that occur between men and animals. The range of topics includes issues such as the use of various animal products and installation of slaughterhouses. Little information is given however, on the organisational and institutional aspects of these issues. Still, the booklet provides a nice introduction to the more general issues regarding veterinary and human health aspects in urban agriculture. (JBS)

THE CATTLE OF CHITUNGWIZA : CONFLICTS ON THE RURAL-URBAN FRINGE

Mbiba, Beacon M (1994). In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 22-23. Mexico City : DDF. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe

Expanding cities are engulfing farmland without providing alternative land for the displaced rural people, often peasants without land titles. Herders continue to use the spaces not yet built on, the "city commons", but many residents do not appreciate the presence of cattle. Beacon Mbiba looks at this potentially conflictual situation in urban Zimbabwe. (ILEIA)

Many websites can be found on the subject of urban agriculture. Here you will find only a view of them with a short description. For comments and suggestions, please write to us.

Food into Cities

www.fao.org/ag/sada.htm

The website of FAO's initiative for 'Food Supply and Distribution to Cities' contains information about ongoing and planned activities and opportunities for collaboration and sponsorships. It contains the Food into Cities Collection, which provides free access to technical papers, studies and workshop reports.

Cityfarmer

<http://cityfarmer.org/germanCfarms.html> and

<http://www.bdja.org/oli> describes German children's city farms and playgrounds in Europe and how they contribute to sustainable urban development.

<http://cityfarmer.org/ibsrarn.html#ibsrarn>

This page contains a description of the IBSRAM project Municipal Organic Waste Recycling for Urban and Peri-urban Agriculture in Africa and Asia. It introduces the issue of recycling of organic waste to reduce the environmental pollution potential, increase the lifetime of landfills, and close the rural-urban nutrient cycle. The IBSRAM projects in Africa and Asia will address the knowledge gap on the amounts, quality, and availability of the different organic wastes to recommend location-specific (composting) technologies that match the requirement and ability to pay of different urban and peri-urban farming systems. They are part of IBSRAM's network project 'Management of regional nutrient balances through peri-urban agriculture (see also www.ibsrarn.org)

Seminar municipal waste

<http://www.maxpages.com/execlub>

The Economics Club and The Institute for Andean Studies describe here the Andean 2000 International Seminar held in the city of Santa Cruz, Bolivia, in September 2000. The Seminar focused on the most important aspects of municipal waste disposal, environmental services, eco-technology and entrepreneurship.

Pacific Edge, Permaculture & Media

www.magna.com.au/~pacedge

This is the address of the Pacific Edge, Permaculture & Media website. It contains lots of information on courses (organic agriculture, permaculture), events and networks. Pacific Edge is a small partnership organisation and provides permaculture education, design consultancy and media services in Australia, and has initiated work on urban agriculture.

PRONATUR

<http://138.100.116.150/index.htm>

This site (in Spanish) gives information on the Spanish organisation PRONATUR, for the Promotion of Urban and Rural Natural Improvement (Sociedad Española para la Promoción de la Naturación Urbana y Rural), including the declaration of the International Seminar on Urban Architecture and Natural Improvement.

Urban Waste Expertise Programme

<http://www.waste.nl/publ.htm> UWEP is the Urban Waste Expertise Programme, a six-year research and pilot project programme (1995-2001) on urban waste in the South. The most recent publication published under the UWEP Programme covers linkages between stakeholders. It is based on research into the role of the various actors in waste management. Most UWEP publications are accessible electronically, through the WASTE website. UWEP also publishes an e-mail bulletin. You can access, send your comments, enquiries, orders for back issues and suggestions for other organisations to e-mail: alris-seeuw@waste.nl

Community Food Security Coalition

<http://www.foodsecurity.org/>

The Community Food Security Coalition (CFSC) is a non-profit, membership-based national coalition of over 600 organizations and individuals focusing on food and agriculture issues. The mission of CFSC is to bring about lasting social change by promoting community-based solutions to hunger, poor nutrition, and the globalisation of the food system.

Peri-Urban Interface Project

<http://www.ucl.ac.uk/dpu/pui/>

Information here on the Peri-Urban Interface Project of the Development Planning Unit of the University College London. This research project, funded by Dfid, aims to identify key components and principles of a strategic approach to planning and managing environmental dimensions of the rural-urban interface, to benefit the poor. Dissemination will be particularly directed at overcoming the difficulties of applying new knowledge experienced by institutions positioned to plan and manage rural-urban links.

IFPRI Policy Briefs

<http://www.ifpri.org/2020/focus/focus03.htm>

For the complete Policy Briefs on Urban & Periurban agriculture, food security and nutrition: Achieving Urban Food and Nutrition Security in the Developing World, a collection of 10 briefs edited by James L. Garrett and Marie T. Ruel. August 2000 (see elsewhere in this issue).

Tree City Initiative

<http://www.treecity.de/>

To address the increasing needs for development and improved management of urban forests in developing countries, the following three organizations formed the Tree City Initiative in 1995: GWB (Society for Forest Conservation and Management), Hesseneck/Germany; Institut für Baumpflege (German Institute for Arboriculture), Hamburg/Germany; and the International Institute for the Urban Environment, Delft, the Netherlands

INTERNATIONAL CONFERENCE ON NATURE CONSERVATION IN BIG CITIES

Prague, Czech Republic, 27 August to 1 September 2000
For more information contact the Conference Organisation:
Tel.: + 420 2 8306 9291,
Fax: + 420 2 2251 7144,
e-mail: nemec@nature.cz

Organised by the Czech Union for Nature Conservation in cooperation with the Municipality of Prague, the Ministry of the Environment and the IUCN this conference was held in framework of the "Europe: a Common Heritage" campaign organised by the Council of Europe. Sessions at the conference were on: Plant and Animal World in Towns; Nature Management; Cultural Landscapes; Education and Public Participation. A wide spectrum of conference materials was presented, including the book 'Protected areas of Prague' (in Czech) and a CD ROM with descriptions of nature trails, natural parks and other natural phenomena of Prague (in English). The conference proceedings will be published on CD ROM.

SIUPA, URBAN HARVESTS

Workshops in Nairobi, Kenya, October 31 – 4 November
More Information: Gordon Prain, SIUPA Co-ordinator.
Tel: +51 1 349 6017,
Fax: +51 1 317 5326,
Email: g.prain@cgiar.org

The Strategic Initiative on Urban and Peri-Urban Agriculture (SIUPA) was launched in 1999 by the CGIAR group (see no. 1 of the UA Magazine). In collaboration with national and international efforts, SIUPA is establishing regional sites, a set of research activities collectively known as Urban Harvest. A first stakeholder meeting linked to the Action Plan

Development Workshop, was held in Hanoi, Vietnam in June 2000. A similar workshop is held early November in Nairobi, Kenya. In addition to the exchange of information, the establishment of a pilot site in East or Central Africa was discussed.

MAKING CITIES LIVABLE CONFERENCE

San Francisco, USA, December 13-17, 2000
Savannah, USA, March 4-8, 2001

The International Making Cities Livable Conferences were founded in 1985, and are held biannually in the United States and Europe. They are unique in enabling city officials, architects, planners, developers, community leaders, behavioural scientists, artists and others responsible for the liveability of their cities to exchange experiences, ideas and expertise. Discussions at the IMCL Conferences, therefore, range from architecture appropriate to maintaining a city's identity, to urban design features conducive to public life, to the description of festivals that energise and unite communities.

For more information see:
<http://www.livablecities.org/conferences.htm>

FOOD SECURITY OF URBAN AND PERI-URBAN SYSTEMS IN DEVELOPING COUNTRIES

Vienna, Austria, November 15 - 18, 2000
More information: Conference Secretariat, Gregor Mendel Strasse 33, A - 1180 Vienna, AUSTRIA,
Tel.: +43 1 47654 3103,
Fax: +43 1 478 9110
E-mail: foodsec@edv1.boku.ac.at, or <http://www.boku.ac.at/foodsec/introduc.htm>

This international conference is a follow-up of an international conference on 'Food

Security' held during the General Assembly of the International Council for Science (ICSU) in Cairo/Egypt in September 1999. Results will be discussed of scientific and technological research on food security of urban and peri-urban systems in developing countries. Research results of case studies in Cairo, Egypt, Chennai, India and Kathmandu, Nepal, and further results from other scientists projects will be presented. Four topics will be discussed:

- ❖ Sustainable food production;
- ❖ Food technology;
- ❖ Food markets and economy;
- ❖ Food safety.

FIRST REGIONAL COURSE ON FOOD AND NUTRITION SECURITY IN URBAN AREAS

Harare, December 4-16, 2000

This course will be organised by the Institute for Food, Nutrition and Family Sciences (IFNFS), University of Zimbabwe in Harare in collaboration with the International Agricultural Centre (IAC), Wageningen, The Netherlands. The course objective is to provide participants with current insights into the nature and extent of urban food and nutrition problems, ways to assess and analyse, and examples of interventions, specifically focusing on the situation in Sub-Saharan Africa. A case study / field work in collaboration with Harare City Council will be included in the course, and course facilitators will be regional with an emphasis on the region. The course language is English. Participants are mid-career professionals, preferably working in the urban environment, in the field of food security and nutrition or a related field. They should have an academic degree (at least BSc), be proficient in the English language, and have a minimum of 2 years of profes-

sional experience.

For further information, contact the IAC at iac@iac.agro.nl or the project co-ordinator in Zimbabwe. Strengthening Food and Nutrition Training in Southern Africa Institute of Food, Nutrition and Family Sciences, University of Zimbabwe, PO Box MP 167, Mount Pleasant, Harare, Zimbabwe Phone: +263 4 303 211 ext. 1413/1993 Fax: +263 4 333 407/ 335 429, Email: root@foodsci.uz.zw

INTERNATIONAL COURSE ON FOOD SECURITY AND NUTRITION IN URBAN AREAS

Wageningen, the Netherlands April 1-14, 2001

This course will be organised by the International Agricultural Centre (IAC), Wageningen, in co-operation with Wageningen Agricultural University.

The course objective is to provide participants with current insights into the nature and extent of urban food and nutrition problems, ways to assess and analyse, and examples of interventions. The course language is English. Participants are mid-career professionals from developing countries, preferably working in the urban environment, in the field of food security and nutrition or a related field. For more information (also for application): Email: training@iac.agro.nl or Internet: <http://www.iac-agro.nl> raquelrp@sfsu.edu.

SUB-REGIONAL EXPERT CONSULTATION 'URBAN AND PERI-URBAN HORTICULTURE IN SOUTHERN AFRICAN COUNTRIES'

Stellenbosch, South Africa, January 16-17, 2001

In January 2001, the University of Stellenbosch, Cape Town, South Africa under the auspice-

es of the Food and Agricultural Organization (FAO) of the United Nations will be hosting a Southern African Sub-Regional Expert Consultation Meeting on Urban and Peri-urban Horticulture. This consultation will bring together Southern African scientists and researchers to review and analyse opportunities and constraints related to urban and peri-urban horticulture. The participants at the expert consultation meeting will include representatives from South Africa, Namibia, Zimbabwe, Botswana, Swaziland, Tanzania, Mozambique and Malawi. They are expected to prepare and deliver country background papers detailing the status of urban agriculture in their respective countries. All participants are expected to submit a CV and a short résumé of their presentations to the address below as soon as possible.

For further information please contact Ms Lizl Hobson:
Email: lhob@akad.sun.ac.za,
Phone: +27 21 808 4753,
Fax: +27 21 808 5670

REGIONAL SEMINAR 'FEEDING ASIAN CITIES' Bangkok, 27 to 30 November 2000

This Seminar is organised by FAO, the Association of Food Marketing Agencies (AFMA), and CITYNET, in collaboration with the International Union of Local Authorities (IULA). The organisation of this Seminar is part of the information and sensitisation effort carried out by FAO and other partners, on the consequences of the rapid growth of Asian cities and the associated increase in the number of urban households living in poverty. The objectives of this seminar are:

- ❖ Identify major food security challenges in feeding Asian cit-

ies and the role that City and Local Authorities can play;

- ❖ Prepare a plan of action for the next ten years;
- ❖ Facilitate South-South and North-South collaboration and technical assistance partnerships.

This seminar is especially aimed at mayors, city executives and senior staff of municipalities and local authorities as well as for central government institutions which are directly or indirectly concerned with urban food security.

Details of this event can be found on the website:
<http://www.fao.org/waicent/faoinfo/agricult/ags/-agsm/sada/asia/index.htm>

REQUEST FOR PAPERS ON URBAN AGRICULTURE

The Annual Meeting of the American Sociological Association will be organised by the San Francisco State University and will be held in Anaheim, California, August 18-22, 2001. One session is

entitled "*Urban Agriculture in Cities of the Future*", and will be chaired by Raquel Rivera-Pinderhughes. Papers on the theme "Urban Agriculture in Cities of the Future" are requested for review for presentation at the meetings, and can be sent before January 10th, 2001 to raquelrp@sfsu.edu

WORKSHOP ON URBAN AND PERI-URBAN AGRICULTURE IN SOUTH- EAST ASIA Planned for May 2001

The International Board for Soil Research and Management (IBSRAM) would like to get in touch with potential participants from S-E Asia who are interested in participating in the planned 'state-of-the-art-workshop', and anticipated Consortium on Urban and Peri-Urban Agriculture (UPA) in S-E Asia. The focus of the workshop/consortium will be 'Restoring the Rural-Urban Nutrient Cycle through Peri-

Urban Agriculture'. It is intended to bring together major stakeholders involved in related Research and Development. The workshop will review and analyse country reports on the status quo of UPA and organic waste recycling and identify bottlenecks concerning research/education/awareness and interdisciplinary collaboration in these areas from different national perspectives. Concerned participants are kindly requested to send (short) information on their institutions and subject related activities (please no attachments larger than 500 Kb.) to: Pay Drechsel, Research Coordinator, International Board for Soil Research and Management (IBSRAM), Africa Office c/o KN-UST, Kumasi, Ghana
Tel/Fax: +233 51 60206,
email: ibsramp@africaonline.com.gh This announcement is also posted at: www.ibsramp.org; www.cityfarmer.org/-ibsramp.html

ELECTRONIC CONFERENCE AND INFORMATION MARKET: URBAN AND PERI-URBAN AGRICULTURE ON THE POLICY AGENDA

*Moderator reports will be posted at the end of November 2000.
Please check <http://www.ruaf.org>*

This conference was organised by the interdepartmental Working Group on Urban and Peri-Urban Agriculture of FAO, Food for the Cities (FFC) and the Resource Centre for Urban Agriculture and Forestry (RUAF), ETC, and focused on three themes:

- ❖ Urban and Peri-Urban Agriculture, Food Security and nutrition
- ❖ UPA, Health and the Urban Environment
- ❖ UPA and Urban Planning

On the RUAF-website you will find the Information Market where all contributions of the participants and other articles of interest are posted.

OPEN DISCUSSION ON TRAINING NEEDS NRI, August - September 2000

The discussion on 'Training Needs in Urban Agriculture' is hosted by the Natural Resources Institute (NRI) as a contribution to the Electronic Conference 'Urban and Peri-Urban Agriculture on the Policy Agenda' referred to in this section. The purpose of this forum is to enable participants to share information about their ongoing training activities, and contribute their assessment of needs for training in issues related to urban agriculture. A discussion paper 'Urban Agriculture and Training Needs', by Sabine Gündel and John Butterworth is available on the RUAF website as well as that of NRI: <http://www.nri.org/E-Conf/> The recommendations will be published soon on this site.

PARTNERS

AMENDMENT: FAO PROGRAMME ON URBAN AGRICULTURE

We received clarification on earlier news on FAO activities related to Urban Agriculture from Mr. O. Argenti, Co-Secretary of the Interdepartmental Working Group 'Food for the Cities'. The term Food for the Cities Programme, used throughout the magazine, is actually the title of the Interdepartmental Working Group. There is no programme in FAO with that title. The possible confusion may be due to the fact there are a number of similar titles around at FAO. These are: Meeting Urban food Needs, Food Supply and Distribution to Cities; and Food into Cities.

Meeting Urban Food Needs is a project of the Agriculture Support Systems Division of FAO. Information can be obtained from the project manager: E-mail: richard.roberts@fao.org The FAO initiative for Food Supply and Distribution to Cities started in 1995, and was referred to in the past as the 'Interregional Programme Food Supply and Distribution to Cities'. Under this initiative FAO provides assistance to city and local authorities in developing countries and countries in transition to alleviate urban food insecurity through institutional strengthening to enable city and local authorities to formulate urban policies and programmes for the development of food supply and distribution systems at urban, metropolitan and regional levels. It now forms part of the 'Meeting Urban Food Needs' Project. The Focal Point of this initiative can be reached at e-mail: sada@fao.org or you may visit: www.fao.org/AG/SADA.htm

FONSAG MAGAZINE ON URBAN AGRICULTURE

The FONSAG Magazine is a quarterly publication of the network 'Forum on Sustainable Agriculture, FONSAG', based in Gaborone, Botswana. FONSAG, Volume 3, Number 3 will focus on Urban Agriculture. The editor requests articles for this issue, due in December 2000. You can send your comments and articles to: Kevin George, Information Officer, Forum on Sustainable Agriculture, P/Bag Bo 136. Gaborone. Tel: +267 307 506, e-mail: fonsag@global.bw.

REGIONAL NETWORK IN WESTERN AFRICA

The African Urban Management Institute (IAGU) is an international NGO based in Dakar (Senegal) specialised in training, action research and technical support to African municipalities in urban planning and management. IAGU is currently coordinating an African regional network on urban and peri-urban agriculture (UPA) and is presently conducting a joint research project in seven countries (Ivory Coast, Senegal, Niger, Burkina Faso, Mauritania, Mali and Benin). The network was created with the support of IDRC (International Development Research Centre) during the second semester of 1999. Its main objective is to promote durability of urban and peri-urban agriculture in sub-Saharan Africa. This project is supported by IDRC and UMP and scheduled for three years: from July 2000 to June 2003. The expected results of this research/consultation project are:

- ❖ Evaluation of UPA contributions to sustainable urban development;
 - ❖ Identification of constraints through the profiles and case studies;
 - ❖ Reinforcement of the dialogue, exchange and partnership between stakeholders;
 - ❖ Municipal Actions Plans to raise institutional constraints that face UPA.
- IAGU has agreed to become the Regional Focal Point on Urban Agriculture in Western Africa for the RUAF Programme. More information: Ndèye Fatou Diop Gueye, African Urban Management Institute (IAGU), Tel : +221 824 44 24, Fax : +221 825 08 26, e-mail : iagurrs@enda.sn (or: iagu@cyg.sn)

MUNICIPAL DEVELOPMENT PROGRAMME FOR EASTERN AND SOUTHERN AFRICA

The Municipal Development Programme for Eastern and Southern Africa (MDP-ESA), has operated since 1991. The Programme is currently in its third phase, and aims to enable and support decentralisation, strengthen the capacity of local governments to deliver services and ensure development at local level as a vehicle for improving the quality of life of local communities. The Programme is currently in its 3rd phase 1998-2000. MDP has activities on policy research and governance, training and capacity building,

information exchange and networking and gives direct support to municipalities. It is cooperating with IDRC in urban agriculture related research and governance activities, and coordinates the programme on Strengthening Civic participation in Municipal Governance in ESA.

MDP has agreed to become the Regional Focal Point on Urban Agriculture in Eastern and Southern Africa for the RUAF Programme.

MDP will, among other activities, provide information services to inform city authorities, urban planners, farmers, consumers and NGOs, technical support organizations and other stakeholders on urban agriculture.

More information can be obtained with. Mr. Shingirayi Mushamba, Municipal Development Programme for Eastern and Southern Africa, Tel: +263.4.724356/774385, Fax: +263.4.774387, Email: region@mdpesa.co.zw, Website: <http://www.mdpesa.co.zw>

THE URBAN AGRICULTURE NETWORK, WESTERN PACIFIC NETWORK

The TUAN (the Urban Agriculture Network) has an office in Australia for the Western Pacific Network. The news from this network will be published in Practical Hydroponics & Greenhouses Magazine, a six-times-a-year magazine, starting early 2001. Practical Hydroponics & Greenhouses Magazine has a global circulation of about 12,500, of which half of the subscribers are in Australia, New Zealand, Pacific Islands and S-E Asia. More information on the Network and the Magazine can be obtained from Geoff Wilson, 359 Broadwater Rd, Mansfield Queensland 4122, Australia. Tel: +61 7 3349 1422 Fax: +61 7 3343 8287

AGUILA-MEXICANA

Mexican National Network on Urban Agriculture has started. As part of the Latin American Network on Urban Agriculture AGUILA, the Mexican National Network has been officially launched under the name "Red mexicana de agricultura urbana" General Co-ordinator is Francisco Arroyo. For further information, please contact farroyo@laneta.apc.org

Reaction on the Urban Agriculture Magazine No. 1

The enthusiasm on the appearance and set-up of the UA-Magazine in the letter underneath, reflects most reactions we received on the first issue.

"With great interest I have read the first issue of the UA Magazine. I congratulate all involved with the result. It clearly depicts the importance and at the same time the complexity of urban agriculture.

After reading the articles and also the planned contents of the issues to follow, I see a distinct emphasis on planning, policy formulation and inter-sectoral approaches. What I don't see emphasised is the place and function of the private sector and/or private economic activities. I am especially interested in the question where land development companies and private banks can or should play a role in the development of UA activities. I refer to the following questions/issues:

❖ *Are there also cost effectiveness or commercial reasons, aside those mentioned for pursuing UA as a complement to national food supply (see article UA as a response to crisis?)*

❖ *How do you see the place of land development companies? Are cost-benefit analyses of different types of land use applied?*

❖ *What determines better access of urban farmers? I think the perception of economic profitability is for urban farmers essential in addition to providing supporting services to them. Not only the recognition of the authorities should count (article on livestock), but also the economic potential and gains urban livestock has and can generate.*

❖ *The article on St. Petersburg reflects very well how in post-communist Russia is built on the former USSR-practice to have small private plots for generating extra family income. I feel that especially commercialisation and small enterprise development could have been more highlighted.*

So far my comments, I very much appreciated the set-up and content of the Magazine and I am looking forward to the next issues.

Warm regards, Eric Kamphuis
Programme Support Group, Sri Lanka
Email: psg@sri.lanka.net

UA MAGAZINE Subscription Policy

So far the UA-Magazine has been sent to you for free, and we will continue to do this until we have developed a subscription policy with the RUAF partners.

To cover expenses made for production and charges of the hardcopy, but also to support the development of regional versions of the UA-Magazine, we have proposed to introduce paid subscriptions. Most of you indicated to support us with this policy, in the questionnaire you sent to us, and to be able and willing to pay a yearly subscription on the hardcopy version of the UA-Magazine of Euro 15,- or US\$ 15,-.

Of course, the Internet version (at www.ruaf.org) will continue to be available free of charge.

We are currently investigating arrangements for local currency and/or regional payments, to facilitate payments without heavy bank charges. During the RUAF partner meeting in November 15-17, regional ideas and options for an optimal system will be discussed. We will inform you on this in the next issue. As long as this issue is not clear for the different regions, you will receive the UA-Magazine for free. Meanwhile, you can continue to send us feedback and new contacts.

Regards
The Editor.



URBAN AGRICULTURE MAGAZINE

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October 2000

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The UA-Magazine is published 3 times a year, and is also available on: www.ruaf.org. In the future, the UA Magazine will be published in French and Spanish, and distributed, possibly in separate editions, through regional networks.

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