LIVESTOCK AND THE LIVELIHOODS OF THE URBAN POOR:
A Background Document

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INTRODUCTION

It has been currently estimated that one half the world's population now lives in urban areas. Further, virtually all of the world's population growth between 2000 and 2030 is expected to be absorbed by urban areas (UN 1999). These trends have implications for the nature and distribution of world poverty, which is becoming an increasingly urban phenomenon. It has been suggested that in the light of urbanization the access of urban populations to food, in terms of both availability and affordability, will be crucial to the future sustainability and political stability of cites in the developing world (Binns and Lynch 1998). Food security is one dimension of urban poverty, others include income, living conditions, health and education (World Bank 2001). International donors and development agencies have pledged to reduce world wide poverty, and it is against the backdrop of urbanization and urban poverty that the literature on urban livestock keeping is reviewed. Keeping livestock in urban areas can improve the food security and nutrition of the urban poor (Sansoucy, Jabbar et al. 1995; Gertel and Samir 2000). Livestock can also be a means of diversifying livelihood opportunities for the urban poor (Güendel 2002). Urban livestock may also represent an investment opportunity and be of social value to the keeper (Schiere and Van der Hoek 2001). At a city level livestock can contribute to the resilience of urban communities in times of crisis and provide urban consumers with fresh livestock products (Schiere and Van der Hoek 2001). Livestock may also contribute to a more healthy city environment through waste recycling functions (Richardson and Whitney 1995). There are also problems related to urban livestock keeping including issues concerning pollution from animal waste, health risks to animals and human populations, traffic hazards and the noise and smell of animals (UNDP 1996).

Urban agriculture has been the focus of increasing attention over the past two decades; however, urban livestock keeping remains the area of urban agriculture that has received less attention in the literature. A review of the literature on urban livestock keeping is therefore timely, but will also draw from the wider urban agriculture literature to provide a comprehensive background to the topic. The focus of this review will be on poor urban livestock keepers, although other types of urban livestock keepers will also be considered to provide a wider overview of urban

livestock systems. One of the aims of this review is to link the theme of urban livestock keeping to urbanization and urban poverty, links that have not been comprehensively explored in the literature to date.

This review will fall into four main sections, the first part is concerned with poverty and urbanization, and will review definitions of poverty and the extent and incidence of world poverty before moving on to specific trends and patterns in urban growth. The second part of the review concentrates on urban agriculture, providing the wider background for an exploration of urban livestock keeping. In this second part the recent interest in urban agriculture will be examined and the definitions of urban agriculture that are presented in the literature will be discussed. The historic changes in the pattern and extent of urban agriculture will also be discussed before considering how urban agriculture is perceived by urban authorities, and finally a more critical view of urban agriculture will be presented. The literature on urban livestock keeping is the focus of part three of the review. The extent of urban livestock keeping will be discussed before the wider literature on livestock and the livelihoods of the poor is considered. Attempts will then be made to reach a working definition of who are poor urban livestock keepers before moving on to a discussion of how different authors have classified urban livestock keepers. In order to classify urban livestock keepers the producer characteristics, such as engagement with the market, duration of urban residence, ethnicity and rural connections will be explored. This will be followed by a review of how urban livestock systems have been classified in the literature, including the differences between urban and rural livestock systems, classifications based on different livestock species and the relative benefits and problems related to different species. Different location for livestock keeping and the scale of urban livestock production will also be considered in relation to the classification of different urban livestock systems. A more thorough appraisal of the benefits and problems associated with urban livestock keeping will then be made before the final section of this part of the review considers the constraints faced be poor urban livestock keepers. The forth and final part of the review is concerned with the relationships between policy, institutions and urban livestock keeping. The literature concerning current policy towards urban livestock will be reviewed, as will the policy recommendations that are found in the literature, with particular attention being paid to the potential role for extension services. The issues arising from the literature recommending a change in

policy and institutional attitudes towards urban livestock keeping makes up the final section of this review.

1. POVERTY AND URBANIZATION

1.1 Defining Poverty

Identifying different groups living in poverty and understanding the context of their poverty are vital constituents for developing appropriately targeted strategies and interventions for poverty mitigation. However, defining what is meant by poverty, and developing criteria for measuring it, involves making value judgements and poverty has been defined and measured has shifted over time (Pernia and Quibria 1999). Conceptual shifts with regard to poverty are reflected in the focus and application of projects and programmes attempting to reduce poverty, including livestock interventions (Heffernan 2002).

Pernia and Quibria (1999), identify two concepts of poverty in the literature, those of *absolute* and *relative* poverty. Absolute poverty refers to the inability to reach a minimum standard of living, and therefore "infringes on the basic sustenance of life" (1999:1869), however conceptions of what constitutes a minimum standard of living can vary. Relative poverty is identified in relation to the standards of living of a particular group in society, for example it could be measured against an indicator such as average income (Pernia and Quibria 1999). Poverty in the developing world is more likely to indicate absolute poverty whereas poverty in developed countries is more likely to be defined in relative terms indicating departure from the economic and social norms of a region (Pernia and Quibria 1999). Poverty lines have been, and remain, a common way of defining poverty. A poverty line defines a minimum acceptable standard of living and anyone whose standard of living falls below that line is considered to be living in poverty (Pernia and Quibria 1999). Using a multiple index of basic needs as a measure for standard of living is extremely difficult, the use of a single index is therefore more frequent (Pernia and Quibria 1999). Single index poverty lines are usually based on the measurement of income or consumption, and a person or household is deemed poor if their consumption or income falls below an established minimum level or poverty line (Cox, Farrington et al. 1998; Pernia and

Quibria 1999). The World Bank's international poverty lines are set at $1 and $2 a day, with those living on less than $1 a day identified as the extreme poor (WorldBank 2001). The upper poverty line of living on less than $2 may also be a more appropriate threshold in middle income economies such as those in Latin America and East Asia (WorldBank 2001). However, a number of problems are associated with income based poverty lines, for example, accounting for production for home consumption, combined or shared incomes and the availability of goods to purchase (Pernia and Quibria 1999). Further problems with income-based poverty lines include; the obscuring of health and social dimensions of poverty; the variation in living costs between and within countries; intra-household differences; different size households; non-monetary income sources; the ease with which income-based poverty lines can be manipulated and the way income-based poverty lines may obscure the underlying causes of poverty (UNDP 1996b:110). Although income and consumption based poverty lines are frequently used to measure poverty, recent definitions of poverty are more holistic, attempting recognise some of the causes of poverty as well as the characteristics (WorldBank 2001). For example, the World Bank World Development Report 2000/01 defines poverty as a "pronounced deprivation of well-being (2001:15), the meaning of deprivation is elaborated in the following quote (2001:15):

> To be poor is to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled. But for poor people, living in poverty is more than this. Poor people are particularly vulnerable to adverse events outside their control. They are often treated badly by the institutions of state and society and excluded from voice and power in those institutions.
>
> World Bank (2001:15)

In their 2000/01 report the World Bank broaden previous definitions of poverty to incorporate vulnerability, voicelessness, powerlessness and exposure to risk (WorldBank 2001). The World Bank suggest this broadening of the notion of poverty better characterises the experience of poverty, increases an understanding of the causes of poverty and recognises the way different aspects of poverty interact and

reinforce each other, thereby highlighting further areas for poverty reduction through action and policy (World Bank 2001).

1.2 Extent and Incidence of Poverty

2.8 billion of the world's 6 billion people live on less than $2 a day, which is one of the World Bank's international poverty lines (WorldBank 2001). 1.2 billion live on less than $1 a day and are identified by the World Bank as the very, or extreme poor (WorldBank 2001). In developing countries in 1998 an estimated 1,198.9 million people, or 24% of the population lived on less than $1 a day in 1998 (DFID 2001). When different regions are compared 15.6% of the population of Latin America and Caribbean, 40% of the people in South Asia, 46.3% of the population of Sub Saharan Africa and 15.3% of the population of East Asia and the Pacific lived on less than $1 a day in 1998 (WorldBank 2001). Although the total number of people living on less than $1 a day increased from 1,183.2 million in 1987, to an estimated 1,198.9 million in 1998, the percentage of the worlds population living on less than $1 a day has fallen from 28.3% to 24.0% over the same time period (WorldBank 2001). The absolute numbers of people living on less than $1 a day also fell in some regions between 1987 and 1998, notably in East Asia and the Pacific and the Middle East and North Africa. The percentage of the population living on less than $1 a day only increased between 1987 and 1998 in Eastern Europe and Central Asia, from 0.2% to 5.1%, and in Latin America and Caribbean, from 15.3% to 15.6%, in all other regions the figure fell, although by less than 1% in the case of Sub Saharan Africa (WorldBank 2001).

The rest of this section will discuss the nature, incidence and extent of other selected indicators of poverty, including child malnutrition, literacy rates and infant mortality. Data from the World Bank and UN indicate that in the developing world 31% of children under 5 years old are malnourished, with the highest incidence in South Asia where 51% of under 5s are malnourished; the figures for Sub Saharan Africa, Latin America and Caribbean and East Asia and the Pacific are 33%, 8% and 22% respectively. The Middle East and North Africa also has a high rate of under 5 malnutrition at 15% (DFID 2001). In 1998 the adult literacy rate for the world as a whole was 75%, with 68% of women and 82% of men being literate. In Sub Saharan

Africa the total adult literacy rate in 1998 was 59%, with rates of 51% for women and 68% for men. The 1998 figures for literacy in South Asia were a total of 53%, women 41% and men 65%, and for Latin America and Caribbean a total of 88% of the population were literate, including 87% of women and 89% of men (DFID 2001). All of the indicators on Adult literacy had improved significantly since 1980 (DFID 2001). Infant mortality rates are a further indicator of poverty and the figures given here are for deaths per 1,000 live births. The infant mortality rate for the world as a whole was 54 deaths per 1,000 live births in 1998, for Latin America and Caribbean the rate was 31, South Asia 75 and Sub Saharan Africa 92 (DFID 2001). In 1998 an estimated one-quarter of the world's very poor people lived in Sub-Saharan Africa and two-thirds in South Asia and East Asia (WorldBank 2002). However, it appears that since 1980 most indicators of poverty show more of an improvement in Asia than in Sub Saharan Africa. Other indicators that are regularly used to indicate poverty include life expectancy at birth, maternal mortality rates, child mortality rates, environmental indicators such as access to safe water and primary school enrolment (DFID 2001).

1.4 Urban Growth, Trends and Patterns

In 1900 only 14 percent of the world's population lived in urban areas, by 1950 30 percent of the world's population was urban and this was expected to rise to 47.5% by 2001 (Mehta 2000). The UN (1999:1), predicts that "virtually all the population growth expected during 2000-2030 will be concentrated in the urban areas of the world." During the period 2000-2030 the UN estimates that the world's urban population will increase by 2 billion people and most of this growth will be absorbed by less developed nations (UN 1999). Between 2000 and 2030 the world's urban population is expected to grow an average of 1.8 per cent per annum, in developing countries the rate of urban growth is expected to be 2.3 per cent and can be compared to an overall world average annual growth rate of 1 per cent (UN 1999). The figures presented by the UN are comparably to those generated by the World Bank, who expect the urban population in developing countries to increase by 60 million people a year over the next 30 years and to have doubled by 2030 (WorldBank 2002). The World Bank further predicts that by 2050 the majority of people in developing countries will be living in cities for the first time in history (WorldBank 2002). Urban growth has three main driving forces, migration from rural to urban areas, natural

population increase, and the reclassification of rural areas (WorldBank 2002). Mehta (2000), suggests that the latter two components will be more significant contributors to urban growth, and that rural to urban migration will account for less than half of urban growth in the next two decades (Mehta 2000).

Different regions of the world have experienced different trends and patterns in urban growth. Table 1 illustrates some of the variations in urbanization, concentrating on the experience of the developing world.

Table 1. Urbanization Trends 1975-2025

	Level of Urbanization (% of total population in urban settlements)			Annual Urban Growth Rate (%)		Annual Rural Growth Rate (%)	
	1975	**2000**	**2025**	**1975-2000**	**2000-2025**	**1975-2000**	**2000-2025**
World Total	37.73	47.52	61.07	2.57	2.19	0.97	-
More Developed Regions	69.84	76.28	83.98	0.86	0.56	-0.45	-1.40
Less Developed Regions	26.68	40.67	57.05	3.66	2.75	1.13	0.11
Africa	25.15	37.30	53.77	4.37	3.81	2.08	1.13
Asia	24.62	37.68	54.81	3.46	2.63	1.00	-0.15
Latin America	61.32	76.61	84.67	2.86	1.61	-0.04	-0.47

Source: UNDP 1996:447

Urbanization in the developing world is following different patterns to the processes of urbanization experienced by developed countries. Developed countries urbanized at a slower rate, for example the level of urbanization that the United States reached over 90 years has been realized by Brazil in 30 years and Korea in just 20 (Henderson 2002). High gross domestic product (GDP), and education per capita accompanied urban growth in the developed world which, combined with the slower rate of urbanization, enabled the development of political and economic institutions (Henderson 2002). Urbanization in the developing world is not taking place under the same conditions, hence the scale of challenges posed by urbanization in most developing countries is greater than those faced by developed nations (Henderson 2002). The main demographic trends in Latin America and the Caribbean, Africa and Asia considered briefly, however it should be noted that such broad characterisations disguise demographic dynamics within these regions. During the period 1920-1970

Latin America and the Caribbean had the world's fastest rate of population growth and some of the world's fastest growing large cities. By 1990 the population of Latin America and the Caribbean was 440 million, double what it was in 1960 and 71.4 % of the population lived in urban areas (UNDP 1996). Since 1980 the region's population growth and rate of urbanization have been slower, and the rate of growth for most of the regions large cities has been much slower (UNDP 1996). Africa overtook Latin America and the Caribbean in terms of population growth rate in the 1970s, and it is estimated that in many African countries populations more than trebled between 1950 and 1990 (UNDP 1996). Several main trends can be identified in African urbanization. Growth in most of Africa's cities was rapid in the 1920s, slowed during the 1930s, increased again during and after the Second World War, slowed again during the 1950s and increased rapidly with Independence (UNDP 1996). Since the 1980s Africa's largest cities have continued to grow, however, growth rates have declined and the composition of growth has also shifted; prior to 1980 rural to urban migration was the main component of urban growth but since the 1980s natural increase has become the key factor (UNDP 1996). Although Asia has similar levels of urbanization to Africa in 1990 Asia contained 44.5% of the worlds urban population (and 72.2% of the world's rural population). Asia is home to three-fifths of the worlds population and a large and increasing share of its urban population, in 1990 Asia also had just under half the world's 281 cities with over a million inhabitants and 7 of the world's mega-cities (UNDP 1996). Between 1955 and 1990 Asia's total population doubled and in the same time period the regions urban population more than tripled. Asia, however, remains a predominantly rural continent, although the criteria used for defining urban in countries such as India and China may have an influence on this classification (UNDP 1996). Although the world's population has been urbanizing rapidly for several decades the estimates and projections concerning the trends and patterns of urbanization vary significantly (Becker and Morrison 1999). For example, the UN's 1996 estimations of urbanization levels, presented in Table 1, are considerably lower than previous estimates, for example the Preston Report published for the UN in 1979 estimated that 42.5% of Africans would be living in cities by 1995 (Cited in Becker and Morrison 1999:1677). A further disparity comes from differences in how 'urban' is defined, an issue that is central to section 2.2 of this review where definitions of urban agriculture are explored.

Urbanization and urban growth are associated with a range of problems and dense human populations are associated with a concentration of social and environmental problems such as crime, congestion and pollution (WorldBank 2002). Opportunities however, as well as challenges, are presented by demographic and urban transitions and urbanization is associated with changing social behaviour and attitudes, the World Bank (2003:6) suggest that:

> The most important socioeconomic and cultural transformation over the past 150 years has been the transformation of relatively closed, exclusive, custom-based rural societies into relatively open, inclusive, innovation-orientated urban societies.
>
> (WorldBank 2003)

Opportunities associated with urban growth also include increased creativity, scale of activities, knowledge flow and larger catchment areas for the production of goods and services (WorldBank 2002). DFID, while recognising problems of crime, pollution and squalor, suggest that urban areas can provide opportunities for poor people

> They are places where poor people can have a range of employment options, can participate in local political movements, and can benefit from access to a wide range of key services, education, health, electricity, solid waste collection and welfare programmes.
>
> DFID 2001:7

If better managed the process of urbanization and urban growth could become a mechanism for reducing poverty in developing countries (DFID 2001). However, the extent to which the urban poor can access the opportunities associated with an urban living is highly questionable and as the balance between rural and urban population levels shifts there are likely to be considerable implications for the location and distribution of poverty. In developing countries, where the majority of the population has been rural based, poverty has been a largely rural phenomenon, however with increasing urbanization poverty in urban areas is likely to become the bigger challenge in the future (Pernia and Quibria 1999). There is debate surrounding the urbanization of poverty. Ravallion (2001), suggests that in some conditions the poor urbanize at faster rates than the population as a whole. However, Ravallion predicts that the urban share of poverty will have only have reached 40% by 2020, when the urban share of the world's population is expected to reach 52% and 50% by 2035,

when the 61% of the world's population is expected to be urban (based on 1996 UN estimations) (Ravallion 2001). Haddad et al (1999) used WHO and World Bank sources to collate survey data from a range of countries regarding poverty and child undernutrition to test whether poverty and undernutrition are relocating to urban areas as the urban population increases. The available data indicates that in the majority of countries studied the share of the poor and undernourished in urban areas, as well as the absolute numbers of urban poor and malnourished, are increasing, suggesting that poverty does appear to be shifting from a rural to an urban locus as the population itself shifts (Haddad, Ruel et al. 1999). The evidence suggests that poverty and undernutrition are increasing at a faster rate in urban than in areas and therefore the phenomena can be considered to be urbanizing (Ruel, Haddad et al. 1999). The following section explores further the characteristics of urban poverty.

1.5 Urban Growth and Urban Poverty

Poverty has conventionally been viewed as a predominantly rural phenomenon (Cox, Farrington et al. 1998). Amis (2001:358), claims that "the majority of work on poverty has a rural focus", and while not denying the magnitude or importance of rural poverty suggests that, when an estimated 20 percent to a quarter of the poor in low-income countries are urban, urban poverty demands more attention than it currently receives (Amis 2001). The World Bank poverty reports of 1990 and 2000 are both criticised for neglecting urban poverty (Haddad, Ruel et al. 1999; Amis 2001). Urban poverty has also often been neglected in the wider development literature, for example in Sub-Saharan Africa the thesis of urban-bias has been influential in development thinking since the 1960s, contributing to a development emphasis on rural poverty (Jamal and Weeks 1993). However, more recently the urban-bias thesis has been challenged, Jamal and Weeks for example draw evidence from 10 case study countries in Sub-Saharan Africa to demonstrate that rural-urban inequality had all but disappeared by the 1990s, and if anything income differentials had shifted in favour of farmers in rural areas (Jamal and Weeks 1993). As discussed in sections 1.1 and 1.2 there are different ways of measuring and defining poverty and this section will consider more closely some of the problems associated with measuring poverty in urban areas and some of the features that characterise urban poverty.

There are a number of problems associated with measuring poverty in urban areas and data on urban poverty should be treated with caution. For example, intra-urban trends may be concealed where statistics average out the data from rich and poor households to obtain a single measure of poverty (Haddad, Ruel et al. 1999), health indicators for example often show urban residents as better off than rural dwellers, however, disparities between urban residents can be masked by official statistics (WorldBank 2000). Disparities between different groups of urban dwellers can be large, infant mortality rates for example are often three times higher among low income households when compared to high income households in the same city (WorldBank 2002); and in Bangladesh, infant mortality rates in rural areas are actually reported as lower than rates in urban slums (WorldBank 2000). Statistical measures have further limitations, for example statistics relating to the access of urban residents to water and sanitation do not give details about the quality, quantity or reliability of services, or the numbers of people sharing facilities (WorldBank 2002). Levels of urban poverty may also be underestimated where a poverty line is set too low in relation to the cost of urban living (UNDP 1996). The cost of living may even vary between locations within one city, and using a single poverty line to compare poverty between rural and urban areas, or compare poverty in different countries is particularly problematic (UNDP 1996).

The literature suggests that, despite many shared features, livelihoods, survival strategies and indeed poverty in urban areas have some characteristics that differ from rural areas (UNDP 1996; Beall and Kanji 1999; Maxwell, Levin et al. 2000). In an urban context livelihoods critically depend on access to employment and income generating activities (Beall and Kanji, 1999), and a large proportion of income in poor household is spent on purchasing food (Ruel, Haddad et al. 1999; Maxwell, Levin et al. 2000). Urban populations may have a slight advantage over rural dwellers in terms of access to formal safety nets (Ruel, Haddad et al. 1999). However, several authors suggest that there are fewer, or weaker, informal safety nets and support networks in urban areas that may not provide as effective support and assistance in times of need, thereby potentially reducing the ability of individuals and households to cope with shocks and stresses (UNDP 1996; Ruel, Haddad et al. 1999; Maxwell, Levin et al. 2000). Informal safety nets are underpinned by social capital, relying on trust and reciprocity, such informal safety nets take many different forms and a few examples

are food sharing, loans, child fostering, livestock lending and remittances (Ruel, Haddad et al. 1999). However, the nature of social capital and informal networks remain an area of urban livelihoods that is under explored in the literature, despite undoubtedly having a role to play in the lives of the urban poor (Ruel, Haddad et al. 1999). Urban dwellers may have significant advantages over rural dwellers in terms of access to schools, health care, literacy programmes and the job market. However, there are also disadvantages, which include higher living costs, for example urban dwellers may pay higher prices for water, building materials, fuel, transport and access to land for housing (UNDP 1996). Higher dependency on cash incomes also means urban dwellers are more vulnerable to falls in income and/or price rises (UNDP 1996), the urban population is also more vulnerable to macroeconomic policy for example policy inducing widespread redundancy (Maxwell, Levin et al. 2000). To what extent the urban poor can access the benefits associated with urban living is also uncertain. The poor in rural and urban areas share many characteristics, however urban poverty has some distinctive features. Pernia and Quibria (1999:1887) suggest that the urban poor typically:

> have limited access to resources and services; (ii) possess inadequate human capital; (iii) have large dependency burden; (iv) earn low wages; (v) are preponderant in unorganised and small-scale enterprises (SSEs); and (vi) belong disproportionately to disadvantaged subgroups, living in slum areas.
>
> Pernia and Quibria 1999:1887

Pernia and Quibria (1999) attribute urban poverty predominantly to low earnings, a consequence of a lack of access to, or ownership of, human and physical assets, for example basic infrastructure, land and investment and lack of opportunity to develop human capital through education and health services (Pernia and Quibria 1999). Ruel, Haddad and Garrett suggest that the lack of well paid steady jobs is the primary cause of urban poverty, rather than a simple lack of work.

The urban poor may be more vulnerable than wealthier urban inhabitants in several ways. The lack of basic services, that characterises slum areas where the poor are often concentrated, has a negative impact on human health. Where facilities such as drainage, water and sanitation have broken down, or have not kept pace with urban

growth health hazards such as diarrheal disease, water-borne disease and diseases spread by water related vectors, such as malaria and dengue fever, are increased (WorldBank 2000). Airborne diseases such as tuberculosis may also affect the poor disproportionately as they spread faster in overcrowded areas with inadequate ventilation (WorldBank 2000). Problems associated with inadequate infrastructure may also have an exaggerated impact on the poor, for example in Jakarta a poor resident typically pays 10 times more for a litre of clean water than a rich resident (WorldBank 2000). Crime and violence also increase with poverty and inequality in urban areas (WorldBank 2000). Large numbers of poor urban dwellers also live in dangerous and disaster prone environments "on the edges of ravines, on flood-prone embankments, on slopes liable to mudslide or collapse, in densely packed areas where fires easily start, on roundabouts at busy intersections" (Sanderson 2000).

The urban poor and slum dwellers are often overlapping categories, although if an income measure of poverty is taken as living on less that $1 a day then not all slum dwellers can be classified as poor (Herr and Karl 2002). However, a closer look at some of the characteristics of urban slums can give a more detailed portrayal of urban poverty. Slums are informal, illegal or semi-legal neighbourhoods where residents have a seriously substandard living conditions (WorldBank 2002), and "up to half the populations of the largest cities of the developing world are in unplanned and often illegal squatter colonies" (Walter 1998 cited in Sanderson 2000). Slum neighbourhoods typically house disproportionately high concentrations of low income people, although some groups of the extreme poor, such as the homeless, may be located in other parts of the city. The residents of inner city slums have typically been settled for longer, and often have better infrastructure and more established communities, than the residents of newer slum settlements located on the outskirts of cities. However, the stigma of slum neighbourhoods often restricts residents of both newer and older slums in their access to employment and wider social networks (WorldBank 2002). Lack of security of tenure often characterises slums areas and means residents are vulnerable to involuntary removal from land or residence (WorldBank 2002). Due to the informal nature of slums directly measuring the number of slum dwellers is highly problematic and to estimate the numbers of slum dwellers UN HABITAT developed a composite index, the Secure Tenure Index,

which is "a proxy for the percentage of households with inadequate housing attributes" (Herr and Karl, 2002:17). The concept of 'secure tenure' was used as a starting point for estimating the numbers of slum dwellers, with 'secure tenure' recognised as "protection from involuntary removal from land or residence except through due legal processes" (Herr and Karl, 2002:1). The Secure Tenure Index calculated the number of slum dwellers using city aggregate data, the five indicators included in the index, a lack of which characterise slum conditions, are:

- % of households with access to sanitation
- % of households connected to electricity
- % of households living in permanent housing structures
- % of houses in compliance with local regulations
- % of households with access to an improved source of water within 200 meters

The Secure Tenure Index was used to estimate the numbers of global slum dwellers for the baseline year of 1993 and the estimated number of slum dwellers was 712 million world wide (Herr and Karl 2002). In 1993 an estimated 30% of the world's urban population, 38% of the developing world's urban population and 4% of the developed world's urban population were living in slums. Over half the total population of slum dwellers were located in Asia, where slum dwellers accounted for more than one in three of the total urban population; an estimated 56% of urban residents in Africa and one quarter of urban residents in Latin America and the Caribbean were also slum dwellers. A straight line projection from the 1993 figures, based on the projected rate of urban population growth, estimates the 2001 population of urban slums to be 837 million (Herr and Karl 2002). However, the Security of Tenure Index does not offer a spectrum of slum dwellers and at present does not estimate the severity of inadequate housing, or distinguish between those with only one attribute missing and those lacking all five attributes (Herr and Karl 2002).

With the growth of urban populations and the expansion of the urban poor many authors are calling for an increased research and policy focus on urban poverty and the problems and opportunities facing the urban poor (Gebre-Egziabher 1996; Ruel, Haddad et al. 1999; Maxwell, Levin et al. 2000). Urban agriculture is one of the strategies employed by urban individuals and households to reduce their dependency

on cash income for food security, offering the producer some protection from market forces (Jamal and Weeks 1993; Ruel, Haddad et al. 1999). The last two decades have seen a renewed interest in urban agriculture and the contribution it can make to urban food security and the livelihoods of the urban poor, however, empirical research on the subject remains scarce and the emphasis of existing research is usually on cultivation, to the neglect of livestock keeping.

2.0 URBAN AGRICULTURE

This part of the literature review will consider the literature concerning urban agriculture, providing the context for a more detailed discussion of urban livestock keeping in part 3 of the review.

2.1 Recent Interest in Urban Agriculture

Interest in urban agriculture has increased in the last two decades (Waser 1997). Recent interest in urban agriculture has come from academic, development and policy perspectives and different people are interested in the phenomenon for different reasons. Urban agriculture has been considered in terms of urban food supply (Binns and Lynch 1998; Foeken and Mwangi 2000), household food security and child nutrition (Maxwell 1995; Maxwell, Levin et al. 1998; Maxwell, Levin et al. 2000), gender (Rakodi 1988; Rakodi 1988), land use planning and policy (Maxwell 1996), urbanization (UNDP 1996), as a response to crisis (Bigsten and Kayizzi-Mugerwa 1992; Drescher, Jacobi et al. 2000; Purnomohadi 2000), recycling and waste management (Nunan 2000; Drechsel and Kunze 2001; Harris, Allison et al. 2001; Kiango and Amend 2001; Mensah, Amoah et al. 2001) and also in relation to urban poverty and poverty alleviation (UNDP 1996; FAO 2000; Güendel 2002). Much of the contemporary interest in urban agriculture is concentrated on urban farming practices in the developing countries, and because the focus of this literature review is on poor urban producers the emphasis here will be on urban agriculture in developing countries. However, there is also renewed interest in what urban agriculture can offer the urban dwellers of developed countries, allotment cultivation in Britain for example, is attributed with contributing to the health and nutrition of low income families, community regeneration and the local economy (Garnett 1996; Garnett 1996).

2.2 Defining Urban Agriculture

Urban agriculture is broadly defined as food production in urban areas, usually with an emphasis on livestock keeping and cultivation (Mougeot 2000). However, a more precise definition is harder to reach; different authors vary in the range of production activities included in a definition of urban agriculture, and there is further inconsistency concerning the definition of an urban location. In terms of production activities urban agriculture may be limited to food production in urban areas (Page 2002), or it may be extended to include other types of production such as "forestry, parks, gardens, orchards…fuelwood plantations, aquaculture and related activities" (Gebre-Egziabher 1996). Ornamental or agroindustrial produce, such as tobacco or silk from silk worms could also be included in a definition of urban agriculture (Mougeot 2000). Ellis and Sumberg (1998) suggest that distinctions should be made between food and non food production when considering urban agriculture (Ellis and Sumberg 1998). Food may be for human or livestock consumption (Mougeot 2000). However, perishable animal and vegetable products are often stressed in food based definitions of urban agriculture (Mougeot 2000). The income from non food production may also be used to secure access to food, for example in Russia flowers grown in urban and peri-urban garden plots are sold in cities and towns, the income derived from such production may then used to secure food supply (authors own observations). Ellis and Sumberg (1998) give the example of a poor family producing ornamental shrubs, the income from which contributes to entitlement for food (Ellis and Sumberg 1998). Definitions of urban agriculture may also incorporate the processing and marketing activities associated with food and fuel production in urban areas (UNDP 1996).

Mougeot (2000), identifies location as the most common basis for definitions of urban agriculture, however the geographical dimensions of defining urban agriculture are also problematic. There is no agreed definition of an urban area and in different places urban is defined differently. Opinion in the literature varies on both what is meant by an urban location and how far the concept of urban agriculture extends to the urban periphery. Population size and density, municipal boundaries, competition between agriculture and other land uses or official city limits are all possible criteria for defining an urban locale (FAO 2000; Mougeot 2000). The World Bank identify urban locales by population size and consider urban areas to be towns, with an upper

population limit of 100,000, cities, home to 100,000 to 10 million people and megacities with populations over 10 million (WorldBank 2002). However, governments of different countries define 'urban' in different ways, meaning that assumptions based on data from 'urban' areas should be treated with caution. Some governments use definitions based on a threshold number of inhabitants, however this threshold varies widely, for example in Uganda and Peru the 'urban' threshold is a few hundred whereas Senegal and Italy take a threshold of more than 10,000 (WRI 1997). Other criteria, often used in combination to define urban, include political function, population density, and activity (WRI 1997). Differences in definition makes cross country comparisons regarding urban populations, levels of urbanization, urban growth and city size problematic. For example, if Peru's definition of urban was adopted by the Indian government, then India would become one of the most urbanized nations in Asia (WRI 1997). A further example from China illustrates the ways in which definitions can be misleading. China's level of urbanization appeared to have increased from 18% to 50 % between 1965 and 1988, however the much of this growth can be related to the Chinese government's adoption of a new definition of urban in 1986 which reclassified many formerly rural area (WRI 1997). Identifying the boundaries of urban areas can further problematise definitions and classifications of urban locales, an issue to contend with when defining urban agriculture. 'Urban' or 'intra-urban' and 'peri-urban' are frequently differentiated in the urban agriculture literature and in the wider literature concerning poverty and urbanization. Intra-urban is considered the "older and more settled urban fabric" (Mougeot 2000:6), a range of definitions for peri-urban are offered in the literature but it is widely recognised as the area surrounding a city that exhibits "both urban and rural characteristics" (Schiere and Van der Hoek 2001). Binns and Lynch (1998) emphasise the difficulty in differentiating between 'urban', 'peri-urban' and 'rural', paying particular attention to the problems of defining peri-urban areas. Binns and Lynch (1998) propose that a definition of peri-urban based on processes rather than spatial distinctions is preferable but question the significance of distinguishing between urban and peri-urban agriculture, reasoning that the markets, motivations and production issues are similar in both areas (Binns and Lynch 1998). The pervasive links between different areas and recognising the role such links play in the livelihood security of the urban poor may also compromise the drawing of distinct definitional demarcation between urban and peri-urban, and peri-urban and rural areas. However, other authors maintain

that distinguishing between urban and peri-urban agriculture is useful, in terms of modelling, in a development context in terms of targeted and specific policies and programmes (Adam 2001), for understanding enterprise systems (Ellis and Sumberg 1998) and the constraints and opportunities faced by different producer groups. Adam (2001) recognises the dynamic and diverse nature of peri-urban areas and attempts to identify the characteristics of the Peri-urban interface (PUI) in Kumasi, Ghana, concluding that in the case of Kumasi:

> The PUI is characterised by strong urban influences, including increased possibilities for marketing of farm produce, provision of inputs and services, and non-farm employment, but exacerbated competition for land, inequalities in its distribution, and risks from pollution.
>
> Adam 2001:207

The above definition may be useful for identifying the outer limits of a peri-urban area, however, it does not necessarily distinguish peri-urban areas from the urban core. Maxwell, larbi et al. 1999:375 avoid this limitation by defining peri-urban (based on Rakodi, 1998) as "the area beyond built-up land, but where the influences of the city *directly* affect land-use patterns, changes in land-tenure rights and, therefore, changes in livelihoods" (Maxwell, Larbi et al. 1999). Defining urban agriculture on the basis of an urban location depends therefore, on the definition of an urban area, and on how an urban location is distinguished from the urban periphery. Some authors extend their definition of urban agriculture to peri-urban areas and others limit their definition to intra-urban farming activities. For example Gebre-Egziabher (1996:21) defines urban agriculture as "the practice of food production within a city boundary or on the immediate periphery of a city" (Gebre-Egziabher 1996). On the other hand Aldington (1997:43), defines urban agriculture as "farming and related activities that take place within the purview of urban authorities", thereby excluding peri-urban areas where the influence of urban authorities is not extended, from a definition of urban agriculture. This literature review is primarily interested in agricultural activities taking place within the boundaries of cities and towns, with a particular interest in informal urban and slum settlements, as these areas often house a large proportion of the urban poor. However, there are good reasons for also considering the literature on peri-urban agriculture. The difficulty in distinguishing between peri-urban and urban areas means different authors may classify similar areas

in different ways. The connections between peri-urban and urban areas in terms of social networks and flows of agricultural inputs and outputs provide a further reason for considering the peri-urban agriculture literature.

2.3 Changes in the Pattern and Extent of Urban Agriculture

Many authors stress that urban agriculture is not a new phenomenon (UNDP 1996; Waser 1997; Binns and Lynch 1998; Lynch, Binns et al. 2001; Schiere and Van der Hoek 2001; Page 2002). Agricultural activities, both cultivation and livestock keeping have been, and remain, a feature of urban life in temperate as well as tropical regions (Bourque 2000; Schiere and Van der Hoek 2001). UNDP (1996), suggest that contemporary patterns in urban agriculture are a combined result of recent and ancient historical trends. The four factors identified as the most significant influences on contemporary urban farming systems are: the continuity of historical practices; the industrial agricultural revolution; post-World War II urbanization and the expansion of low-income segments of the urban population (UNDP 1996:27). Historical and archaeological sources, including evidence from, Java, India, Ghana, China, Europe, Iraq, prehistoric Jordan and pre-Columbian America, suggest that ancient civilisations throughout the world developed urban agricultural systems to feed city dwelling populations (UNDP 1996). Further to providing food for urban populations food production in and around cities and towns has historically helped protect urban areas from unpredictability, with roles in defence and reducing the effects of seasonal shortage and drought (Ellis and Sumberg 1998). Evidence from ancient Pompeii in Italy indicates that livestock such as oxen and horses had a further role in ancient cities drawing carts (Schiere and Van der Hoek 2001). Despite the widespread occurrence of urban agriculture its historical development has not been uniform; indeed, different regions have experienced different trends and patterns in the historic practise of urban agriculture, contributing to the variation in contemporary practise (UNDP 1996). In Asia, which has the most diverse and prolific modern intensive urban farming systems, urban agriculture has a long tradition with the types of practise showing a high degree of continuity and agriculture is still widely accepted as a valid use of urban land (UNDP 1996). Urban Agriculture also has a long history in Africa and reports from early colonial travellers indicate that urban agriculture had an established tradition in many indigenous cities, for example in the cities of Morocco and Nigeria's Hausa cities. However, urban agriculture in Africa does not have the

same level of recognition and support that it does in many Asian countries and there is less continuity in the types of practise (UNDP 1996). Evidence from Latin America indicates that pre-Columbian civilisations, including the Aztecs, Incas and Mayans, had intensive agricultural systems in urban areas, however these activities were largely abandoned with the European colonisation and urban agriculture was largely resisted in colonial cities (UNDP 1996). In contemporary Latin America however, urban agriculture has re-established itself as a significant feature of the urban landscape, initially re-emerging in the shantytowns surrounding colonial cities that grew rapidly following World War II. Since the 1970s some governments, charities and NGOs have supported urban agricultural projects and recent innovations include the adaptation of some native animals, for example guinea pigs and iguanas for rearing in urban areas and the introduction of European and Asian fish farming technologies and hydroponics (UNDP, 1996).

The importance and significance, as well as the extent and techniques of urban cultivation and animal husbandry, show both continuity and change throughout their long history in different world regions. Diversification as a livelihood strategy has been well documented, especially in relation to rural areas (Ellis 1998; Ellis 2000). Diversification of income sources is also a feature of urban livelihoods, and urban agriculture is one such manifestation of diversification and livelihood adaptability (Ellis and Sumberg 1998). In Africa changes in the role and significance of urban agriculture have been linked to economic crisis (Maxwell 1995; Binns and Lynch 1998; Page 2002). Political and economic trends influencing African cities in and the 1970s, 1980s and 1990s impacted on food security and in response to declining food security urban dwellers developed a range of coping strategies. Domestic production of food, through livestock keeping or cultivation, is one such coping strategy (Binns and Lynch 1998). Other strategies included dietary changes and, in some African cities, counter-urbanization, with some urban residents migrating to rural areas (Binns and Lynch, 1998). In Buea Cameroon, increased agricultural production is considered a response to falling wages that resulted from structural adjustment policies in the late 1980s (Page 2002). In Kampala, increasing domestic food production during the 1970s and 1980s is related to the economic hardships that accompanied the collapse of the urban economy in Uganda. Jamal and Weeks, (1983) suggest that real wage income in Kampala fell by nearly 80% between 1972 and 1980 and declining wages,

increased unemployment and inflated, unpredictable food prices provided the context for the changing role of urban farming (Jamal and Weeks 1993; Maxwell 1995; Maxwell, Levin et al. 1998). Although urban agriculture was present in Buea and Kampala before the economic crises in Cameroon and Uganda both Maxwell (1995) and Page (2002) argue that the extent, role and significance of urban agriculture changed in response to deteriorating economic conditions, with urban agriculture providing farming families with an increasingly significant source of food independent of the market. Individual and household activities and decisions, for example the decision to take up farming or intensify existing agricultural activities, can therefore be framed against wider economic trends (Ellis and Sumberg 1998). However, Ellis and Sumberg (1998), highlight the danger of mistaking renewed interest in and awareness of food production in urban areas for significant changes in the incidence, nature and importance of such activities.

The historical growth and spread of cities may also influence the pattern and extent of urban agriculture, for example where growing cities have swallowed villages where livestock have traditionally been kept urban livestock keeping may represent a continuity with traditional lifestyles (Schiere and Van der Hoek 2001). Delhi for example has spread to encompass 140 villages since 1951 and despite this urbanization of former villages and wider changes in land use many dairy producers continue with their former economic traditions, thereby contributing to the persistence of dairy farming in the city (Bentick 2000). Where evidence does indicate an increase in the level of food production in urban areas, such increases are largely spontaneous, resulting from the initiative of urban dwellers rather than the planning and initiation of government, and most urban farmers receive little official support, and in some cases their activities are resisted and suppressed by officials (UNDP 1996). The following section will consider more closely official attitudes and behaviour towards urban agriculture.

2.4 Official Perceptions of Urban Agriculture

How urban authorities, who include planners, policy makers, civil servants and government officials, perceive urban based food production informs official policy towards urban agriculture and also influences more informal attitudes and behaviour. The attitude of urban authorities towards urban agriculture varies throughout the

world. However, there is a general pattern of greater acceptance and official support for urban farming activities in Asia, especially East and South-East Asia, with governments in Africa taking a more restrictive view and a more mixed approach in Latin America (Lewcock 1996; Waser 1997). The perception of urban agriculture as temporary and marginal remains widespread among governments and municipal authorities (Gebre-Egziabher 1996; Lewcock 1996; UNDP 1996). Cultivation and livestock keeping were frequently banned by colonial authorities in African cities and independence brought few concessions to urban farmers, whose activities continue to be considered marginal, and often illegal, by many urban authorities (Bruins 1997; Brickhill 1998). Although there is evidence to suggest that in some African cities, for example Dar es Salaam, official views towards urban agriculture are changing (Mwalukasa 2000), in most places "'urban agriculture' is virtually an oxymoronic concept to many African urban authorities and state officials who consider the practice to be illegal, economically insignificant and a threat to public health" (Maxwell 2001). Public health has frequently been the justification for actively hostile policies towards urban agriculture (Page 2002). For example, city officials in Lusaka frequently slashed maize crops because of the fear that they were a potential breeding ground for mosquitoes, a practise that continued periodically until the late 1970s (Rakodi 1988; UNDP 1996). A further explanation for the hostility towards urban agriculture is that farming is not considered an appropriate urban activity and does not adhere to the vision of a 'modern city' as conceived by most municipal authorities and urban planners (UNDP 1996; Bourque 2000; Page 2002). Urban farming activities can be an embarrassment to government officials, presenting a 'backwards' image of an urban centre, or even a nation (Bentick 2000). For example, authorities in East Timor, not wanting to give the wrong impression to foreign media and dignitaries, ordered a round up of wandering pigs in the capital Dili as part of their preparations for the countries independence ceremony (Collins and Whiteside 2002). However, Kironde (1992) argues, with particular reference to African countries, that contemporary conceptualisation of urban management and urban problems is predominantly based on received, exogenous concepts and has lead to inappropriate and unrealistic urban policy in a number of areas, including urban agriculture (Kironde 1992). A further explanation for the neglect of urban agriculture by municipal authorities has been suggested by Binns and Lynch (1998), who propose that attitudes towards urban agriculture are symptomatic of viewing 'rural' and

'urban' as separate entities, with agriculture associated with 'rural' areas in contrast to 'urban', which is linked to manufacturing and service industries (Binns and Lynch 1998). Negative impressions of urban agriculture are not restricted to urban authorities. A case study of urban agriculture in Cairo shows that some of Cairo's residents view urban livestock keeping as undesirable, one woman, when considering some photos of urban poultry commented that:

> These photos are an embarrassment for the image of Cairo as a civilised city, and activities like poultry raising should be eliminated and kept for the villages. Poultry raising in the city is a source of dirt and diseases.
>
> Gertel and Samir 2000:219

This hostile view is however, not necessarily the standard view of residents in Cairo and other non livestock keeping residents felt that poultry raising was economically beneficial and would practise it themselves if they had more space or a more conducive rental situation (Gertel and Samir 2000).

In some places there is also a certain amount of contradiction in the approach taken by urban officials to urban agriculture. For example, in Dar es Salaam the urban dairy business is often a side line for civil servants (Waters-Bayer 2000; Schiere and Van der Hoek 2001), emphasising the complex attitudes that exist in relation to urban agriculture, where it can simultaneously be considered backwards and be an income generating activity for some urban officials. Part 4 of this review will consider in more detail the impact that policies and institutions have on urban livestock keeping specifically and how the negative perceptions of authorities regarding urban livestock keeping represent a key constraint on urban livestock keepers

2.5 Urban Agriculture: A more critical view

Ellis and Sumberg (1998), identify two main strands in the urban agriculture literature, the first is characterised in terms of advocacy, concerned with promoting urban agriculture in relation to food self-sufficiency, urban poverty reduction, sustainability and "futuristic waste recycling systems" (1998:213). The second strand in the literature is related to the empirical investigation of urban agriculture, with an emphasis on African cities (Ellis and Sumberg 1998). The aim of this section of the literature review is to offer a more critical view of some of the claims made by

advocates of urban agriculture, based on evidence and argument in the literature. Despite a wide recognition of its value and benefits some authors are careful not to over exaggerate the contribution of urban agriculture, emphasising that urban agriculture is not the most important source of urban food, even for farming families, and stressing that the urban poor are not necessarily the main beneficiaries of urban agriculture (Drakakis-Smith 1994, 1995, Mibib 1995 cited in Page 2002). The entitlements approach to food security (Sen 1981), also implies that increasing food production in urban areas does not in itself ensure that the most vulnerable can secure nutritional and food security. This more critical viewpoint could challenge the claims of the UNDP who consider poverty reduction to be a direct benefit of urban agriculture (UNDP 1996). Indeed, not all authors are convinced that urban agriculture makes a critical difference to the livelihoods of urban dwellers. For example, Bigsten and Kayizzi-Mugerwa (1992), discuss the adaptation mechanisms employed by households in Kampala in the face of rapid economic decline in the 1970s and 1980s. A socio-economic survey of 239 households formed the basis of the authors study and diversification of income sources was the most notable response to worsening economic conditions (Bigsten and Kayizzi-Mugerwa 1992). As presented earlier when discussing changes in the pattern and extent of urban agriculture, urban food production was one such response to deteriorating economic conditions in Kampala (Jamal and Weeks 1993; Maxwell 1995). However, the data collected by Bigsten and Kayizzi-Mugerwa indicated that urban farming only represented a modest contribution to the household income, even when the value of household consumption was accounted for farming contributed an average of 8% to household income. The authors further suggest lower socio-economic quintile of the population had the smallest income from farming, challenging popular perception that urban agriculture is predominantly a survival strategy of the poor (Bigsten and Kayizzi-Mugerwa 1992).

Several authors emphasise areas where the urban agriculture literature is commonly weak. Page (2002), conducted a study on urban agriculture in Cameroon and argues that the development literature particularly, has a tendency to neglect the history of urban farming and its political implications. Furthermore, describing urban agriculture exclusively in terms of an economic response to hardship neglects the cultural, political, ecological and value dimensions of farming activities (Page 2002). Ellis and

Sumberg (1998), argue that the literature on urban agriculture has a tendency to neglect the significance of rural-urban interactions in determining the welfare of the urban poor and in particular their access to food, they also argue that isolating urban food production from the rural economy is problematic (Ellis and Sumberg 1998). In conclusion to this section, Ellis and Sumberg (1998) warn that the significance of food production in urban areas should not be exaggerated and nor should 'its claims for scarce development resources' (Ellis and Sumberg 1998:222).

3.0 URBAN LIVESTOCK KEEPING

The previous part of this review provided a brief overview of the wider literature concerning urban agriculture while engaging with some of the arguments and debates surrounding food production in urban areas. The purpose here is to focus more specifically on urban livestock keeping, with particular attention on empirical research in this area. As Güendel (2002) points out, urban livestock keeping is the area in urban agriculture that has received less attention in the literature, and information on urban livestock keeping from a pro poor perspective is particularly limited (Güendel 2002). Therefore, the wider literature on livestock and the role of livestock in the livelihoods of the poor will provide a further background to the more specific literature on livestock keeping in urban areas. Evidence will also be drawn from the broader urban agriculture literature.

3.1 Livestock and Livelihoods

Livestock contributes to the livelihoods of nearly 2 billion people in the world, and just under one in eight people are almost entirely dependent on livestock for their livelihood (ILRI 1998). Livestock provide more than 30% of people's agricultural and food needs and their role extends beyond food production (ILRI 1998). Livestock In Development (LID) (1998:93) suggests that "livestock are important to the majority of the rural poor in developing countries, contributing in many and diverse ways to rural livelihoods". Although livestock are not necessarily important to the majority of poor urban dwellers, many of the contributions that livestock make to the livelihoods of rural livestock keepers are also relevant in an urban context. LID emphasise the following contributions that livestock can make to the livelihoods of the poor (LID 1998). Livestock are an important source of income, generating cash from the sale of products, animals or hiring livestock. Livestock are one of the few assets available to

women and to the poor and can be both accumulated and sold in times of crisis. Livestock also function as a central component of wider farming systems providing manure and draught power, although this may be of less importance in urban areas where they are less likely to be integrated into a broader system of farming. Livestock keepers can secure private benefits from common property resources through their livestock, this is applicable in off-plot urban livestock keeping systems where animals graze or scavenge for food in public spaces. Livestock can be a way of managing and diversifying risk and therefore increasing livelihood security, and they can make the difference between survival and abject poverty. Livestock also provide a source of transport, fuel, food and access to social networks (LID 1998).

As demonstrated by LID in the paragraph above, livestock play a varied and dynamic role in rural and urban societies. Seré and Steinfeld also emphasise the multiple roles that livestock can have:

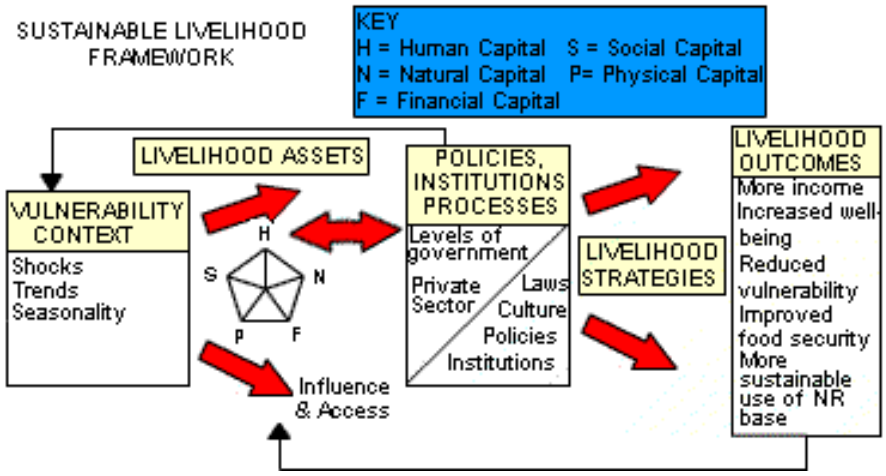
> Livestock produce food, provide security, enhance crop production, generate cash incomes for rural and urban populations, provide fuel and transport, and produce value added goods which can have multiplier effects and create a need for services. Furthermore, livestock diversify production and income, provide year-round employment, and spread risk. Livestock also form a major capital reserve of farming households
>
> (Seré and Steinfeld 1996).

Meat is generally the main product of livestock rearing however, useful by-products, that sometimes play a more important role than meat, include; eggs, milk, fur, hide, dung and feathers (UNDP 1996). However, the raising of livestock in both rural and urban areas can have further benefits to the provision of food and by-products, for example animals may provide emotional attachment and perform a social function, (Schiere and Van der Hoek 2001). The social functions of livestock are diverse. In the Niayes zone of Senegal it is believed that "an animal will protect human beings from calamity", therefore spiritual and mystical motivations are one of the reasons for keeping urban livestock (Fall, Fall et al. 2000). Religion can also have a large impact on livestock keeping, often influencing the type of species that is favoured. In Muslim countries, rearing animals in urban areas is common, and the raising of lambs for slaughter at religious festivals is popular, especially in low income neighbourhoods,

hence the role of the animal goes beyond food security and has religious significance (Nasr and Kaldjian 1997). Orthodox Christians also raise animals for slaughter at festivals, notably Easter, however this practice is on a much smaller scale than is found in Muslim societies (Nasr and Kaldjian 1997). Religion also influences other aspects of urban livestock production, for example both Islam and Judaism require particular processing techniques, halal and kosher, for livestock products, which may influence the pattern of livestock keeping in countries where these religions have significant populations (Nasr and Kaldjian 1997).

The contribution that livestock make to livelihoods can be further explored using the Sustainable Livelihood (SL) Framework, promoted by organisations such as DFID, Oxfam, UNDP and Care. Such frameworks are used to conceptualise and analyse livelihoods and a Sustainable Livelihoods (SL) approach encompasses "the capabilities, assets (including both material and social resources) and activities required for a means of living" (Chambers and Conway cited in Carney, 1998: 4). A livelihood is considered sustainable when "it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Chambers and Conway cited in Carney, 1998 p:4). The evolution of the Sustainable Livelihood approach can be paralleled to the changing conceptions of poverty that were outlined in section 1.1 of this review and the SL approach is in part a response to more holistic notions of poverty (Cox, Farrington et al. 1998; Farrington, Carney et al. 1999). Figure 1 below illustrates DFIDs Sustainable Livelihood Framework

Figure 1. DFIDs Sustainable Livelihoods Framework



Source: Carney 1998:5

The five capital assets, represented by the pentagon in the framework shown in Figure 1, are essentially the starting point for analysis. These five types of capital, Human, Natural, Physical, Financial and Social are the assets that people can make use of in building their livelihoods (Carney 1998). The contribution of livestock to livelihoods, both rural and urban, can be explored in terms of the five capital assets represented in the SL framework.

Human Capital is the "skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies" (Carney 1998:7). In terms of livestock keeping available labour for tending animals would influence the decision to keep livestock, therefore the household or compound size would be relevant to the human capital necessary for livestock keeping (Heffernan and Misturelli 2000). Education is one way of increasing human capital, however, educating children may be at odds with livestock keeping as children who are in school are no longer available labour sources for animal tending. A the same time school fees represent a significant expense for poor livestock keepers and evidence from Kenya shows that raise money for school fees is a common reason for livestock sales (Heffernan and Misturelli 2000).

Financial Capital is the "financial resources which are available to people … and which provide them with different livelihood options" (Carney 1998:7). Livestock may act as a form of financial capital in a number of different ways: as a form of savings, as an investment, a means for generating cash in an emergency, animal off-take as an income, or by acting as collateral for credit or loans (Heffernan 2002).

Evidence from Bolivia, Kenya and India supports the perception that livestock is a key form of investment, indeed when asked to rank different forms of investment poor livestock keepers from these three countries consistently ranked livestock the highest (Heffernan, Misturelli et al. 2001). There are also a wide range of livestock related economic activities, for example bringing livestock to markets, butchery, hides and skins, marketing, herding, selling livestock products (Heffernan and Misturelli 2000).

Social Capital Carney (1998:7), considers social capital to be the "social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods". Livestock can have a number of different roles in terms of social capital, for example owning livestock may enable the owner to participate in rituals and meet social obligations, and in some cultures livestock is an important form of cultural identity (Heffernan 2002). Heffernan and Misturelli (2000), resolved the difficulties surrounding the measurement of social capital by considering the levels at which people could access formal and informal institutions in times of need, livestock share-rearing relationship were also examined in relation to social capital. The evidence from Heffernan and Misturelli's analysis of social capital among poor livestock keepers in Kenya suggests that for the poor livestock represent an important form of social capital and that social capital is also key to livestock acquisition. Relationships of reciprocity and patronage are one way of obtaining livestock, inheritance, gifts, bridewealth and loans are all other means of exchanging livestock that utilise the bonds and linkages that are part of a persons social networks and as such form part of their social capital (Heffernan and Misturelli 2000).

Physical Capital is considered to be the "basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means which enable people to pursue their livelihoods" (Carney 1998:7). Physical capital may be relevant in terms of urban livestock keeping through the access people have to markets for livestock products, the conditions in which people keep their animals, for example with regard to housing, bedding, food troughs and water supply. Physical capital also encompasses the equipment people have for livestock rearing, for example rope, fencing, carts for transporting food, or products or waste (REF).

Natural Capital is the "natural resource stocks from which resource flows for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources)" (Carney 1998:7). This form of capital is also of relevance to the urban livestock keeper, although arguably to a lesser extent than livestock keepers in rural areas. Access to land is critical for urban livestock production and is cited as an important constraint on urban livestock keeping (Maxwell 1996), access to grazing or scavenging off-plot or the feeding of livestock on gathered fodder also require access to natural capital.

The consideration livestock in terms of the capital assets presented in the Sustainable Livelihoods Framework emphasises the assets that are needed for accessing and maintaining livestock and also illustrates the ways in which livestock can facilitate access to assets. The way in which livestock assist in the acquisition of further assets, for example social capital, accentuates their value as a livelihood strategy for those who can successfully keep and maintain their animals.

3.2 Extent of Livestock Keeping in Urban Areas

Keeping livestock in urban areas is practiced by high and low-income urban dwellers (Lewcock 1996; UNDP 1996), and production ranges from large to small scale (UNDP 1996). A wide range of livestock are reared in cities including cows, goats, sheep, guinea pigs, rabbits, chickens, ducks, geese, pigs and pigeons (UNDP 1996). Accurately measuring the number urban livestock, or indeed livestock keepers is very difficult. For example, in Cairo the subject of livestock keeping is sensitive, and some aspects are taboo among certain social groups, making it difficult to collect accurate data about livestock rearing activities (Gertel and Samir 2000). Section 2.1 also discussed in some detail the problems of defining an urban area, where the boundaries of ‘urban’ are drawn will obviously influence the number of livestock considered urban. Therefore the following examples should be taken as estimates only, but do give some indication of the scale and extent of keeping livestock in urban areas. In Cairo 16% of households keep livestock, and chickens, geese, pigeons and ducks are the most prominent species, and in former villages and informal settlements over 25% of households are involved in animal husbandry (Gertel and Samir 2000). Approximately 400,000 dairy cows are kept in Karachi, Pakistan (Lewcock 1996). In Bamako, Mali, more than 20,000 households keep livestock in town, and inputs and

marketing services engage thousands more people (Schiere and Van der Hoek 2001). Ninety one percent of urban households in Bangladesh keep livestock, especially poultry and "in Kenya, 1.5 million livestock, owned by more than 50 percent of the households, are found in major towns" (Ghirotti 1999:6). In a survey of urban households in 6 Kenyan cities conducted by Lee-Smith and Memon (1994) (cited in Güendel 2002) 17% of respondents kept livestock and a survey conducted in Zaria, Nigeria by Gefu (1992) found that 80% of respondents kept livestock for both household consumption and to supplement income (Güendel 2002).

> Over one-third of households surveyed in Harare rear animals in the city, mainly chickens but also rabbits, pigeons, ducks and turkeys… In Dar es Salaam, urban farming is the second largest source of employment after petty trade and labour, and 74 percent of urban farmers keep animals.
>
> Waters-Bayer 1996:220

Livestock keeping as an agricultural activity has different importance in different cities. In Cairo for example, small livestock keeping is the most important agricultural activity, partly due to the lack of suitable space for cultivation and partly due to the demand for cheap meat (Gertel and Samir 2000).

3.3 Classifying Poor Urban Livestock Keepers

Heffernan and Sidahmed, (cited in Heffernan 2002:7), offer the following definition of poor livestock keepers as "those who are economically and/or socially at risk and whose animals, at most, provide subsistence or the minimum augmentation of daily nutritional requirements". This definition can apply to poor livestock keepers in rural and urban areas. To further explore the broad spectrum of poor urban livestock keepers different classifications of poor urban livestock keepers can be made. There are a number of different ways in which urban livestock keepers could be classified, and the aim here is to consider how different authors have made these classifications and which of these are most useful for classifying poor urban livestock keepers. There appears to be two main ways to approach the classification of urban livestock keepers; by producer or by system of production. Different livestock keeping groups could be identified by the characteristics of the producer, for example, wealth, ethnicity or duration of urban residence; alternately urban livestock keepers could be

differentiated by different livestock production systems, including for example the species of animal and husbandry techniques and strategies employed. Different classification systems will be suitable for different enquiries, for example if the aim is to identify the poorest livestock keepers then focusing on the producer characteristics may be appropriate, alternately if the aim is to identify poor producers who might best benefit from extension services then considering the different livestock systems would be important. The characteristics of urban livestock keepers and the systems they employ are not independent of each other, for example when exploring the reasons for keeping livestock and the destination of livestock products both producer and system characteristics will be relevant. Classifications of urban livestock keepers based on producer characteristics will be the focus of this section and the following section will consider in more depth the classification of poor urban livestock keepers based on the characterisations of urban livestock production systems.

Producer Characteristics

Urban dwellers of all income groups are involved in livestock keeping, and different social groups engage in urban livestock keeping for different reasons (Güendel 2002). Two studies, by Siegmund-Schultze *et al.* (2001) and by Richardson and Whitney (1995) attempted to identify the household characteristics that influence the decision to keep livestock. Siegmund-Schultze *et al.* (2001) identified a certain socio-economic profile that inclines people towards urban sheep production in West Africa. The characteristics identified include job instability, limited education and available labour, implying that poorer urban households are more inclined to make the decision to take up sheep keeping in West African cities (Siegmund-Schultze and Rischkowsky 2001). When considering the keeping of goats in Khartoum, Sudan, Richardson and Whitney (1995), identified a range of demographic factors as significant for predicting livestock keeping, these included rural roots, less education per household, lower per capita income, more children and more neighbours who keep animals (Richardson and Whitney 1995). These two studies suggest that certain producer characteristics can be associated with certain types of livestock keeping in particular urban areas. The example above indicate that lack of education may predispose people towards livestock keeping, which is supported by evidence from Nairobi where a third of livestock keepers were found to have no formal education (Güendel 2002). In Cairo however there was found to be no difference in access to

formal education between low income livestock keepers and low income non-livestock keepers (Gertel and Samir 2000).

It is widely accepted that different groups of urban dwellers farm for different reasons and Güendel (2002) suggests that the urban poor are primarily involved in urban livestock keeping in response to limited food security and a lack of alternate livelihood options, livestock keeping is therefore likely to be a response to crisis (Güendel 2002). However, poor producers are not a homogenous group and evidence suggests that different groups of the urban poor have different motivations for farming. Evidence will be drawn from the wider literature on urban agriculture as well as from the specific urban livestock literature. A frequently cited study of urban agriculture in Kampala, Uganda[1] considers the primary reason for farming, the primary use of produce, land tenure and household income in a classification of urban farmers, table 2 shows the four categories identified in the study and the proportion of farmers in each category.

Table 2. Main Categories of Urban Farmers, Identified by Maxwell, 1995

Category	% of total	Primary Reason	Primary use of produce	Land Tenure	Household Income
Commercial	2.5	Income	Sales	Own or lease	Middle, high
Self-Sufficiency	5.8	Food	Basis of Diet	Customary tenancy	Low
Measure of Food Security	81.0	Food	a) Supplementary b) Reserve	All categories	All Levels
No other means	10.7	Food	a) Supplementary b) Often forced to sell some food to	"Squatting" or borrowing	Low or very low

[1] conducted between November 1992 and October 1993, the research included a two-round survey of 360 households and 40 comparative household case studies Maxwell, D. G. (1995). "Alternative Food Security Strategy - a Household Analysis of Urban Agriculture in Kampala." World Development **23**(10): 1669-1681.

			meet other expenses		

Source: Maxwell 1995:1673

The above classification system indicates three different reasons why low income urban dwellers might engage with urban food production; for self sufficiency, as a measure of food security or if they have no other means. The commercial category of farmers would not be applicable to the poor but illustrates that it is not just the poor who find benefits in urban food production (Maxwell 1995). The notion that producers have different motivations for farming and that urban agriculture has different roles in the livelihoods of different groups is prevalent in the literature. The UNDP, for example, suggest that:

> For the poorest of the poor, it provides good access to food. For the stable poor, it provides a source of income and good-quality of food at low cost. For middle-income families, it offers the possibility of savings and a return on their investment in urban property. For small and large entrepreneurs, it is a profitable business.
>
> (UNDP, 1996:4).

In a similar way to Maxwell (1995), the UNDP (1996), suggest that the primary reason for low-income groups of farmers' engagement with urban agriculture is to increase food security and they suggest that in most low-income cities farmers producing for household consumption represent a significant population. To support this claim the UNDP draw on evidence from a survey in Kenya in 1986 where 40% of families practicing urban agriculture were dependent on their produce for nutritional survival (UNDP 1996). Middle and high-income farmers may have many features in common with lower income farmers, however the UNDP suggest that these groups of farmers may have different motives and priorities for farming when compared to lower income groups. For example, middle and upper income farmers who are producing for home consumption may have nutritional and cultural motives for farming, with access to better quality food being a more substantial motive than pure economics. Livelihood diversification and insurance in times of recession may be further priorities for middle and high income groups and farming may also be a form of investment and a business opportunity (UNDP 1996). The UNDP argues that

security of tenure is a less critical issue for this wealthier group and access to inputs is less problematic when compared to lower income groups. UNDP contrast those farmers growing primarily for home consumption with entrepreneurs, who tend to focus on single or few, high value crops for sale. Capital requirements distinguish middle and high-income entrepreneurs and both groups tend to have better access to extension advice, credit, inputs and land compared to lower income groups (UNDP 1996). Evidence from Kano further supports the link between wealth and purpose of production, Binns and Lynch (1998), suggests that the wealthier cultivators view fruit production as an investment, whereas poorer farmers grow vegetables mainly for household consumption. A further study, based on a survey of three areas of Dar es Salaam in 1994, discussed by Binns and Lynch (1998), questions whether urban and peri-urban agricultural activities in Dar es Salaam are actually benefiting the poor, suggesting that high-income groups can better negotiate access to land through institutional structures and can better afford inputs (Binns and Lynch 1998).

Although the above classifications were of urban farmers in a broad sense, they were primarily based on evidence from studies of urban cultivators. However, poor livestock keepers and poor producers may vary in terms of their engagement with the market, a theme which is explored further below.

Engagement of Poor Livestock Keepers with The Market

Livestock may be raised in urban areas to supplement household nutrition with livestock products such as milk, eggs or meat. Evidence indicates that household consumption rather than the sale of products is more important for most poor urban livestock keepers (Foeken and Owuor, 2000, Maxwell, 2001, Foeken and Mwangi, 2000). In Cairo, for example, where poultry is the mainstay of subsistence farming, 95% of livestock are kept for home consumption (Gertel and Samir 2000). Mlozi (1999) discusses the results of a questionnaire based survey investigating urban agriculture in five towns and cities in Tanzania. 57% of the respondents[2] raised livestock and 54.4% of livestock keepers both sold and consumed the products of their livestock and a further 37.6% of livestock keepers only consumed livestock products indicating that for the majority of livestock keepers in the survey livestock

[2] 999 out of total sample of 1755

products are more frequently consumed in the household than sold (Mlozi 1999). However, the relative significance of sales and home consumption for different income groups remains unknown.

Where poor urban livestock keepers do engage with the market livestock products can be sold to generate income, providing a regular or occasional flow of cash into the household economy, and even very small sales of animal products can be of great significance to household income (Foeken and Mwangi 2000). Poor urban livestock keepers vary widely in terms of their engagement with the market and this feature of urban livestock keeping may be one way of classifying poor urban livestock keepers. Poor urban livestock keepers vary in the level to which they commercialise their activities. For example, in the Southeast of Mexico City raising rabbits for sale is increasingly popular among poor urban livestock keepers. Increasing levels of rabbit production are related to the expanding niche market for rabbits in the tourist food market. Rabbits are rarely consumed in the household but provide an important source of income for poor urban livestock keepers (Lopez, Losada et al. 1999). A further example from Mexico City demonstrates that different species of livestock may be kept for different reasons, and a single household that keeps more than one species of livestock may engage in production both for household consumption and the market (Losada, Cortés et al. 1998). Losada, *et al*. (1998) identify the rearing of pigs and poultry as an important livelihood strategy for poor urban dwellers the southeast of Mexico City, and poultry are kept predominantly for household consumption and the sale of pigs supplements the household budget (Losada, Cortés et al. 1998). Where livestock products are sold by poor livestock keepers to generate income they are often sold directly to the consumer though informal channels (Güendel 2002). There are however exceptions, for example in the case of small-scale rabbit production for tourist consumption in Mexico City the rabbits reach the market via traders (Lopez, Losada et al. 1999). Marketing channels utilised by poor urban livestock keepers may provide a further means of classifying the group of poor producers who have some engagement with the market.

Duration of Urban Residence

It is widely believed that most urban farmers are recent migrants, the logic being that migrants with farming backgrounds continue with their way of living on arrival in the

city (Foeken and Mwangi 2000). Where it is assumed that the chief proponents of urban agriculture are recent migrants from rural areas it is expected that their engagement will diminish as they become more integrated into the social and economic life of the city or town (Gebre-Egziabher 1996). Evidence from some studies supports the proposition that urban farmers tend to be migrants, for example a case study of La Paz and El Alto in Bolivia found that the majority of urban farmers were migrants, predominantly from one ethnic group which had a history of farming (Kreinecker 2000). However, evidence from other studies appears to suggest otherwise, in Nairobi, for example most urban farmers do not appear to be recent migrants but tend to have been settled for long enough to build the social networks necessary to acquire access to land (Foeken and Mwangi 2000).

Ethnicity

Pantuliano (2000), identifies the ethnic background of livestock keepers as a significant factor influencing urban livestock production. Pantuliano discusses the migration of Beja pastoralists from the Halaib Province of NE Sudan to Port Sudan and suggests that some of the opportunities and constraints the Beja face are different from those confronted by other groups. Consequently for targeted development interventions to be successful in reducing the poverty of this group then livestock keepers with pastoralist backgrounds must be distinguished from other groups of urban poor (Pantuliano 2000). Ethnicity is also a significant factor in urban livestock keeping in India. In Hubli-Darward, India, there are many urban dairies of various sizes and commercial engagement and most of these dairies are owned by gowlies, who are buffalo keepers by tradition and heritage (Nunan 2000). Scavenging pigs in the same city are also associated with particular communities including the Hindi 'Gollar' and the Bhils from the Punjab for whom pig owning is a tradition that is passed down from generation to generation (Nunan 2000). In the examples above classifying urban livestock keepers in terms of ethnicity or caste would offer insights into the motivations and techniques of livestock keeping in urban areas.

Rural Connections

Some urban livestock systems show high levels of integration with rural areas, for example, in Karachi, Pakistan, interactions between rural and urban areas are crucial for the urban dairy system. In Karachi there are 400,000 urban dairy cows integrated

into a small-scale entrepreneurial system that supplies milk to the urban market. The cows are bred in rural areas before being relocated to the city to be stall-fed, feed for urban cattle is transported from areas surrounding the city and a separate network transports manure for utilisation in cultivation (Lewcock 1996). Looking at the connections of urban producers to rural areas may an interesting way of distinguishing between different urban livestock producers. Güendel (2002), suggests that rural linkages decline with the time the producer has lived in the city however, the connectedness of settled producers, as well as recent migrants, to rural areas through social and economic networks remains an interesting possibility for classifying urban livestock keepers.

Further means for classifying poor urban livestock keepers could include the involvement of urban livestock keepers with other forms of food production. For example in Nairobi over a third of livestock keepers also produced crops and in Addis Ababa 75% of livestock keepers reported crop production to be their main occupation (Güendel 2002). The systems of production and species of animal that are kept could be further ways of identifying different groups of poor livestock keepers and will be considered in the following section.

3.4 Urban Livestock Systems

The previous section considered some of the characteristics of poor urban livestock keepers that could be used to distinguish between different producer groups. However, this characterisation has limitations in terms of understanding how livestock contributes to the livelihoods of the poor if the details of the production systems they utilise remain unexplored. Poor livestock keepers who share similar characteristics in terms of duration of residence in urban areas, ethnicity, engagement with the market or socio-economic status may have different systems of livestock keeping. For example, differences in the species raised, the location for livestock keeping, scale of production or husbandry techniques, these are all features of urban livestock systems, and how urban livestock systems have been classified in the literature will be discussed in this section. Firstly however, this section will consider where urban livestock systems fit into a broader classification of the world's livestock systems, how urban livestock systems might be defined and to what extent they differ from rural based livestock systems.

Livestock Production Systems: Where do Urban Systems fit in?

Seré and Steinfeld (1996) developed a classification and characterisation of the world's livestock systems, using "quantitative estimates of the importance of each system globally and by region in terms of their resource base, human population affected, livestock numbers and outputs" (Seré and Steinfeld 1996:3). The basis for Seré and Steinfeld's categorisation is threefold, incorporating integration with crops, agro-ecological zone and relation to land. The initial distinction is between 'Solely Livestock Production Systems' and 'Mixed Farming Systems'; Solely Livestock Systems are then further disaggregated into Landless and Grassland Based Systems, the Mixed Farming Systems are broken down into Rainfed and Irrigated categories. Urban livestock would most likely fall into the Landless Livestock Production System, defined as "a subset of the solely livestock systems in which less than 10 percent of the dry matter fed to animals is farm produced and in which annual average stocking rates are above ten livestock units (LU) per hectare of agricultural land" (p.12). The authors further differentiate between Landless Monogastric Systems, concentrating on pigs and chickens and Landless Ruminant Systems, concentrating on cattle and sheep (Seré and Steinfeld 1996). Although a wide range of urban livestock systems could be considered Landless Livestock Production Systems, Seré and Steinfeld focus on intensive peri-urban livestock production units that are geared towards urban markets, small-scale urban livestock keepers operating in Landless Production Systems are not identified (Seré and Steinfeld 1996). The range of species considered by Seré and Steinfeld are sheep, goats, cattle, buffalo, chickens and pigs. Goats and small animals such as rabbits and guinea pigs are not considered and these species are frequently found in urban production systems (UNDP 1996). The absence of poor urban livestock keepers and their various production systems from Seré and Steinfeld's classification emphasises the neglect of poor urban livestock keepers in the mainstream livestock production literature, and if such systems are to be characterised other areas of the literature must be explored.

Defining Urban Livestock Production Systems

Schiere and van der Hoek (2001) offer the following definition of urban livestock systems:

> An urban livestock system is characterised by a large variation of livestock systems that occur in and around densely populated areas and that strongly interact with the surrounding wealthy as well as poor human communities in different ways, at several different levels of system-hierarchy and with nearby and distant rural areas.
>
> Schiere and van der Hoek 2001

This definition encompasses all types of livestock keeping in and around densely populated areas, highlighting both the wide variety of systems and links with rural areas. However, this broad and imprecise definition does not give any indication of how far away from an urban centre such a definition might extend or how urban systems might be differentiated from rural livestock systems in terms other than location. With reference to wider urban agriculture Mougeot (2000), suggests that the key feature that distinguishes it from rural agriculture is "its integration into the urban economic and ecological system" (2000:9). The closer proximity of production to urban markets where products can be sold and inputs purchased and production, marketing and processing of products taking place quicker and in closer proximity also distinguish urban from rural systems (Mougeot 2000). In terms of livestock production more specifically there are a range of further differences between rural and urban production systems. The conditions for livestock production are different and livestock production in urban areas usually takes place in more confined conditions with space and access to land being major constraints (Bayer and Waters-Bayer 1998; Schiere and Van der Hoek 2001). Maxwell et al (1998), suggests that two further features distinguishing urban and rural agriculture are the constraints faced by farmers in terms of access to land and the legal status of urban farming (Maxwell, Levin et al. 1998). Husbandry techniques may also differ in urban areas, in traditional rural livestock production systems the majority of livestock food requirements are met through crop residues and natural forages (Mohamed Saleem 1998). Natural forages may provide the basis for feeding in some urban livestock systems, in others however, nutrients may be imported into the production system in the form of purchased crop residues or agro-industrial by-products (Mohamed Saleem 1998). Waste and by-products from the household or commercial enterprises such as hotels or restaurants can be utilised for feed in rural and urban areas however they are also available in larger quantities in urban areas (Schiere and Van der Hoek 2001). In rural areas

livestock contribute to agricultural production through the provision of manure for fertilizer and fuel and draught (Sansoucy, Jabbar et al. 1995), this may be less significant in urban areas. Different authors classify urban livestock systems in different ways, and many studies use more than one criteria, for example a study of urban livestock systems in the Niayes zone in Senegal futher characterised systems according to location, farm size and products and distinctions were made between two main systems, urban and sub-urban (Fall, Fall et al. 2000). What follows is a consideration of some of the different features regularly used for classifying urban livestock systems.

Different Livestock Species

In terms of the livestock systems found in urban areas distinctions could be made between ruminant and monogastric livestock, however in terms of identifying different groups of poor urban livestock keepers consider the different types of species that are frequently kept may be more useful. Different species have different advantages and disadvantages, and are kept in different types of production system (Schiere and Van der Hoek 2001). Culture and religion are influential in the choice of livestock species and contribute to the diversity and pattern of urban livestock keeping throughout the world. For example in Muslim countries goats are often a favoured species, whereas in China pigs are frequently kept and Cows are valued for religious reasons in Hindu societies (Schiere and Van der Hoek 2001). Further to the variety of species types found in urban systems, there is a wide selection of livestock breeds that may be exotic or native to any given area (Schiere and Van der Hoek 2001).

Poultry

Poultry production varies greatly between countries, for example in many parts of Asia poultry production is moving towards large scale 'factory' type systems and in African countries poultry production is shifting towards becoming a middle-income farming system (UNDP 1996). Both large-scale poultry enterprises and small-scale poultry keeping are found in and near urban areas throughout the world (Schiere and Van der Hoek 2001). Poultry includes ducks, turkey and other fowl, however it is chickens that are most frequently associated with this category of livestock. There are multiple reasons for keeping chickens, for household consumption of eggs and/or meat, supplementing to household income through the sale of eggs or birds and

chickens may also be kept to fulfil social obligations and ceremonial functions (Schiere and Van der Hoek 2001). Poor urban livestock keepers have different systems for keeping poultry, for example poultry may be allowed to scavenge for food beyond the confines of the yard or compound or alternately production may be enclosed, often involving larger numbers of birds (Schiere and Van der Hoek 2001). Scavenging and enclosed systems require different inputs and often have different orientations, for example production in an enclosed system is frequently geared towards the market, whereas scavenging systems may be more orientated towards home consumption and/or providing a source of cash in an emergency. Where a production system is more market orientated, farmers are more likely to invest in inputs such as concentrates, vaccinations and housing (Schiere and Van der Hoek 2001). Keeping scavenging poultry can be a very low input form of production and is often favoured by women as a means of increasing their income or food security (Schiere and Van der Hoek 2001). In Cairo, poultry raising is the most important agricultural activity, and it is mainly undertaken by women in low income social groups in densely populated areas of the city (Gertel and Samir 2000). In Cairo social networks are often utilised for accessing cheap sources of food for poultry and birds are usually home consumed (Gertel and Samir 2000).

Micro Livestock

Micro livestock commonly refers to the raising of small animals such as rabbits and guinea pigs. The keeping of micro livestock in cities is considered an increasingly important technology (UNDP 1996). Small species of livestock are adaptive and dynamic and can be kept for income or to supplement household diets in areas where alternative forms of animal production are problematic (Schiere and Van der Hoek 2001). UNDP (1996) suggest that raising micro-stock is widely practiced by low and middle-income farmers. The three species that are going to be considered in some detail here are rabbits, guinea pigs and also pigeons. Urban rabbit keeping is common in many countries including Mexico, Ghana, Egypt and Indonesia and animals are usually kept in cages on rooftops, in yards or gardens or in the house (Schiere and Van der Hoek 2001). The benefits associated with raising rabbits include the small amount of space needed for rearing, high fecundity and the wide range of feed sources that can utilised (UNDP 1996). It is common to keep four to six does and one buck and a normal level of production is between ten and twenty offspring per doe per year,

efficient production however requires managing the rabbits breeding cycles (Schiere and Van der Hoek 2001). Keeping guinea pigs is similar to keeping rabbits, they can be fed on grass, leaves and household scraps and need little space, an enclosed area of about $1m^2$ for eight to ten does and one buck is adequate (Schiere and Van der Hoek 2001). Unlike rabbits there is no need to manage the reproductive cycle of guinea pigs to reach efficient production and a doe can normally produce between eight and ten offspring per year. Guinea pigs are also smaller than rabbits and do not require separate cages making them easier to keep and manage (Schiere and Van der Hoek 2001). Pigeons are very popular in the Mediterranean region and keeping pigeons is a low input system where birds only require feeding when they are getting used to a new home, when accustomed they can find feed within a radius of 15 km and therefore do not compete with other animals for feed or space (Schiere and Van der Hoek 2001). Pigeons are very adaptable to urban conditions and dovecotes are usually situated on rooftops, making pigeon keeping suitable even for people living in multi-storey buildings. Pigeons are cheap to produce and easy to raise but have been largely neglected by programmes promoting urban food security (Schiere and Van der Hoek 2001).

Small Stock

Pigs, goats and sheep are all considered 'smallstock'. Pig keeping is common in cities throughout the world, with the exception of cities where there is a large Muslim or Jewish population. Pig keeping is often related to the recycling of household waste as feed but utilising waste from commercial and industrial sources is also common (Schiere and Van der Hoek 2001). In Motevideo, Uruguay and Pot-au-Prince, Haiti pig keeping is associated with the pursuit of collecting, sorting and selling waste to the recycling industry (Santandreu, Castro et al. 2000; Schiere and Van der Hoek 2001). Small scale pig producers often keep one or two sows and raising them from birth and then fatten for slaughter, suckling pigs are often sold direct to consumers or to slaughterhouses or traders. Whereas pigs are usually slaughtered when they reach a certain weight in large-scale commercial units small-scale farmers tend to slaughter animals when they need the money (Schiere and Van der Hoek 2001). One of the disadvantages with pigs is their associations with disease and their image as a public nuisance, being noisy and a potential traffic hazard (Schiere and Van der Hoek 2001). Sheep are also kept in urban areas. In Muslim cities lambs are frequently raised for

sacrifice at religious festivals, and this type of livestock keeping is especially popular in low income areas (Nasr and Kaldjian 1997). In West and North African cities stall-fed rams are often kept and fattened for Muslim festivals, the high market prices that can be fetched by these animals offsets the high inputs of labour and purchased feed that poor livestock keepers must invest (Waters-Bayer 1996; Waters-Bayer 2000). The raising of sheep for Muslim ceremonies is also popular in Cairo, some families bring the animal to the house a few days before slaughter and other may raise animals in the city for several months, many are consumed by the household but others are raised for the market (Gertel and Samir 2000). Goats are also popular with urban livestock keepers, and may have a particular role to play in waste disposal, as indicated in a study of goat keeping in Khartoum, Sudan (Richardson and Whitney 1995).

Large Livestock

Different types of large livestock are important in different cities in the world. Large livestock may be reared on-plot under 'zero grazing' farming systems where animals are stall fed, or off-plot making use of grazing resources on public land (UNDP, 1996). Keeping ruminants, especially large ruminants such as cattle, in urban areas can be more complex than keeping monogastric species such as goats and pigs as a large proportion of the animal diet has to be fibre, and roughage is usually expensive to purchase and difficult to find in urban areas (Schiere and Van der Hoek 2001). Where ruminant husbandry is linked to dairy production then purchasing feed can be more economically feasible (Schiere and Van der Hoek 2001). In cities in India, where there is a high demand for buffalo milk, grass has become a cash crop for smallholders on the outskirts of cities who specialise in grass production and cutting to sell to buffalo keepers in the city (Nunan 2000; Schiere and Van der Hoek 2001). In Cairo cattle are usually raised in peri-urban rather than intra-urban areas although the later form of cattle keeping does exist on a limited scale (Gertel and Samir 2000).

Locations for Livestock Keeping

In the discussion of different livestock species kept by poor residents in urban areas it clear that there are different ways of raising the same species of animals. For example, there are different locations for livestock keeping and different scales on which livestock keeping can operate. The location of livestock rearing is one way that urban

livestock keeping has been classified in the literature and it incorporates issues surrounding access to land, that are often critical for all types of poor urban farmers. Waters-Bayer (1996, 2000) distinguishes between 'on-plot' and 'off-plot' locations for urban livestock rearing. Livestock reared 'on-plot' tend to be kept enclosed or tethered and reared on private land, for example in the home, in backyards or on rooftops and balconies. This type of 'on-plot' production tends to be labour intensive with fodder and water being brought to the animal. For example, stall-feeding dairy cows purchased is more labour intensive and costly in terms of fodder, however the quantity of milk produced is much higher than from animals wandering 'off-plot', there is therefore a greater potential for commercial returns from milk sales and/or greater quantities of milk for household consumption (Tegegne, Tadesse et al. 2000). 'Off-plot' livestock are usually grazing or scavenging animals kept on unoccupied or public land and roaming with relative freedom (Waters-Bayer 1996; Waters-Bayer 2000). In Nairobi for example animals can be seen roaming "along roadsides, in the middle of roundabouts, along and between railway lines, in parks, along rivers, under power lines, in short in all kinds of open public spaces" (Foeken and Mwangi 2000:311). In an ‘off-plot’ production system little of the animal's food requirements are met through food brought by keepers, making this type of production less labour intensive and less costly (Foeken and Mwangi 2000). ‘On-plot’, ‘off-plot’ distinctions between the husbandry strategies of urban livestock keepers indicates the different land used by livestock keepers. However, this systems of classification could also be applied to livestock keeping in rural areas and to some extent the location of rearing depends on the species being reared and if production is for household consumption or sale (REF).

Scale of Production

The scale of production is often identified as key means of classifying urban livestock systems (Schiere and Van der Hoek 2001). Poor urban livestock keepers are associated with small scale livestock systems where production is identified with cash saving and consumption for urban households (Ghirotti 1999). However, as previously discussed, the level to which poor urban livestock keepers engage with the market varies widely. Small scale livestock systems can be contrasted to large scale livestock production systems, which are characterised as intensive and commercial operations (Ghirotti 1999). Large scale livestock production units are frequently

located in or around urban areas, for example in Côte d'Ivoire approximately 90% of 'modern' poultry production is situated around the capital Abidjan (Ghirotti 1999). Although classifying in terms of scale of production is useful for distinguishing the systems used by poor urban livestock keepers from large scale intensive urban livestock production systems it is not necessarily useful for further disaggregating the group of poor urban livestock keepers who are, almost by definition, operating on a small scale.

Further classifications

An interesting possibility would be to explore whether or not producers are involved in any co-operative that organises the production or marketing of livestock products. For example the in Karachi, Pakistan, the Landhi milk colony consists of thousands of cattle, most individually owned, and is integrated into the high-demand market in the city (Schiere and Van der Hoek 2001). Integration with rural systems could also form the basis of a classification system, for example dairy and beef cattle in Khartoum, Sudan, are frequently fed on roughage that comes from irrigated areas over 100 km from the city (Schiere and Van der Hoek 2001). Classifying in terms of links to other production and marketing systems has certain advantages, for example in helping to identify the flows of inputs and outputs through a livestock system. However, in isolation such a classification system does not necessarily offer any deeper understanding of how livestock contributes to the livelihoods of poor urban livestock keepers or the problems and constraints faced by different livestock keepers. Other possible ways of classifying urban livestock keepers could include the knowledge base of the producer (Waters-Bayer 1996), and how poor urban livestock keepers access knowledge regarding their livestock, and indeed how they themselves obtain their animals. In conclusion to sections 3.3 and 3.4, there are many possibilities for classifying poor urban livestock keepers and a multi faceted system of classification is likely to be more useful than one that deals only with a single feature of the producer or the production system.

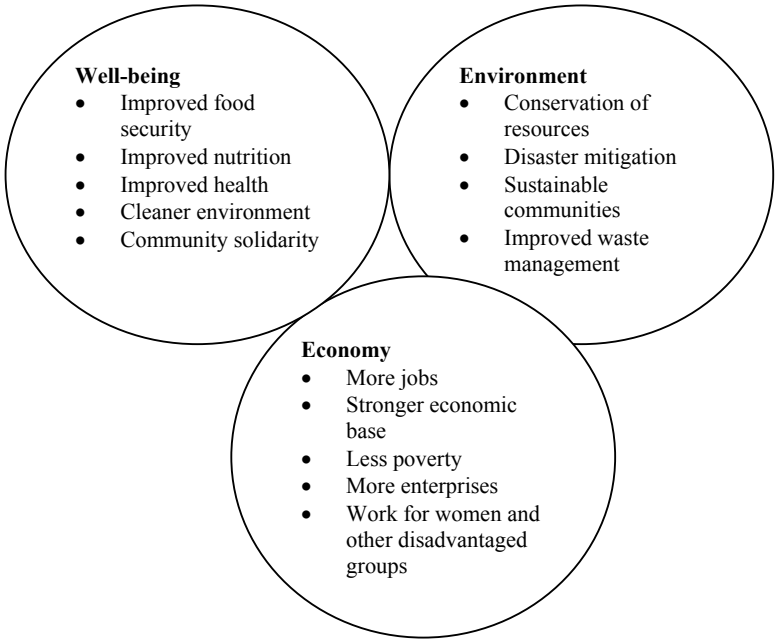
3.5 Benefits Associated with Urban Livestock

This section of the literature review will consider the main benefits associated with urban livestock keeping, although the focus will be on livestock some of the broader literature on urban agriculture will be drawn upon. This consideration of the benefits

of urban livestock keeping is balanced by the following section where the focus will be on the problems associated with urban livestock. There is a wide range of different stakeholders with different perspectives of the problems and benefits of urban livestock production. Stakeholders might include government officials, retailers, feed and medicine traders, shopkeepers, civil servants, co-operative members, consumers, neighbours as well as the producers themselves (Schiere and Van der Hoek 2001). These different stakeholder groups might interpret the benefits and problems associated with urban livestock keeping very differently.

Despite recognising inter-country variation in the significance of urban agriculture the UNDP (1996), identifies three main areas where urban agriculture can make positive contributions as illustrated in figure 2.

Figure 2. The Main Benefits of Urban Agriculture



Source: The Urban Agricultural Network cited in UNDP, 1996:159

Many of the benefits outlined by the UNDP (1996), in Figure 1 are echoed by other authors. With specific reference to livestock keeping the benefits of waste recycling, income generation, fungible income, nutrition and the role of livestock keeping and

other food production as a household livelihood strategy will be considered in detail. Some of these benefits are realised at a household or individual level and other have an impact at a community or city wide level (UNDP 1996). Livestock keeping in urban areas is also a multi-purpose activity and livestock may be important for a range of different reasons in any one situation, these roles include food security, income generation, saving, insurance and livestock and livestock products providing convertible assets (Güendel 2002)

Waste Recycling

The role of urban agriculture in urban waste management is seen as both a benefit and a problem of urban agriculture, the benefits will be discussed here and the problems in section 3.6. Rapid urbanization means waste management is an increasingly important issue in the urban areas of the developing world (Richardson and Whitney 1995; Drechsel and Kunze 2001). Waste is usually conceptualised as a 'useless or discarded material' and may present health, environmental or aesthetic concerns if accumulated (Harris, Allison et al. 2001). However, if usable then 'waste', which includes livestock manure, can be considered a resource; soil amelioration for urban cultivation is one potential use of 'waste', others include livestock or aquaculture feed, fuel or construction (Harris, Allison et al. 2001). In Khartoum, Sudan, urban garbage represents an important source of feed for goats, sheep and cattle, thereby providing benefits to livestock keepers, who have a source of 'free food' for their animals. The consumption of waste by livestock also has external benefits, reducing the amount of waste that would otherwise have to be disposed of by municipal waste management initiatives or remain uncollected (Richardson and Whitney 1995). It is estimated that 27% of Khartoum's rubbish is consumed by urban livestock. In terms of the waste that is produced by livestock, social networks may further facilitate 'recycling' with dung being sold to enhance horticultural productivity (Foeken and Mwangi 2000). Many authors emphasise the potential of urban agriculture for improving urban nutrient recycling, both in terms of recycling the by-products of urban agriculture, for example animal waste, and the potential for urban agriculture to absorb more of the organic wastes that are currently lost in urban nutrient flows (Nunan 2000; Santandreu, Castro et al. 2000; Harris, Allison et al. 2001; Kiango and Amend 2001).

Income

It was suggested in section 3.4 that for poor urban livestock keepers household consumption was, in many cases, a more important feature of urban livestock keeping than the sale of livestock and livestock products. However, examples, such as rabbit production in Mexico City (Lopez, Losada et al. 1999), were provided that contradicted this observation, it was further pointed out that even where sales of animal products are small they can make a significant contribution to household income (Foeken and Mwangi 2000). The economic role of small and large animals for poor livestock keepers tends to be different, with smallstock acting as a cash buffer and large livestock as a reserve of capital (Sansoucy, Jabbar et al. 1995). Livestock species that produce milk and eggs can provide a regular source of income whereas the sale of live animals, wool, hides and meat will be less regular, and likewise income from hiring the services of animals for draught or transport. In Addis Ababa for example, income from donkey transportation enterprises is an important source of income for poor urban livestock keepers (Güendel 2002). However, the most regular income from livestock is often from dairy produce (Sansoucy, Jabbar et al. 1995). Different groups of poor urban livestock keepers may be more likely to utilise livestock as a source of income, different species for example are association with income generation (Losada, Cortés et al. 1998), and relative wealth may also influence the frequency of sales (Maxwell 1995). Binns and Lynch (1998) further suggest that in Dar es Salaam there is evidence that agriculture towards the centre of the city tends to be produced mainly for household consumption whereas more agriculture towards the periphery of the city is more likely to be sold. Even where livestock do not represent a regular income the poor often use livestock as a form of insurance or saving account as they can be a quick source of cash in an emergency (UNDP 1996; Mohamed Saleem 1998; Schiere and Van der Hoek 2001).

Fungible Income

Fungible income is frequently mentioned in relation to the benefits of domestic food production for urban farmers (Maxwell 1995; UNDP 1996; Foeken and Mwangi 2000). A 'fungible income' is where goods or labour are substituted for money that would otherwise have to be earned to acquire these goods, for example, urban agriculture provides food for family consumption, substituting for food that would otherwise have to be purchased (UNDP 1996). Urban agriculture has particular value as a source of fungible income where a high proportion of earned income is spent on

food, and it frees part of the household income for paying for other goods and services (UNDP 1996). Evidence suggests that in developing countries urban dwellers frequently spend a large proportion of their income on food. For example an extensive four round study of urban livelihoods and food and nutrition security in Greater Accra, Ghana[3], found that urban households spend over half their income on food, with nearly one in five households spending over 70 percent their budget on food (Maxwell, Levin et al. 2000). This pattern of high expenditure on food among poor urban households is reflected elsewhere, for example in La Paz families spend between 52% and 83% of their income on food, and this figure is likely to be at the higher end of the scale for poorer families (Kreinecker 2000). A study in Nairobi found that even farming households spend a large proportion of their income on food, with over one third spending as much as 70-75% of their income on food. This figure would be even higher if households did not have the contribution of their farming activities, or members of a household may suffer from severe hunger (Foeken and Mwangi, 2000).

Nutrition and Food Security

Food security relates to having "access to enough food for an active and healthy life" (Sansoucy, Jabbar et al. 1995:10). It frequently claimed that one of the benefits of urban agriculture is improved nutrition for the producer (UNDP 1996; Armar-Klemesu 2000; Foeken and Mwangi 2000). Increasing access to livestock products through the rearing of animals in urban areas can contribute to the nutrition and food security of urban livestock keepers and their families. Animal products an important food source and are rich in high quality protein, vitamins and minerals, they also contain essential amino acids that lacking in cereals (Sansoucy, Jabbar et al. 1995). Meat protein and dairy produce are expensive foodstuffs and by rearing livestock, poor families can improve their nutrition by increasing their access to fresh livestock products (UNDP 1996). Maxwell et al. (1998) provide evidence from a study in Kampala to support the claim that engagement with urban agriculture improves nutrition; when socio-economic and other child and maternal variables are controlled for their data indicates a positive relationship between child nutrition and urban agriculture (Maxwell, Levin et al. 1998). The Kampala study indicates that in 1993,

[3] which included a survey of 559 households in 16 areas,

when the fieldwork was conducted, 35% of Kampala households were involved in some form of urban agriculture and data was collected on the nutritional status of children under five years, as well as on agricultural activities. The children from farming households had a significantly higher nutritional status than children from non-farming households (Maxwell, Levin et al. 1998). The study concludes that urban agriculture improves the nutritional status of children, especially among children of lower-socio-economic groups who showed significantly higher frequencies of malnutrition and lower heights for age in non-farming households when compared to children of farming households (Maxwell, Levin et al. 1998). Nearly all the farming respondents in the study indicated that the primary reason for farming was to provide a food source for that was not dependent on having a cash income, with food produced being consumed in the household, however, sales of food may also generate cash in an emergency (Maxwell, Levin et al. 1998). Foeken and Mwangi suggest that farming in Nairobi is undertaken primarily to provide food for the family, contributing to both the amount of food and the composition of the diet. Evidence from Korogocho, an extensive slum area of Nairobi shows that food energy intake and protein intake were higher in farmers in comparison to non farmers and this pattern also extended to better nutritional status of the children of urban farmers when compared to non-farmers (Foeken and Mwangi, 2000).

Urban Livestock Keeping as a Household Livelihood Strategy

Urban Agriculture is frequently portrayed as a household survival strategy (Maxwell 1995; Gebre-Egziabher 1996). Gebre-Egziabher (1996), defines a household survival strategy as "the household's collective effort to secure or assure its daily survival in the face of increasing scarcity" (1996:21). However, by viewing urban agriculture as a household survival strategy intra-household dynamics may be masked (Maxwell 2001). It is widely recognised that most urban farmers are women (Rakodi 1988; FAO 2000; Foeken and Mwangi 2000; Kreinecker 2000; Waters-Bayer 2000); and Maxwell et al (1998), suggest that 80% of labour for urban agriculture in Kampala is provided by women (Maxwell, Levin et al. 1998). Urban agriculture might therefore, be considered a strategy of women rather than the household as a whole (Rakodi cited in Page 2002). UNDP (1996), suggest that in countries where women are the main farmers in rural areas this pattern is reflected in urban agriculture with women being the main producers. However, this gendered pattern of urban farming is not universal,

Binns and Lynch (1998), in a study of urban agriculture in Kano, Northern Nigeria, found that men made up the majority of farmers outside the family compound as women were largely confined to the compound in accordance with Islamic tradition (Binns and Lynch 1998). Where food production takes place on a larger scale and/or has a more commercial motivation men may also be more prominent producers than women, who are more likely to be involved in farming where producing food for household consumption is the primary function (UNDP 1996).

Livestock keeping is one way that the urban poor can diversify their livelihood activities (Güendel 2002). Providing fodder and space can be found livestock keeping is an attractive option for diversifying livelihoods and improving food security (Nunan 2000). Livestock may also provide a social security net for the poor, and this may be a particularly important function of urban livestock keeping for vulnerable groups like female headed households, the retired, or widows (Güendel 2002).

Response to Crisis

Drescher, *et al.*, (2000), suggest that urban agriculture can be a 'crisis induced strategy', (Drescher, Jacobi et al. 2000). Evidence from Indonesia, Mongolia and Africa appears to supports this notion. For example, at the time of the economic crash in Indonesia, officials in Jakarta actually encouraged redundant urban workers to take up farming in the city to reduce the hardships induced by the economic crisis (Purnomohadi, 2000). Such examples are not limited to the developing world, for example as a response to food scarcity in London during the Second World War the raising of rabbits became popular (Schiere and Van der Hoek 2001).

Further functions

Although not specifically related to livestock, Page (2002), presents an interesting argument relating to the political functions of urban agriculture in Buea, Cameroon. Page (2002) argues that urban agriculture in Cameroon has had unintended political implications, whereby the contribution of urban food production to household subsistence helped diffuse civil unrest when household incomes were falling as a result of structural adjustment processes in the 1990s, thereby contributing to the survival of Cameroon's political elites (Page 2002).

Other benefits of urban livestock keeping include the productive use of urban open spaces and compared to crops livestock require less land and provide a higher return per unit of land, which is particularly beneficial in cities where land is scare (Güendel 2002). Grazing also contributes to the maintenance of urban open spaces (UNDP 1996). Compared to crops, livestock are also considerable more flexible in terms of land use, and can be moved around as required (Güendel 2002). Where the products of urban livestock keeping are sold they do not require extensive transportation to reach the market, thereby reducing traffic and pollution (UNDP 1996). Consumers can also benefit from the sale of fresh perishable livestock products, however such products may also present certain health risks as discussed in the following section (Güendel 2002). Those that supply inputs and services for urban livestock keepers also benefit from livestock keeping activities in urban areas (Güendel 2002).

For the producer livestock may be a form of nutrition, an investment opportunity and of social value; at a city level livestock can contribute to the resilience of urban communities in times of crisis and provide urban consumers with fresh livestock products (Schiere and Van der Hoek 2001). In western countries in particular animals in cities can be a source of learning and education and city farms can provide both education and leisure for urban dwellers (Schiere and Van der Hoek 2001).

3.6 Problems Associated with Urban Livestock

This section will consider some of the problems associated with urban livestock keeping. The issues will be broken down into three sections, environment and pollution, health and disease and other problems. Perceptions of problems vary between countries and interest groups (Schiere and Van der Hoek 2001). Many of the problems associated with urban cultivation and livestock keeping are only problems from the perspective of certain interest groups, farmers themselves who do not necessarily perceive problems in the same way.

Environment and Pollution

The previous section considered some of the benefits that livestock in particular can have in terms of the urban environment, with a role in waste recycling, however, animals are also producers of waste. In rural systems dung and urine from livestock are usually recycled as fertilised for cultivation (Sansoucy, Jabbar et al. 1995),

however one problem with urban systems is that this recycling often does not occur, this maybe in part due to limited social networks between cultivators and livestock keepers (Güendel 2002). Where urban or peri-urban livestock systems are not integrated into wider farming systems the potential for exchange of manure for feed supply is limited and the nutrient recycling that often characterises rural agricultural systems is reduced in the urban context (Mohamed Saleem 1998). For example one third of livestock keepers interviewed in a survey in Nakuru, Kenya dumped all or part of the waste from their livestock in the street (Foeken and Owuor 2000). Uncollected refuse can block sewage systems and drains, presenting a health as well as an environmental problem (UNDP 1996). Pollution from dung and urine causes a range of potential problems, for example, flies breeding on solid waste may transmit diseases such as diarrhoea (Schiere and Van der Hoek 2001). Problems of waste may also arise from the from processing of meat and milk; for example slaughterhouses, if not managed properly, be a big polluter (Schiere and Van der Hoek 2001; Del Campo 2002). However, pollution from livestock may be a more serious problem in large industrial units than at a small scale household level (Schiere and Van der Hoek 2001).

Health and Disease

Cultivation in urban areas presents a different range of problems to urban livestock production and irrigating crops and vegetables with polluted water in particular is considered a potential health hazard for consumers (Mensah, Amoah et al. 2001). Animal products can also present health risks to consumers. If insufficiently processed then diseases such as tuberculosis, leptospirosis, anthrax salmonellosis and brucellosis can be transmitted though the milk and meat of urban livestock (UNDP, 1996). Dairy and meat products are low acid foods that potentially support bacterial growth, which can also lead to food poisoning. Transmitting bacteria is a particular risk where animals are slaughtered in unhygienic conditions and/or meat is displayed uncovered (Schiere and Van der Hoek 2001). Processing techniques such as drying, salting and smoking meat can reduce the health risks and processing such as cutting, grinding and cooking meat, if done hygienically, can add value to the products and provide more income if undertaken within the household (Schiere and Van der Hoek 2001). Milk is also vulnerable to bacteria and processing can make it safer for consumption, some producers employ technologies at a household level to process

milk, for example fermentation, curdling or pasteurisation, however poor producers may have less access to such technologies and milk is frequently sold and consumed raw (Schiere and Van der Hoek 2001). For example an estimated 80% of milk consumed in Nairobi is unprocessed, consumers often prefer unprocessed milk because it is cheaper and also has a higher fat content, however, tuberculosis, pneumonia and brucellosis can all be transmitted to humans via raw milk (Neondo 2002).

Zoonotic diseases are also associated with urban livestock (Mantovani 2000; Santandreu, Castro et al. 2000; Schiere and Van der Hoek 2001). Zoonoses, diseases that effect both animals and humans, area a risk in all livestock keeping environments (Mantovani 2000), and are more likely in conditions where levels of hygiene are low, in urban areas where conditions are commonly cramped transmission may be a particular risk (Waters-Bayer 1996; Schiere and Van der Hoek 2001). Rodents, especially rats can be vectors or reservoirs for human diseases such as hanta virus in Asia, rodents may be encouraged where animal foodstuffs are stored, although again this is not exclusive to urban livestock keeping (Schiere and Van der Hoek 2001). Urban livestock can potentially pose further human health hazards, for example scavenging pigs in Africa and Latin America have been used by human tapeworms to complete their lifecycle. Pigs that eat human excrement with tapeworm eggs become infected by the larval stage of the tapeworm, cysticerci, if humans then eat the pork that has been insufficiently heated they become hosts to the adult tapeworm (van't Hooft 2000; Schiere and Van der Hoek 2001). If pork is cooked sufficiently before being consumed by humans tapeworms can be avoided, keeping animals enclosed where they cannot eat human excrement also eliminates the disease (van't Hooft 2000; Schiere and Van der Hoek 2001). Urban livestock can also pose a threat to the health of animal populations; for example the first outbreak of African swine fever, a virulent tick-borne disease, in Ghana was linked to backyard pigs, however this is also symptomatic of inadequate veterinary services and the tendency of veterinary officials to overlook urban livestock (Schiere and Van der Hoek 2001).

Other Problems

Wandering animals are also considered a traffic hazard in many urban areas (Lewcock 1996; UNDP 1996; Foeken and Owuor 2000). Odour and noise pollution are also

problems associated with urban livestock (UNDP 1996; Nunan 2000). Livestock may also cause friction between neighbours who consider the livestock keeping activities of neighbours as noisy, smelly, dirty and disruptive (Schiere and Van der Hoek 2001).

3.7 Constraints on Urban Livestock Keeping

Livestock keepers in urban areas face a wide range of constraints. This section of the review will consider these in more detail, drawing on the broader literature on urban agriculture as well as the specific research that has been done on urban livestock production. The UNDP (1996:212) identify five main categories of constraints faced by urban farmers all of which are relevant to both cultivators and livestock keepers:

- Institutional constraints and sociocultural biases
- Access to inputs, resources and services
- Constraints postproduction, especially marketing and processing
- Organisational constraints
- Risks related to farming in the city.

The policy and institutional constraints faced by urban farmers, and the potential for overcoming these constraints, will provide the basis for part 4 of the review so will only be considered here in passing. Evidence supporting the suggestion that the legal status of urban agriculture significantly constrains urban livestock keeping comes from a study of urban agriculture in Nakuru, Kenya where non livestock keepers frequently mentioned legal considerations as reasons for not keeping livestock in town (Foeken and Owuor 2000). Lewcock (1996), points towards a general assumption that in urban areas other land uses must be more valuable than agriculture as an underlying cause of neglect of agriculture in urban land use planning, and emphasises that this assumption remains untested (Lewcock 1996). Urban agriculture is also often at risk when local authorities perceive there is a more lucrative use for public land. For example in Britain several city farms have been closed when a more profitable offer has been made for the land by developers (Ward 2000). Further issues that are central to livestock keeping, but appear to be neglected in the UNDP's list of constraints include issues of constraints of space, fodder and animal health all of which will be considered here in some detail.

In the Niayes zone in Senegal the further development of urban livestock production is constrained by the deterioration of natural resources, lack of organisation among farmers, minimal access to credit and the land tenure system (Fall, Fall et al. 2000). Lack of feed and space for animals are also major constraints on urban livestock systems; opportunities on the other hand include marketing potential and the availability of wastes for recycling (Fall, Fall et al. 2000). In Hubli-Dharward, India, Nunan (2000) identifies a number of incentives for livestock keeping, including the availability of waste that can be used as feed and the accessibility of markets, in particular markets for the produce of urban dairies (Nunan 2000). However, access to water and grazing and the problems of storing dung for sale are constraints on urban livestock keeping, and further problems such as complaints about noise and smell and health concerns may deter people from keeping livestock (Nunan 2000). Costs involved in livestock keeping include expenditure in terms of inputs such as drugs, feed and water, and labour, sufficient space and housing are also required if animals are going to be maintained. If any of the above elements are lacking then livestock keeping may actually increase rather than reduce the vulnerability of the livestock keeper due to increased rates of mortality and morbidity and a reduction in livestock productivity (Heffernan 2002). High animal mortality is a major problem for urban livestock keepers, a study in Nairobi found that the value of cattle that were sold or consumed annually was actually lower that the value of cattle that died (Lee-Smith and Memon 1994 cited in Waters-Bayer 2000) . The health of their animals was the biggest concern for livestock keepers in Nakuru, Kenya, a concern rated highly by both richer and poorer livestock keepers, however poorer livestock keepers were less likely to invest in inputs to reduce the risk of animal disease (Foeken and Owuor 2000). Güendel (2002), suggests that poor urban livestock keepers rarely vaccinate their animals and poor health of livestock and the high cost of veterinary services represent significant constraints on urban livestock keeping (Güendel 2002). The issue of space and housing may be of greater significance for urban than rural livestock keepers who have more restrictions in terms of space (Heffernan 2002). An example from Cairo demonstrates how important access to space is for livestock keeping; 70.8% of all livestock keeping households in Cairo live either on the top floor or with access to the roof, a popular place for poultry production, or live on the ground floor thereby having access to a yard or public space (Gertel and Samir 2000). Limited social capital may also constrain urban livestock keepers, for example,

Güendel (2002), suggests that a lack of organisation among poor urban livestock keepers means they cannot express their demands adequately and effectively, and furthermore their lack of access to sources of advice and information regarding livestock husbandry practices limits their knowledge of how to best keep livestock (Güendel 2002). However, little research has been done into the networks of social capital that poor urban livestock keepers do have access too.

Different types of livestock keeper face different constraints, for example the constraints faced by producers in La Paz and El Alto, Bolivia vary somewhat from the constraints faced by livestock keepers in other cities. For example La Paz, the capital of Bolivia and El Alto, an autonomous suburb, exist at a very high altitude, 3,600 – 3,800 m asl and 4,000 – 4,100 m asl respectively and this physical location, which strongly influences the climate, presents some of the main constraints on urban farming activities. Water especially is a critical constraint on all farming activities including livestock keeping in La Paz and El Alto (Kreinecker 2000). Different constraints are also associated with different livestock species, for example, high price of fodder, space and problems of waste disposal may be especially constraining for urban cattle keeping (Gertel and Samir 2000). Where animals are zero grazed obtaining sufficient quantities of fodder is likely to constrain production, whereas the quality of feed is a problem for scavenging or free roaming animals (Güendel 2002). Urban livestock keepers from different social groups, as well as having different reasons for keeping livestock, also face different opportunities and constraints, and poor livestock keepers have less access to and control over inputs and less access to services and are more likely to be harassed than their better off counterparts (Güendel 2002).

Different researchers have studied these constraints in different ways. For example, Foeken and Owuor conducted a general survey on urban agriculture in Nakuru, Kenya in which 594 households were surveyed, livestock keepers were asked about the problems of animal rearing in town. Some problems were associated predominantly with keeping large livestock, for example lack of feed and access to drinking water, harassment was also a constraint specific to large livestock, whereas predators were a problem associated with small livestock. However, animal health was by far the largest concern for livestock keepers, with 72% mentioning it as one of the problems

and 57% considering it the major problem of animal production (Foeken and Owuor 2000). Other studies have used different methods for investigating the constraints faced by livestock keepers. Heffernan *et al.* (2001), for example, used tools that are associated with a more participatory approach to explore how livestock keepers in Kenya prioritise the problems and constraints associated with livestock keeping, this included ranking and descriptive exercises to probe the positive and negative factors involved in livestock keeping. The results from this study indicated that disease was again of major concern to livestock keepers with drought being another significant constraint (Heffernan, Misturelli et al. 2001). However, this research was not conducted exclusively in an urban setting. Güendel, (2002) co-ordinated a study of urban livestock keeping in East Africa, the methods used for the study, which included an assessment of the constraints on urban livestock keeping, incorporated questionnaires and stakeholder meetings. However, no reference is made to the contents of these meetings or to the scale and breadth of the survey. The study report presents a range of constraints including: inappropriate waste management, water availability, poor livestock health and high cost of veterinary services, feed availability and quality, low production, poor organisation and networking, lack of research and limited knowledge. However it is unclear if these are the constraints as identified by livestock keepers themselves or those identified by other stakeholders, furthermore no ranking or relativity in terms of importance and significance of these constraints is offered (Güendel 2002).

4.0 POLICY, INSTITUTIONS AND URBAN LIVESTOCK

4.1 Current Policy

Policy and institutions were identified as a constraint on urban agriculture in the previous section. This part of the literature review will consider further the nature of policy and institutional constraints on urban livestock keeping and some of the policy recommendations that are found in the literature. Particular attention will be paid to the potential role of extension services and some of the issues arising from the institutionalisation of urban farming activities will also be discussed.

Urban authorities have responded to urban agriculture in a variety of ways (Lewcock 1996). In East and South-East Asia, where there is a long tradition of urban farming, there is significant support from authorities (Lewcock 1996). In Africa, a more

restrictive policy often characterises the attitudes of authorities to urban agriculture (Lewcock 1996). In some parts of Latin America urban agriculture is encouraged through government programmes (Lewcock 1996). At a citywide level the response of many local governments to urban agriculture is to limit it, however some city governments, for example in Mexico city, Jakarta and Buenos Aries have recognised its role and have established departments with extension and research divisions to deal with urban agriculture (UNDP 1996). Municipalities in Java, Indonesia, provide some marketing support, extension services and facilitate access to land for some urban farming activities (UNDP 1996). In Latin America some cities have policies supporting some urban agricultural activities (Madaleno 2001). The following examples are of policies that may have positive impacts on poor urban livestock keepers. In Lima, Peru, policy at national level promotes micro livestock such as rabbits and ducks in urban areas. In Parà, Brazil, a state level policy provides support for raising chickens and ducks in peri-urban areas. There is local level support for local farmer co-operatives in poor areas of Bogotà, Columbia and further local legislation in Mexico City provides financial support for chicken keepers in addition to supporting urban dairy production (Madaleno 2001).

The impacts of policy on poor urban livestock keepers varies greatly, for example the exclusion of livestock keeping from plans regarding urban land use present a different range of issues to policies that actively persecute urban livestock keepers. In La Paz and El Alto, Bolivia, despite the prevalence of livestock keeping and cultivation, there is formally no such thing as urban agriculture and when questioned “the secretary-general of El Alto's municipal government confirmed that 'something like that' does not exist in El Alto, while he passed by sheep grazing at the roadside” (Kreinecker, 2000, p.391). Where there is no official recognition of urban farming there is often no account for it in urban planning, and therefore no services or facilities that could benefit poor producers (Waters-Bayer 2000).

Livestock keeping is probably the most controversial aspect of urban agriculture with animals widely perceived as a nuisance, a threat to human health and public safety, noisy, smelly and generally not appropriate for urban conditions (Schiere and Van der Hoek 2001). Even in India, where it might be assumed that cows are an uncontroversial part of the cityscape, recent policy formulation at a national level

proves otherwise. In 1998 the nation wide Supreme Court Interim Report stated 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" (Nunan 2000). This national policy is echoed by municipal authorities in Delhi who are campaigning for a ban on cattle in the city. Public hygiene is the main platform for the campaign, despite evidence that dung is utilised as fuel and the considerable quantities of organic waste consumed by cattle significantly reduces the municipal authorities waste disposal bill (Bentick 2000). A more pertinent reason for the ban might well be the 'backward' image that cattle give to urban India. The official policy line in Delhi is to remove cattle from the city, but authorities have had little success in implementing it (Bentick 2000). Nunan (2000) provides a further example of municipal authorities in India being increasingly intolerant of livestock rearing. Authorities in Hubli-Dharwad, in the State of Karnataka have made recent moves to evict roaming pigs from the city and in 1997 the Hubli-Dharwad Municipal Corporation began rounding up and removing between 50 and 60 pigs a week, a policy that reflects a broader trend in the national perspective on livestock in cities (Nunan 2000). The scale to which policy restricting urban livestock keeping impacts on the livelihoods of poor urban livestock keepers depends on the degree to which such policies are enforced. The differences between the formulation and implementation of policy can be considerable, and as Bourque (2000:124) suggests, in reality "policy is often determined by those who implement and enforce it". Both prohibitive and supportive policy regarding urban livestock will have little impact on the livelihoods of poor urban livestock keepers if not enforced or supported. Banning urban livestock production to avoid the associated problems is not a practical solution as the vast scale of urban livestock keeping is a predominant reason why existing prohibitions remain largely unenforced (Foeken and Mwangi 2000). Denying urban farming a legitimate status may also be counter productive, preventing the intervention of government services which could potentially help improve animal health, reduce risks to human health and improve the urban environment (Waters-Bayer 1996).

4.2 Policy Recommendations

There are a variety of policy recommendations regarding urban agriculture, and more specifically urban livestock keeping, in the literature. Some authors are keen to encourage intervention in urban agriculture and remould current policy thinking

regarding food production in urban areas (UNDP 1996; Bourque 2000; Waters-Bayer 2000), while others remain more cautious with their recommendations (Ellis and Sumberg 1998).

Many authors recommend that some degree of regulation is needed with regard to urban livestock, as the associated risks do raise real concerns (Foeken and Owuor 2000; Mwalukasa 2000). A survey of urban agriculture in Nakuru, Kenya, was conducted in 1999 and included interviews with 121 livestock keepers (Foeken and Owuor 2000). The aim of the survey was to provide the urban authorities with an overview of urban agriculture in Nakuru with the purpose of informing planning exercises. The authors of the survey findings outline some appropriate policy steps. The report recommends that policy regarding livestock keeping in cities should distinguish between small and large livestock, which have different associated risks and benefits. Further recommendations included the establishment of zones where certain types of farming and certain types of animals are permitted, it is also suggested that "the number of cattle should be bound to a certain maximum and should be kept under zerograzing" (Foeken and Owuor 2000). Other policy recommendations are more facilitatory than restrictive, with suggestions that more should be done to improve the recycling of animal waste and technical and extension advise should be made available to livestock keepers. A prerequisite of policy change regarding urban livestock is the recognition and acceptance of urban agriculture as a valid form of urban land use, Nakuru is unusual in that this prerequisite appears to have been met (Foeken and Owuor 2000). Dar es Salaam is another city where policy regarding urban agriculture has been recently revised (Mwalukasa 2000). Key aspects of the new strategy on urban agriculture that referred specifically to livestock keeping included:

> Moving large livestock to periurban areas and promoting growing fodder on periurban farms … Encouraging livestock keeping in low-density areas and supporting small livestock keeping in high-density areas where it is already common practice … No livestock rearing in high-density residential areas … Zero-grazing in built-up low-density residential areas and open grazing only in periurban areas.
>
> Mwalukasa 2000:152-153

Ellis and Sumberg (1998) identify a further range of recommendations for policy in the urban agriculture literature. These recommendations include: the revoking by laws, broad zoning, identifying public land for agriculture, setting aside plots as a city expands, changing the legal framework and encouraging the involvement of NGOs (Ellis and Sumberg 1998). Bourque (2000), and de Zeeuw (2000), explore in detail some of the policy options for urban agriculture and how they might be achieved; improved resource use, technical support services, input/output support services and health policy are all areas recommended for positive policy action (Bourque 2000; De Zeeuw 2000). Integrating urban agriculture into urban planning, particularly land use planning, is also a central theme to emerge from the literature (Maxwell 1996; De Zeeuw 2000; Drescher, Jacobi et al. 2000). Other themes include the need to improve access to markets for urban livestock producers (Bohrt, 1993), and the re-training of government officials in relation to urban agriculture (Schiere and Van der Hoek 2001). Schiere, et al. (2000), argue that non-linear thinking and creative approaches are required when discussing the role of livestock in cities. However, the process of shedding preconceived ideas regarding urban livestock requires the (re)orientation of planners, civil servants and academics at an institutional level (Schiere, Tegegne et al. 2000). Such (re)orientating involves the education of policy makers with regard to the potential benefit of urban livestock (Aldington 1997; Schiere, Tegegne et al. 2000). The recognition of livestock keeping and other agricultural practices as valid urban activities is a fundamental step towards creating more appropriate policy for urban agriculture, and Bourque (2000), suggests that at the very least a policy environment where people can create their own solutions to the problems they face is required. However, Bourque also argues that legitimising urban agriculture and recognising the contribution it can make to alleviating poverty does not mean the root causes of poverty are being addressed and confronted, and institutional change should also tackle the causes of poverty (Bourque 2000). Policy regarding urban agriculture should, ideally, be based on a multi-stakeholder planning process and be responsive to local conditions (De Zeeuw 2000).

Although many authors encourage a revision of policy regarding urban agriculture others are more cautious, Bruins (1997), for example suggests that the informal sector of urban agriculture should not be taken over by authorities but suggests that some elements of planning and investment could benefit the urban poor (Bruins 1997). Ellis

and Sumberg (1998), also emphasise the need for caution when considering the policy context of urban agriculture and recommend that where policy change is advocated it should be enforceable, sustainable and not prone to capture by stronger social groups at the expense of weaker groups. Ellis and Sumberg (1998), are critical of advocates of interventionist policy, arguing that interventionist policy has traditionally focussed on outputs, with potentially damaging consequences for the welfare of poor producers and they suggest that it would be very difficult to target the poorest producers in such a way that they benefit from policy advocating urban agriculture (Ellis and Sumberg 1998). The authors however, do not argue against the involvement of community groups, NGOs or self-help schemes in the area of urban agriculture but rather suggest that making fresh demands on public resources in places where they are scarce is not appropriate (Ellis and Sumberg 1998). Central to the argument presented by Ellis and Sumberg (1998) is the notion that not all activities that contribute to the livelihoods of the poor have to become a focus for donors or governments. However, the authors do agree that the interests of the urban poor are best met when they are permitted to construct their livelihoods from as wide as possible range of opportunities and options, and in this context support a policy proposal whereby governments drop their attempts to ban food producing activities in urban areas (Ellis and Sumberg 1998).

4.3 The Potential role of Extension Services

The provision of technical assistance, extension and advice is frequently mentioned as a policy option that could support urban livestock production (Maxwell, Levin et al. 1998; De Zeeuw 2000; Waters-Bayer 2000). Poor urban livestock keepers are, Güendel (2002) suggests, "marginalized from existing knowledge and improved technologies" (Güendel 2002:iv). The provision of extension services is one recommendation that could potentially improve the access of poor urban livestock keepers to knowledge, information and technology regarding animal husbandry practices(Güendel 2002). However, based on the experience of existing services, access to extension and veterinary services would remain an issue for poor urban livestock keepers even should more extensive services be implemented. Existing extension services for urban livestock production are extremely limited, and even where they do exist, in the form of private veterinary services for example, the cost is often prohibitive for poor livestock keepers (Güendel 2002). Furthermore, where there are some extension services available, for example in Nairobi, many farming

activities such as grazing animals along roadsides, riversides and sewage lines are officially prohibited, meaning many poor farmers are excluded from services (Foeken and Mwangi 2000).

The meaning of agricultural extension has changed and evolved over time and is interpreted differently by different people, however extension broadly involves varying degrees of communication, technology transfer, knowledge and information exchange and increasingly a facilitatory role (Anderson and Farrington 1996; Enters and Hagmann 1996; Jones and Garforth 1997). There is however, a debate surrounding the targeting of the poor in the provision of extension services. Ellis and Sumberg (1998), argue that targeting the poor so they receive the benefits of policy, such as extension provision, is very difficult because inputs, such as advise and information, are often captured by the better informed and better off rather than the poorest (Ellis and Sumberg 1998). Garforth (2001), furthers this notion, suggesting that the connections of resource rich mean they are usually the first to get information about new services and opportunities, and where services are offered to all producers those that are already better off have a tendency to benefit disproportionately (Garforth 2001). Another point connected to pro-poor targeting of extension services is the recognition that the poor are not only producers but consumers and labourers; consequently extension can benefit the poor in different ways, for example extension that leads to cheap, regular food supplies can benefit poor consumers even if it does not benefit poor producers (Farrington, Christoplos et al. 2002). If poor producers, rather than poor consumers or labourers, are the main intended beneficiaries of targeted extension then in order to reduce poverty extension must relieve some of the constraints faced by producers (Garforth 2001). Evidence suggests that poorer farmers may well have strong networks of social capital through which knowledge and information can be exchanged, however accessing information and advice that is external to these networks may be more problematic for poor farmers (Garforth 2001). If knowledge and information are indeed critical constraints faced by poor urban livestock keepers then extension services could prove beneficial. High transaction costs are often faced by poor producers due to limited information and weak infrastructure and pro-poor extension could have a role in reducing these costs (Farrington, Christoplos et al. 2002). Advice about animal health and access to drugs could potentially not only improve the livelihood of the farmer concerned, but have

positive externalities, reducing the potential for urban livestock to spread disease and threaten the health of other animals and humans (Waters-Bayer 2000). Improving facilities and mechanisms for recycling animal waste also has a range of benefits that extends beyond the livestock keeper, improving the urban environment and potentially benefiting cultivators who can make use of waste as manure (Nunan 2000).

4.3 Issues Arising

It is important to understand the impact of policy on different livelihood groups (De Zeeuw 2000). Maxwell (2001), suggests that motives for urban farming are complex and multiple and related to internal household dynamics and struggles for resources as much as they are linked to external factors. For women, who make up the majority of urban farmers, there may be good reasons for perpetuating the view that their farming activities are marginal and keeping their economic activities 'hidden'. Indeed, part of the success of urban agriculture as a strategy for increasing food security may be its role in providing women with the opportunity to control their own income and access a food supply that is detached from unpredictable markets and wages (Maxwell 2001). There is a potential danger that policy that legitimises and promotes urban agriculture may inadvertently reduce the autonomy and independence of female farmers by contributing to conflict in the household over the benefits of interventions. Furthermore, "recent research on gender conflicts over economic activities elsewhere in Africa suggests that well-intended donor programs can easily be manipulated by men to recapture female labour and income in circumstances where women had asserted some autonomy over their economic activities" (Maxwell 2001). A further example relates to changing the focus and purpose of urban livestock production. Smallholder dairy production can contribute to household nutrition as well as providing an income, the introduction of crossbred cows, and an associated package of management and feeding strategies, can increase milk production, thereby boosting both income and household nutrition. However, there is a concern that as milk yields increase it will be increasingly perceived as a cash crop and men may take control of marketing milk, consequently women may lose control over income and also control over household consumption of milk (ILRI 1998). Maxwell (2001) argues that programs relating to urban agriculture should work consciously to avoid such threats to the intended beneficiaries and proposes a number of policy strategies to this effect,

for example targeting female-headed households and working through established women's groups (Maxwell, Levin et al. 2000). Any change in the policy and institutional position on urban agriculture, if it is to be of justified in terms of poverty alleviation, must ensure that the benefits of promoting and legitimising urban agriculture can be captured poorer rather than wealthier stakeholders groups. The direct and indirect impacts of policy and interventions must be sufficiently monitored and evaluated to ensure the poor are indeed the beneficiaries (Maxwell, Levin et al. 2000). Because women often dominate urban agriculture, partly due to their exclusion from other income generating activities, any stakeholder consultation must ensure that women are adequately represented and their needs and priorities articulated. Without the above conditions there is a danger that attempts to promote urban agriculture rather increase the constraints on what is often one of the only measures some groups of the urban poor have for ensuring their livelihoods and securing food (Maxwell 2001).

REFERENCES

Adam, M. (2001). Definition and Boundaries of the Peri-urban Interface: Patterns in the Patchwork. Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. P. Drechsel and D. Kunze. Wallingford, CABI Publishing**:** 193-208.

Aldington, T. (1997). "Urban and peri-urban agriculture: Some thoughts on the matter." Land Reform, Land Settlement & Cooperatives **2**: 43-44.

Amis, P. (2001). "*Attacking poverty*: But What Happened to Urban Poverty and Development?" Journal of International Development **13**(3): 353-360.

Anderson, J. and J. Farrington (1996). "Forestry extension: Facing the challenges of today and tomorrow." Unasylva **47**(1): Available on FAO website at: http://fao.org/docrep/v9122e/v9122e02.htm.

Armar-Klemesu, M. (2000). Urban Agriculture and Food Security, Nutrition and Health. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 99-117.

Bayer, W. and A. Waters-Bayer (1998). Forage Husbandry. London, Macmillan Education Ltd.

Beall, J. and N. Kanji (1999). Households, Livelihoods and Urban Poverty, www.livelihoods.org/info/docs/urbhsld1.doc. **November 2002**.

Becker, C., M and A. Morrison, R (1999). Urbanization in Transforming Economies. Handbook of Regional and Urban Economics: Volume 3 Applied Urban Economics. P. Cheshire and E. Mills, S. Amsterdam, Elsevier**:** 1673-1790.

Bentick, J. (2000). The Stray-Cattle Controversy in Delhi, www.ruaf.org. **September 2002**.

Bigsten, A. and S. Kayizzi-Mugerwa (1992). "Adaptation and distress in the urban economy: A study of Kampala households." World Development **20**(10): 1423-1441.

Binns, T. and K. Lynch (1998). "Feeding Africa's growing cities into the 21st century: the potential of urban agriculture." Journal of International Development **10**(6): 777-793.

Bourque, M. (2000). Policy Options for urban Agriculture. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 119-148.

Brickhill, J. (1998). Investigating the Impact of Urban Agriculture in Harare, Zimbabwe, www.idrc.ca/reports/read_article_english.cfm?article_num=239. **October 2002**.

Bruins, H. (1997). "Drought Mitigation Policy and Food Provision for Urban Africa: Potential Use of Treated Wastewater and Solar Energy." Arid Lands Newsletter(42): In http//:www.eldis.org.

Carney, D. (1998). Implementing the Sustainable Rural Livelihoods Approach. Sustainable Rural Livelihoods; What contribution can we make? D. Carney. London, DFID**:** 3-23.

Collins, J. and D. Whiteside (2002). East Timor Fears Stray Sows Will Ruin Independence Day, www.cityfarmer.org. **September 2002**.

Cox, A., J. Farrington, et al. (1998). Reaching the Poor? Developing a Poverty Screen for Agricultural Research Proposals. London, ODI.

De Zeeuw, H. (2000). The Integration of Agriculture in Urban Policies, www.ruaf.org and shortened from Bakker et al. **October 2002**.

Del Campo, L. M. (2002). Management And Utilisation Of Waste From Slaughterhouses In Developing Countries, www.fao.org. **October 2002**.
DFID (2001). Meeting the challenge of poverty in urban areas. London, DFID.
Drechsel, P. and D. Kunze, Eds. (2001). Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. Wallingford, CABI Publishing.
Drescher, A., P. Jacobi, et al. (2000). Urban Food Security: Urban Agriculture, Response to Crisis, www.ruaf.org. **October 2002**.
Ellis, F. (1998). Livelihood Diversification and Sustainable Rural Livelihoods. Sustainable Rural Livelihoods; What contribution can we make? D. Carney. London, DFID.
Ellis, F. (2000). Rural Livelihoods and Diversity in Developing Countries. Oxford, Oxford University Press.
Ellis, F. and J. Sumberg (1998). "Food production, urban areas and policy responses." World Development **26**(2): 213-225.
Enters, T. and J. Hagmann (1996). "One-way, two-way, which way? Extension workers: from messengers to facilitators." Unasylva **47**(1): Available on FAO website at: http://www.fao.org/docrep/v9122e/v9122e03.htm.
Fall, S. T., S. A. Fall, et al. (2000). Urban Livestock Systems in the Niayes Zone in Senegal, www.ruaf.org/newslgen_fr.html. **Dec 2002**.
FAO (2000). Urban and Peri-Urban Agriculture, www.fao.org/unfao/bodies/COAG/COAG15/X0076e.htm. **September 2002**.
Farrington, J., D. Carney, et al. (1999). Sustainable Livelihoods in practice: Early Applications of concepts in Rural Areas - CHECK!!! London, ODI.
Farrington, J., I. Christoplos, et al. (2002). "Creating a Policy Environment for Pro-Poor Agricultural Extension: The Who? What? and How?" Natural Resource Perspectives **80**.
Foeken, D. and A. M. Mwangi (2000). Increasing food security through Urban Farming in Nairobi. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 303-328.
Foeken, D. and S. O. Owuor (2000). Urban Farmers in Nakuru, Kenya, www.cityfarmer.org/nakuru.html#nakuru. **October 2002**.
Foeken, D. and S. O. Owuor (2000). Urban Farmers in Nakuru, Kenya. Leiden, African Studies Centre, via www.cityfarmer.org/nakuru.html#nakuru.
Garnett, T. (1996). "Farming the City: The Potential of Urban Agriculture." The ecologist **26**(6): 299.
Garnett, T. (1996). "Harvesting the cities." Town and country planning : the quarterly review of the Town and Country Planning Association **65**(10): 264-266.
Gebre-Egziabher, A. (1996). "Understanding urban survival strategies: urban agriculture, the ultimate stage in household survival." Habitat Debate **2**(2): 21-22.
Gertel, J. and S. Samir (2000). Cairo: urban agriculture and visions for a "modern" city. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 209-234.
Ghirotti, M. (1999). "Making better use of animal resources in a rapidly urbanizing world: a professional challenge."**? ULB**.
Güendel, S. (2002). Peri-Urban and Urban Livestock Keeping in East Africa - A Coping Strategy for the Poor. ?, NRI.

Haddad, L., M. T. Ruel, et al. (1999). "Are Urban Poverty and Undernutrition Growing? Some Newly Assembled Evidence." World Development **27**(11): 1891-1904.
Harris, P. J. C., M. Allison, et al. (2001). The Potential Use of Waste-stream Products for Soil Amelioration in Per-urban Interface Agricultural Production Systems. Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. P. Drechsel and D. Kunze. Wallingford, CABI Publishing**:** 1-27.
Heffernan, C. (2002). Livestock Services and the Poor. Reading, LDG: The University of Reading.
Heffernan, C. and F. Misturelli (2000). The Delivery of Veterinary Services to the Poor: Preliminary findings from Kenya, LDG: The University of Reading.
Heffernan, C., F. Misturelli, et al. (2001). Restocking and Poverty Alleviation: Perceptions and Realities of Livestock-Keeping Among Poor Pastoralists in Kenya. Reading, LDG: The University of Reading.
Henderson, V. (2002). "Urbanization in Developing Countries." The World Bank Research Observer **17**(1): 89-112.
Herr, H. and G. Karl (2002). Estimating Global Slum Dwellers: Monitoring the Millennium Development Goals 7, Target 11, UN HABITAT www.unhabitat.org/mdg/documents/MDG_Data_Sourcesandmethod.pdf. **Dec 2002**.
ILRI (1998). ILRI 1997: Livestock, people and the environment. Nairobi, International Livestock Research Institute.
Jamal, V. and J. Weeks (1993). Africa Misunderstood, or Whatever Happened to the Rural-Urban gap? London, The Macmillan Press Ltd.
Jones, G. E. and C. Garforth (1997). History, Development and Future of Agricultural Extension. Improving Agricultural Extension: A Reference Manual. B. Swanson. Rome, FAO**:** Chapter 1.
Kiango, S. and J. Amend (2001). Linking (Peri-)Urban Agriculture and Organic Waste Management in Dar es Salaam. Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. P. Drechsel and D. Kunze. Wallingford, CABI Publishing**:** 115-128.
Kironde, J. M. L. (1992). "Received Concepts and Theories in African Urbanisation and Management Strategies: The Struggle Continues." Urban Studies **29**(8): 1277-1292.
Kreinecker, P. (2000). La Paz: Urban Agriculture in harsh ecological conditions. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 391-412.
Lewcock, C. (1996). "Agricultural issues for developing country city management." Town and country planning : the quarterly review of the Town and Country Planning Association **65**(10): 267-269.
LID (1998). The Integration of Livestock Interventions into a Sustainable Rural Livelihoods Approach. Sustainable Rural Livelihoods; What contribution can we make? D. Carney. London, DFID**:** 93-106.
Lopez, M., H. Losada, et al. (1999). The influence of urban tourism on household agriculture: The rabbit as a new guest in the Southeast of the metropolitan area of Mexico City, www.eldis.org. **September 2002**.
Losada, H., J. Cortés, et al. (1998). 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, www.cityfarmer.org. **September 2002**.
Lynch, K., T. Binns, et al. (2001). "Urban agriculture under threat - The land security question in Kano, Nigeria." Cities **18**(3): 159-171.
Madaleno, I. (2001). Urban Agriculture Supportive Policies in Latin America, www.cityfarmer.org. **October 2002**.
Mantovani, A. (2000). Veterinary urban hygine in developing countries, www.ruaf.org/newslgen_fr.html. **Dec 2002**.
Maxwell, D. (1996). "Highest and best use? Access to urban land for semi-subsistence food production." Land Use Policy **13**(3): 181-195.
Maxwell, D. (2001). Internal Struggles over Resources, External Struggles for Survival: Urban Women and Subsistence Household Production, www.cityfarmer.org/danmax.html#danmax. **October 2002**.
Maxwell, D., W. O. Larbi, et al. (1999). "Farming in the shadow of the city: Changes in land rights and livelihoods in peri-urban Accra." Third World Planning Review **21**(4): 373-391.
Maxwell, D., C. Levin, et al. (2000). Urban Livelihoods and Food and Nutrition Security In Greater Accra, Ghana, www.ifpri.org/checknames.cfm/rr112.pdf?name=rr112.pdf&direc=d:\webs\ifpri\pubs\abstract\112.
Maxwell, D., C. Levin, et al. (1998). "Does urban agriculture help prevent malnutrition? Evidence from Kampala." Food Policy **23**(5): 411-424.
Maxwell, D. G. (1995). "Alternative Food Security Strategy - a Household Analysis of Urban Agriculture in Kampala." World Development **23**(10): 1669-1681.
Mehta, D. (2000). "Urbanization of Poverty." Habitat Debate **6**(4): http://www.unhabitat.org/mdg/documents/global/Vol6_No4_urbanization_of_poverty.doc.
Mensah, E., P. Amoah, et al. (2001). Environmental Concerns of Urban and Peri-urban Agriculture: Case studies from Accra and Kumasi. Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. P. Drechsel and D. Kunze. Wallingford, CABI Publishing**:** 55-68.
Mlozi, M. R. S. (1999). Urban Agriculture, Production and marketing: The Tanzania Experience. Urban and peri-urban agriculture in Africa: Proceedings of a Workshop, Netanya, Israel, Ashgate Publishing Ltd, Aldershot.
Mohamed Saleem, M. A. (1998). "Nutrient balance patterns in African livestock systems." Agriculture, Ecosystems and Environment **71**(1): 241-254.
Mougeot, L. (2000). Urban Agriculture: Definition, Presence, Potentials and Risks. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 1-43.
Mwalukasa, M. (2000). Institutional aspects of Urban Agriculture in the city of Dar es Salaam. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 147-159.
Nasr, J. and P. Kaldjian (1997). "Agriculture in Middle Eastern cities: Commonalties and contrasts." Arid Lands Newsletter(42): In Http//:www.eldis.org September 2002.
Neondo, H. (2002). More Kenyans Consume Raw Milk Due to Poverty, www.cityfarmer.org/milkKenya.html#rawmilk. **Dec 2002**.
Nunan, F. (2000). Livestock and Livelihoods in Hubli-Dharwad, www.ruaf.org/newslgen_fr.html. **September 2002**.

Nunan, F. (2000). Waste not want not: Making the most of urban organic waste - check name, www.id21.org/society/2cfn3.html. **September 2002**.

Page, B. (2002). "Urban agriculture in Cameroon: an anti-politics machine in the making?" Geoforum **33**(1): 41-54.

Pantuliano, S. (2000). The Beja Urban Economy: Understanding and responding to an evolving reality, www.ruaf.org. **September 2002**.

Pernia, E. M. and M. G. Quibria (1999). Poverty in Developing Countries. Handbook of Regional and Urban Economics: Volume 3 Applied Urban Economics. P. Cheshire and E. S. Mills. Amsterdam, Elsevier**:** 1865-1934.

Purnomohadi, N. (2000). Jakarta: Urban Agriculture as an alternative strategy to face the economic crisis. Growing Cities, Growing Food. N. Bakker, M. Dubbeling, S. Güendel, U. Sabel-Koschella and H. de Zeeuw. Feldafing, DSE**:** 453-466.

Rakodi, C. (1988). "Urban Agriculture - Research Questions and Zambian Evidence." Journal of Modern African Studies **26**(3): 495-515.

Rakodi, C. (1988). Urban Agriculture in Lusaka. Women and Environment in the Third World: Alliance for the Future. I. Dankelman and J. Davidson. London, Earthscan Publications Ltd**:** 108-110.

Ravallion, M. (2001). On the Urbanization of Poverty, www.worldbank.org http://econ.worldbank.org/files/1695_wps2586.pdf. **September 2002**.

Richardson, G. and J. Whitney (1995). "Goats and Garbage in Khartoum, Sudan: A Study of the Urban Ecology of Animal Keeping." Human Ecology **23**(4): 455-475.

Ruel, M. T., L. Haddad, et al. (1999). "Some Urban facts of Life: Implications for Research and Policy." World Development **27**(11): 1917-1938.

Sanderson, D. (2000). "Cities, Disasters and Livelihoods." Environment and Urbanization **12**(2): 93-102.

Sansoucy, R., M. A. Jabbar, et al. (1995). The Contribution of livestock to food security and sustainable development. Joint FAO/ILRI Roundtable on Livestock Development Strategies for Low Income Countries, Addis Ababa, Ethiopia, Fao, Rome; ILRI, Nairobi.

Santandreu, A., G. Castro, et al. (2000). Urban Pig Farming in Irregular Settlements in Uruguay, www.ruaf.org/newslgen_fr.html. **Dec 2002**.

Schiere, H., A. Tegegne, et al. (2000). Livestock in and around cities, www.ruaf.org. **September 2002**.

Schiere, H. and R. Van der Hoek (2001). Livestock keeping in urban areas: A review of traditional technologies based on literature and field experiences. Rome, FAO**:** http://www.fao.org/DOCREP/004/Y0500E/y0500e00.htm#toc.

Sen, A. (1981). Poverty and Famines: An Essay on Entitlement and Deprivation. Oxford, Oxford University Press.

Seré, C. and H. Steinfeld (1996). World Livestock Production Systems: Current Status, Issues and Trends. Rome, FAO Animal Production and Health paper 127.

Siegmund-Schultze, B. and B. Rischkowsky (2001). "Relating household characteristics to urban sheep keeping in West Africa." Agricultural Systems **67**: 139-152.

Tegegne, A., M. Tadesse, et al. (2000). Market-oriented Urban and Peri-Urban Dairy Systems, www.ruaf.org. **September 2002**.

UN (1999). World Urbanization Prospects: The 1999 Revision, http://www.un.org/esa/population/publications/wup1999/urbanization.pdf. **Dec 2002**.

UNDP (1996). Urban agriculture: food, jobs and sustainable cities. New York, United Nations Development Programme (UNDP).

UNDP (1996). An Urbanizing World: Global report on Human Settlements 1996. Oxford, Oxford University Press.

van't Hooft, K. (2000). Cysticercosis, a Zoonosis in Rural and Urban Areas, www.ruaf.org/newslgen_fr.html. **Dec 2002**.

Ward, C. (2000). "Exploring urban agriculture." Town and country planning : the quarterly review of the Town and Country Planning Association **69**(6): 179.

Waser, K. (1997). "The newly recognised importance of urban agriculture." Arid Lands Newsletter **42**: In www.eldis.org September 2002.

Waters-Bayer, A. (1996). "Animal Farming in African Cities." African Urban Quarterly **11?**: 218-226.

Waters-Bayer, A. (2000). Learning to Live with Livestock in Town, www.ruaf.org. **September 2002**.

WorldBank (2000). World Development Report 1999/2000: Entering the 21st Century. New York, Oxford University Press.

WorldBank (2001). World Development Report 2000/2001: Attacking Poverty. New York, Oxford University Press.

WorldBank (2002). World Development Report 2003: Sustainable Development in A Dynamic World. Washington, D.C., The World Bank.

WorldBank (2003). World Bank Development Report 2003: Sustainable Development in a Dynamic World. New York, Oxford University Press.

WRI (1997). World Resources 1996-97, A guide to the Global Environment: The Urban Environment, World Resources Institute, www.wri.org/wri/wr-96-97/ud_b3.html. **Dec 2002**.