

**The Peri-Urban Interface:  
a Tale of Two Cities**

**Edited by**

**Robert M Brook,  
School of Agricultural and Forest Sciences,  
University of Wales, Bangor**

**Julio Dávila,  
Development Planning Unit,  
University College London**

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Copies of this book may be obtained from:

Dr Robert Brook, School of Agricultural and Forest Sciences, University of Wales, Bangor, Gwynedd, LL57 2UW, United Kingdom.

E-mail: r.m.brook@bangor.ac.uk Fax: +44 (0)1248 354997.

Dr Julio Dávila, Development Planning Unit, 9 Endsleigh Gardens, London, WC1H 0ED, UK.

E-mail: j.davila@ucl.ac.uk Fax: +44 (0)20 7387 4541.

Natural Resources Systems Programme, HTS Consultants, Thamesfield House, Boundary Way, Hemel Hempstead, Herts, HP2 7SR, UK.

E-mail: nrsp@htsdevelopment.com Fax: +44 (0)1442 21886.

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## 4 Livestock

### Characteristics of major production systems in the peri-urban interface, Hubli-Dharwad

As explained in Chapter 1, as a city expands and increases the length of the interface, so the areas representative of 'urban' and 'peri-urban' increase. Land that earlier met the definition of 'peri-urban' becomes 'urban' and truly rural land now becomes 'peri-urban'. Although the remit of the original knowledge consolidation project was a peri-urban one, in this case it seemed appropriate to consider livestock production systems in both 'urban' and 'peri-urban' zones, in order to understand how the degree of urbanisation influences animal enterprises through and across the 'interface'. Unfortunately, most information available from project documents related to the urban environment and contrasts with the peri-urban were difficult to establish.

#### *Cattle and Buffalo*

##### *Caveat*

These animals occupy a very special position in India and their importance to Hindu culture cannot be over emphasised. Cattle and buffalo are regarded as sacred and this single fact certainly accounts for the tolerance shown by the majority of inhabitants to the presence of free-ranging animals in urban and peri-urban areas. The treatment of cattle is seldom seen and acts of kindness, such as the provision of feed, are believed to reflect favourably on the benefactor. This strongly held religious belief is unlikely to be challenged in the immediate future and underpins the relationship between man and the animal in all respects.

It follows that any attempt to analyse production systems for cattle and buffalo must take account of this special relationship and to ignore it runs the risk of offending the sensibilities of the vast majority of the people.

Having said that, analysis of current production systems in purely practical, economic terms can still be carried out and the outcomes of such exercises weighed against alternative approaches that might be possible if the animals were not so highly regarded.

##### *General observations*

There appears to be adequate information on the systems of production employed in the Hubli-Dharwad urban and peri-urban areas, which closely follow those found in other city areas in India. Indeed, the husbandry of these animals resembles that of a typical Indian village in many ways. In contrast, the scale of production in terms of the animal population and their production of milk (beef will not be considered for obvious reasons) has not been clearly established. In this section on cattle and buffalo, the principal source of information is Khan and Mulla (1997) unless otherwise stated.

##### *Husbandry*

Milk production units in Hubli-Dharwad range in size from those with 10-20 local or crossbred cows and/or buffalo to units with 1-5 animals (Nunan, 2000). The contribution of dairy farming to household income is roughly proportional to herd-size. People of many castes and tribes keep cattle and buffalo, but particular mention must be made of the Gowlies (Nunan, 2000), who have a long tradition of keeping milking animals, especially buffalo. Cattle breeds represented are a nondescript local type and crossbreeds, which have Deoni, Jersey or Holstein-Friesian blood. The breed of buffalo kept by the Gowlies is the Pandarpuri (alias Dharwari), others keepers have a Surti type.

The health status of mature animals with respect to the major endemic diseases (Foot and Mouth, Haemorrhagic Septicaemia and Blackquarter) is said to be satisfactory as owners have access to vaccination services, but mortality among young stock is high.

The feeding of animals follows typical Indian practice. Among free-ranging animals, especially those within the urban zone, part of their intake is found by foraging on vegetable wastes or as 'handouts' from those anxious to please the gods. Owners supply crop residues after harvest (e.g. sorghum stalks, rice straw) and grass in the rainy season on a cut-and-carry basis. Domestic vegetable waste is also supplied, as is waste from hotels and restaurants. Little compound is used, but straights such as groundnut cake, cotton seed cake, rice bran and horse gram are given in limited amount. Access to grazing is limited within the city but increases as the peri-urban area is approached and occurs on common land and wasteland during the rainy season. Only the larger and better-organised units grow forage crops for their animals in the peri-urban zone and in rural areas.

Animals are hand-milked, often by women, and marketing takes several different forms, as detailed in the section on liquid milk marketing below. Milk yields quoted by Khan and Mulla (1997), which seem somewhat optimistic, are as follows:

- Local cattle: 1200-1800 kg/lactation
- Crossbreeds: 5000-6000 kg/lactation
- Jandarpuri buffalo: 1200-1800 kg/lactation
- Surti buffalo: 600-800 kg/lactation

There is considerable variation in yield between seasons, much higher yields are obtained in the rainy season than in the dry season, but this too is typical of India as a whole (University of Birmingham *et al.*, 1998b, p.56).

#### *Cattle and buffalo numbers*

Information given in the project reports on animal numbers is not consistent. Thus Khan and Mulla (1997) present the following table:

| Particulars        | Cross bred | Local cows | Buffaloes | Total milch cattle |
|--------------------|------------|------------|-----------|--------------------|
| Rural Dharwad      | 13000      | 132500     | 138300    | 283800             |
| Urban Dharwad      | 29000      | 12600      | 18400     | 33800              |
| Hubli-Dharwad City | 1000       | 3300       | 6100      | 10400              |
| Dharwad Total      | 15900      | 145100     | 156700    | 317700             |

These figures do not reconcile across rows for Urban Dharwad or for each of the columns.

Figures presented by Nunan (2000) are for the Hubli-Dharwad City in 1997/98:

| Animal           | Total for 1997/98 |
|------------------|-------------------|
| Local cattle     | 8815              |
| Crossbred cattle | 655               |
| Buffalo          | 6949              |
| Total            | 16419             |

The only (tentative) conclusion it is possible to reach is that there are 10,000 to 16,000 animals in the city and rather more in the peri-urban area. Given the

difficulty of deciding when the urban become peri-urban and the peri-urban becomes rural, the exactness of the figures scarcely matters.

#### *Liquid milk marketing*

There are several channels for the marketing of liquid milk, but the volume passing through each of them cannot be established from project reports consulted. Consequently it is not possible to judge the size of the milk market in the city.

For dairy units in the urban area, marketing follows the following channels (Khan and Mulla, 1997; Nunan, 2000):

- Some of the larger dairy farmers market branded milk in half- or one-litre sachets through delivery boys.
- Urban Gowlies have established bulk outlets with hotels and boarding houses, which take a proportion of their production.
- Urban Gowlies also supply households through deliverymen who carry small churns from house to house. The opportunity for adulteration is clearly present!
- Some milk is supplied direct from the cow, which is driven from house to house for milking, thus obviating the risk of adulteration. In other cases animals congregate at a fixed place twice a day and customers call to purchase milk taken directly from the cow.
- There are milk vendors who do not own animals. These collect milk from producers, pool it and distribute through small outlets, of which there 40-50 in the city.
- Hubli-Dharwad has one large-scale milk processing plant, operated by the Karnataka Milk Federation (KMF) which has the capacity to separate milk, make butter and ghee, pasteurise, make whole and skimmed milk powders and prepare a range of fermented milk products. The background to the KMF and the organisation of its marketing mechanisms are described in (University of Birmingham, *et al.*, 1998b, p. 55). Standardised milk with 3% fat is sold through its agents and up to 110,000 litres is sold daily in this way. It is not clear from the reports what proportion of the output derives from urban or peri-urban sources of milk, but it cannot be very large, most coming from the truly rural zone.

Milk produced in the rural zone, and presumably from some units within the peri-urban zone, follows similar paths, with two important additions:

- The Dairy Co-operative Societies operating at village level buy milk from both members and non-members on a fat/SNF basis. This milk passes to:
- Large creameries such as the KMF, some situated up to 150 km from the city, which package branded milk and market through agencies in the city or supply it direct to larger customers.

As might be expected there appears to be considerable variation in the quality and keeping qualities of liquid milk. The practice of milking in front of the customer, which at least ensures freshness, has been referred to. Milk produced by the KMF and others with the ability to pasteurise will have an extended shelf life and be free of a number of infective organisms. Non-pasteurised, pooled milk, especially that sold from churns is likely to be of low quality and go sour very quickly. It should be noted that the Indian Milk and Milk Products Order (MMPO) for the regulation of milk quality standards does not apply to units handling less than 10,000 litres daily.

#### *Milk products*

There are a variety of milk products produced by KMF, including butter and ghee from cream after separation, whole milk powder, skim milk powder and lassi (buttermilk). Some skim milk is converted into curd and shreekand (a flavoured, sweetened curd). Two ice cream factories in the city purchase cream and skim milk.

#### *Manure and waste*

Urban dairymen may have problems in storing manure but they have no trouble in disposing of it. The manure finds two uses, either as fuel cakes, which fetch Rs15-20 for 100 cakes, or as fertiliser. Farmyard manure (FYM) is sold periodically to landowners at around Rs. 250-300 per tonne, or it may be exchanged for forage (Sinde and Joshi, 1997; Subhas, 1997). In the peri-urban area, those owning land use FYM on their own fields.

Slaughterhouse waste is collected from the abattoir and transported to HDMC pits at the dumping grounds. At auction the material fetches a higher price than general refuse, around Rs. 1,700 to 2,200 per pit (Subhas, 1997).

#### *Pigs*

Unless otherwise stated, information for this section was obtained from Khan and Mulla (1997).

#### *Numbers and breeds*

The pigs of Hubli-Dharwad are predominantly of the local type (Desi) and there does not appear to have been much crossbreeding with 'exotics' such as the Landrace, Large White or Tamworth. The animal is small, black and active and a very good scavenger, though by international standards its performance is poor. All that can be said about numbers is that there are very many! The official figure, quoted by Nunan (2000) is 839 in 1990, but she believes a more realistic figure is around 20,000 in the city. The discrepancy appears to be due to the fact that owners are reluctant or unable to give good estimates of the animals in their possession. For example, they may be unwilling to reveal their financial status to the authorities.

#### *Husbandry*

It is important to understand that the pig as well as the cow is revered in India. According to Hindu mythology the pig is considered to be an 'avatar', i.e. an Incarnation of the Lord Vishnu, the boar being one of the Ten Revered Incarnations (Ghatnekar, 1981).

Within the city, pigs are owned by the lower castes and by members of scheduled tribes, many of whom reside in distinct communities. As with buffalo, there is a tradition of keeping pigs, handed down within the family (Nunan, 2000).

In Hubli-Dharwad, pigs are not 'farmed' in the Western sense of the word and little effort has been made to control breeding, provide veterinary attention or care for the animals between birth and slaughter. The pigs are free to roam the streets and scavenge for feed, though in some instances food wastes are collected and given to them (Nunan, 2000).

This system has undoubted advantages:

- Low husbandry costs, principally arising from the low cost of feeding.
- Low capital costs, as permanent housing is not provided.
- Pigs remove refuse and litter from the streets.

In combination, these factors account for the profitability of pig husbandry in the area, even though the performance of individual animals is low compared to exotic breeds. For example, Ghatnekar (1981) reports the following results (Table 4.1) for Desi and 'exotic' pigs under Indian conditions:

**Table 4.1. A comparison of Desi and 'exotic' pigs**

| Characteristic                         | Country Pigs (Desi) | Exotic Pigs |
|--|---------------------|-------------|
| Adult body weight (kg)                 | 80-120              | 200-255     |
| Number born per litter                 | 6-8                 | 8-11        |
| Number of piglets weaned at 2-3 months | 4-6                 | 6-8         |
| Growing period (months)                | 9-12                | 7-9         |
| Weight at slaughter (kg)               | 40-50               | 80-100      |
| Feed:Gain ratio                        | 6:1                 | 3:1         |
| Dressing percentage                    | 60                  | 80          |
| Age at puberty (months)                | 18                  | 9-12        |
| Farrowing interval (months)            | 12-18               | 8-9         |

These results were obtained under housed conditions and it is unlikely that the 'exotics' would have performed so well on the streets of the city; the Desi is well adapted to its street-wise role. However, the pig has its detractors.

#### *Marketing of pigs*

Pig-meat is eaten by only some of the peoples of India and it would appear that the numbers produced in and around Hubli-Dharwad are more than enough to satisfy local demand as many are exported to Goa and to other cities in Karnataka. Animals are sold on a live-weight and dead-weight basis, at Rs. 15-20 and Rs. 35-50 per kg respectively (Nunan, 2000). The Christmas period is the busiest for trade, presumably because Goan Christians are happy to eat pork over the festive period. Pigs' bristles are used for brush making, but this was not considered in the reports consulted.

#### *Manure*

As pigs roam the streets and are seldom confined to pens, the opportunity to collect their manure is small. However, they serve the useful purpose of consuming all sorts of refuse, even though they foul the streets and are seen as a threat to health for this and other reasons (see below) (Subhas, 1997).

#### *Poultry*

The project reports consulted have little to say about poultry production, both for eggs and meat. This is hardly surprising, as apart from the backyard hen, production is in the hands of relatively well developed producers with broiler

capacities of between 100 to 2,500 birds per week and layer units having 1,000 to 10,000 birds (Khan and Mulla, 1997). In general, such units are well run and follow standard Western practice. Large-scale poultry farmers are presumably well off, having the necessary capital to set up their enterprises. Poultry manure is prized and is used for horticultural purposes (Khan and Mulla, 1997; Subhas, 1997; Sindhe and Joshi, 1997). As birds are not centrally slaughtered but sold to shops where they are killed, there is no great concentration of offal and feathers at any one site. Such material is handled along with other refuse (Subhas, 1997).

It would seem best to leave this sector to its own devices. The following changes can be anticipated, brought about by increasing Western influence:

- A decline in the sale of live-birds for the table.
- An increase in frozen and chilled-bird sales.
- Increasing acceptance of brand names
- Under the aegis of the GATT/WTO, expansion of fast food outlets in Indian cities e.g. KFC and McDonalds (see Starchik Corporate file at [www.starchik.com](http://www.starchik.com)).

No doubt the backyard hen will survive, to provide a few eggs and meat for special occasions. There is no mention of ducks in the reports though there must be some about.

#### *Sheep and goats (shoats)*

Unless stated otherwise, information for this section has come from Khan and Mulla (1997). These animals are kept in the outskirts of the cities and according to official figures the number of sheep has risen from 558 in 1990 to 1,888 in 1997/98. In contrast, goats have declined from 4,139 to 3,683 in the same period (Nunan, 2000).

Animals are kept for milk and meat, and are often owned by people originally from rural areas. There is no information on the sheep-owners, other than that they include Gowlie families (Nunan, 2000). They are cared for by women (and children) and are sold direct to customers. Sheep, being grazers, face increasing shortages of pasture, while goats, which browse, can be maintained on harvested tree material (Nunan, 2000, p.19). There were reported to be '5 or 6 organised sheep farms' (Khan and Mulla, 1997) in the Hubli-Dharwad area, some of which have floated 'sheep bond schemes'. The significance of these schemes is not clear. Sheep penning on harvested arable land is practised the

animals' dung adding to soil fertility. Manure collected from homesteads is sold for around Rs200-300 per tractor load (Nunan, 2000).

### **Changes to production systems due to urban development pressures**

#### ***Cattle and buffalo***

##### *Types of urban pressure*

Increasing urbanisation is associated with pressure on city milk producers that take several forms. These include:

- The presence of cattle on the streets will not be tolerated and that the Supreme Court Interim Report of 1998 will be acted upon (Nunan, 2000).
- Increasing distances over which livestock forage and manure must be carried, in turn associated with increased transport costs.
- Increasing distance between dairy sites and grazing lands in the peri-urban zone.
- Reduction in the availability of grazing areas within the city due to building.
- Increasing risk that roaming animals may ingest harmful items (Nunan, 2000).
- Increase in traffic volume, such that wandering animals present a greater threat to the flow of vehicles (Nunan, 2000).
- Greater intolerance by an increasingly urbanised population to the smells arising from the storage of manure.

Of these seven points the last three are self-explanatory; the first three merit amplification.

##### *Supreme Court Interim Report*

Among the recommendations of this report on improving solid waste management in cities was the following relating to cattle.

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

The report goes on to recommend the phasing-out of stall-fed milk production in the cities. It is probable that the Supreme Court based its decision on

the final two points in the above list for it refers to cattle as a 'nuisance'. If this proposal were implemented, and if it applied to buffalo as well as cattle, then this would be the end of the urban dairy in India.

##### *Transport costs for feed and manure*

There are two practical advantages from the keeping milk-producing animals in and close to the city centre. Firstly, there is no delay between milking and purchase, so ensuring freshness; secondly, no opportunity arises for adulteration when animals are milked in the presence of the customer.

In Britain, the first of these advantages applied up to the early years of the 1900's but with the development of the railway system the 'city dairy' fell into a gradual decline. The practice of milking in front of the customer was not followed in Britain, but the law was strictly enforced whenever adulteration was detected. This certainly did not ensure that milk was never watered-down, neither did it mean that high-quality milk was supplied at all times. Indeed, milk quality issues were a major concern at the time and local authorities increasingly took steps to improve the housing of cattle and the quality of milk. The introduction of the tuberculin test and checks on total bacterial count, Coliform organisms, keeping quality and the classification of milk (Grade A. standard) contributed to the improvement in quality. Further improvements can be attributed to the phased eradication of bovine tuberculosis in the national herd and in recent years to compulsory pasteurisation.

The fate of the British city-dairy was essentially decided on economic grounds. It simply became too expensive to import feed for the animals from rural areas. With the coming of the railways and other forms of improved transport, improved milk handling and cooling, it was much cheaper to import milk than feed. It seems likely that as Hubli-Dharwad expands this will be true of that city. Further, dung produced in the city has to be carted to the field when it is used as a fertiliser and while it has commercial worth, there must be a cost of transport that reduces its value below that it would command if it were produced where it was needed. However, as long as milk produced in the rural areas is distributed in unhygienic fashion, and as long as the populace prefers 'milk fresh from the cow' the urban and peri-urban milk producer may well prevail.



It can be calculated that not less than 2 kg of feed and solid excreta must be transported for each kilogram of milk produced, and this figure applies for high yielding animals on nutrient rich diets. In Hubli-Dharwad a high proportion of animals in the dairy units are not producing. A case study reported by Nunan (2000) suggested that at any one time only a modest proportion of the animals are in milk and this exacerbates the problem. It is expensive enough in time and money to feed a cow that produces milk; the cost of feeding unproductive animals for no return, hard to justify. It should be noted that in Britain, city dairy-farmers kept 'flying herds', i.e. recently calved cows (or in-calf animals that were due to calve in a few weeks time) were bought, milked and then sold at the end of their lactation, to be replaced by new, productive animals. How this system would marry with the Hindu attitude to the cow is hard to predict.

The problem of the dry cow is of course a universal one, but is especially acute in tropical countries, where puberty is later and inter-calving intervals much longer than in temperate countries. Even in the rural area it will remain a problem, as has been shown by van den Ende (1999) in a study of dairy production in rural Orissa. Some of his conclusions are shown below:

". . .it is clear that the hybrid 'Jersi' (crossbred Jersey) cows produced considerably more milk than the domestic breeds.

. . . best margins of sales over feed costs were achieved by herd owners with smaller herds, fewer unproductive cows and those whose 'Jersi' cows were in milk for the greater part of the recording programme.

All cows, whether in milk or dry, received similar rations. Failure to target better rations at the higher yielding crossbred cows is clearly counterproductive. When this was raised for discussion, it was forcefully stated that cows are kept not only for their milk, but also for religious and sentimental reasons. 'We have a duty to feed all our cattle. Cows are close to God and if we neglect them, other people will notice'. (Son of Pali Bahera, participant No. 13). The concept of maximising profit was not paramount."

It is interesting to note than van den Ende (1999) found that only two of the twenty herds studied produced milk of greater value than the cost of feed-stuffs supplied to the animals. Losses of up to 86% of the cost of feed were recorded, while one of the two profitable units made a profit of 60%. This should not be taken as indicating that dairy farming *per se* is generally unprofitable, as the cattle and buffalo he studied were also used for traction and it was not possible to separate the cost of feeding the cows from that of the herd as a whole. However, it does illustrate the impact that dry animals can make on the economics of dairying.

### *Grazing land*

The City has a relatively high proportion of its land set aside for recreational purposes and there is even some ground that is used for crop production. These areas are used for grazing and for exercise after harvest. However, most animals are taken to the surrounding 'green belt' lands to graze in the rainy season (Khan and Mulla, 1997).

Open land within the city is under increasing pressure from developers and as the city expands, so those within the urban area are forced to drive their animals over greater and greater distances in search of grazing. This is expensive of time and energy.

### *Pigs*

The pigs of Hubli-Dharwad are seen by many as a nuisance, for the much the same reasons, as free-ranging cattle are disliked, e.g.:

- Pigs are a hazard to traffic, especially cyclists and motorcyclists.
- They are believed to carry communicable diseases.
- They raid gardens and cropped land.

With regard to health hazards, there is no doubt that improperly cooked pork can lead to *Taenia solium* cysticercosis, as can contact with infected animals. Another potential hazard is that of Japanese encephalitis, which is transmitted by certain mosquitoes (*Anopheles* sp. and *Culex* sp. principally) between man and pigs. Because there are no extensive areas of still water in which the mosquito can breed, there are only small populations of these insects in the city, so risk of disease is not high. However, the perception of risk persists.

The HDMC has been trying to evict pigs from the city for about 10 years, in response to complaints about their nuisance value. Following publication of a notice in the papers, they are rounded up and taken out of the city to woodlands about 10 km away. The future of the pig may well rest on the energy with which the Corporation pursues this policy, (Nunan, 2000).

The alternative of keeping the animals in yards or pigsties carries with it cost implications for the farmer in the shape of capital for housing and increased running costs in procuring and carrying feed to the animals. Farmers believe that this would be too high a price to pay and that the Desi would not thrive under such conditions. An alternative would be to introduce exotic breeds and educate the farmers in their management.

## **Characteristics of principal stakeholders**

### ***Cattle and buffalo***

In the milk-production sector, the principal stakeholders are the farmers, their customers, those producing the forage and waste vegetable material consumed by the animals and the people who buy dung cakes or manure. Viewed from a farming systems standpoint, other interested parties are those intent on the development of the properties presently occupied by the cattlemen and the land within the city and its surrounds that is currently used for grazing.

The characteristics of the farmers, in terms of their numbers, caste, traditions, division of labour between the two sexes etc. appears to be adequately understood, but there is little or no information about other actors. There is considerable variation in the characteristics of the dairy farmers, especially in the size of their herds and the reliance they place on milk production as a source of income. In consequence, livelihood strategies range from total to marginal reliance on milk production as a source of income. Those with small herds undertake a range of manual jobs, including labouring, metal work and domestic service (Nunan, 2000).

It is not clear from the information available what the wealth ranking of dairy farmers is and this is a serious omission.

### ***Pigs***

Project reports provide a partial picture of the characteristics of pig-keepers in and around Hubli-Dharwad. Thus their location (Malmaddi, Saraswatpur, Hossallapur, Old Hubli, Settlement Area, Keswapur), ethnicity, livelihood practices and customs have been adequately established. Once again, the wealth-ranking of these people is not adequately identified, through it would seem that at least some are rich, as they are able to employ workers and equip them with motorcycles to look after the animals (Nunan, 2000).

## **Livelihood strategies of poor households**

It is not possible to come to any conclusions about the livelihood strategies of poor households in the peri-urban area simply because there is no information on these at all. Animal husbandry practices are likely to be the same as in rural areas of Karnataka and other parts of India but this is not spelt out. The correlation

between livestock ownership and wealth, even in the urban area, is not very clear. Presumably those families that own few animals are less well off and may fall into the poverty stratum, members of the family may have to pick rags and undertake other menial work, but their financial status and well-being have not been characterised.

## **The effects upon the poor of changes to the PUI land use driven by urban development, strategy options and interventions**

The future of livestock production in Hubli-Dharwad city and the livelihood strategies of livestock owners would seem to rest on the balance between two opposing forces, which apply to rich and poor alike. On the one hand there is the efficient utilisation of organic wastes generated within the city and immediate access to markets, plus the provision of nutritious food for the rich and poor of the area. Another important factor on the side of the city farmer is 'tradition' and the significance of this should not be underestimated. On the other hand there is the increasing cost of transporting supplementary feed from the rural surrounds, of carrying manure to the field, the nuisance value and the perceived disease-risk presented by the animals.

Official policy is on the side of those against urban (and to a degree, peri-urban) livestock-keeping and to oppose it would seem to be most high-handed. However, this does not mean that future project activities should actively support the policy of eliminating urban livestock farming or focus on the formulation of strategies to achieve this end. A neutral stance would seem to be the best option, one that allows the existing forces to run their course.

The forces against animal keeping in the city are represented by legislative actions, (a consequence of increasing road traffic congestion), the dislike of the general public of middens near their homes and the perceived risk of disease. Adding to these are the economic forces, arising from declining availability of grazing areas within reach, transport costs and the growing acceptance of branded foods of higher quality from the large co-operative dairies, poultry units etc.

It seems inevitable that, over time, the animal will leave the city and this will mean that major changes in the lifestyle of farmers that are forced to abandon their businesses will come about. When this will happen is hard to predict. Whenever it happens, the municipal corporation will be faced with the problem of disposing of a larger amount of organic waste than at present. This suggests that future project activities could be directed to alternative uses of this organic waste.

Assuming that cattle are evicted from the city in the fullness of time, something should be done about the KMF Dharwad. This branch is not serving its clients well and has shown a market decline in milk procurement from the peak of 1992/3. Other branches in Belgaum and Bangalore work well and a consultancy to sort out the Dharwad branch's problems seems to be called for (University of Agricultural Sciences, 1997, p.56).

For sheep, goats and pigs a number of group schemes have been tried elsewhere in rural India (e.g. Kribhco East, DFID Contract No. 943431), which have had modest success among the rural poor. The formulation of policy options to be tested in pilot projects will focus on a specific sub-set of poor households, whose production figures and livelihood practices must be established prior to project initiation. This appears not yet to have been done. Factors affecting the outcome of group livestock-husbandry initiatives are the usual ones, i.e. assured fodder supply, provision of preventative medicines, effective marketing and equitable distribution of responsibilities and benefits among participants.

Also, links between the community and the governmental agencies providing support services (extension, veterinary, credit) should be fostered and people made aware of what can be provided by these agencies. Finally, training courses for key personnel may be needed, depending on the nature of the initiatives undertaken.

### **Characteristics of major production systems in the peri-urban interface around Kumasi**

#### ***Animal ownership and numbers of stock in the peri-urban villages***

In order to obtain some idea of the importance of various animal enterprises in the peri-urban area it is necessary to estimate the pattern of ownership and total numbers. There is no information on the numbers of any species for the peri-urban area around Hubli-Dharwad. For Kumasi, there are three important sources of this information, as explained below.

Firstly, a survey of seven peri-urban and one rural village (Kasanga, 1998, p.94, 102-105), in which 320 females and 160 males were questioned yielded the results shown in Table 4.2.

**Table 4.2. Ownership of livestock in the Kumasi peri-urban area**

| Question                          | Yes |     | Total      |
|-----------------------------------|-----|-----|------------|
|                                   | F   | M   |            |
| Sex                               |     |     |            |
| No. of respondents                | 320 | 160 | 480        |
| Is your major occupation farming? | 130 | 47  | 177        |
| Do you own livestock?             | 128 | 66  | 194        |
| Do you own cattle?                | 0   | 2   | 2 (1%)     |
| Do you own goats?                 | 13  | 12  | 25 (14%)   |
| Do you own sheep?                 | 33  | 22  | 55 (31%)   |
| Do you own poultry?               | 125 | 54  | 179 (101%) |
| Do you own pigs?                  | 1   | 2   | 3 (2%)     |
| Do you own any other livestock?   | 0   | 0   | 0          |
| Total owning specified livestock  | 172 | 92  | 264        |

The discrepancy between those who claimed to own livestock and the total number of men and women who replied 'yes' to the questions about individual species ownership may be because poultry are sometimes regarded as not being 'livestock' and/or because some owned more than one species.

One hundred and thirty women and 47 men, a total of 177, stated that their primary occupation was farming. If it is assumed that these people owned the cattle, sheep, goats and pigs (ownership of poultry is likely to be more general), it is possible to calculate the percentage ownership of these species among the farming community. Figures from Kasanga (1998) are shown in bold in Table 4.3.

**Table 4.3. Number of villages in which certain proportions of villagers keep different livestock types**

| Class       | Pro-portion | Sheep   |                | Goats   |                | Pigs    |                | Cattle  |                |
|-------------|-------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
|             |             | No. (%) | Owner ship (%) | No. (%) | Owner Ship (%) | No. (%) | Owner Ship (%) | No. (%) | Owner ship (%) |
| None        | 0           | 5 (8)   | 0              | 32 (49) | 0              | 51 (78) | 0              | 46 (70) | 0              |
| Some        | 0.10        | 33 (50) | 5              | 21 (32) | 3.2            | 15 (22) | 2.3            | 20 (30) | 3              |
| About half  | 0.50        | 23 (35) | 17             | 11 (17) | 8.4            | 0 (0)   | 0              | 0 (0)   | 0              |
| Most        | 0.80        | 5 (8)   | 6              | 2 (3)   | 2.4            | 0 (0)   | 0              | 0 (0)   | 0              |
| Al-most all | 0.95        | 0 (0)   | 0              | 0 (0)   | 0              | 0 (0)   | 0              | 0 (0)   | 0              |
|             |             |         | 28.5           |         | 14.0           |         | 2.3            |         | 3.0            |

Notes: Class = classification as shown in Kindness (1999, p. 12)

Proportion = assumed proportion corresponding to class

It is clear that cattle and pigs are not widely owned, and that sheep and goats are the most important species in this respect. Confirmation of this picture is provided by (Kindness, 1999, p.12), where the information shown in Table 4.3 is presented, gathered from 66 villages in the peri-urban village characterisation survey reported in (Blake *et al.*, 1997a).

The agreement between the two sets of figures is good, i.e. around 1-3% of farmers own cattle, 2-3% own pigs, 14% own goats and 28-31% own sheep. The size of the herds and flocks is also indicated in (Kasanga, 1998, p.102-104), which shows that the modal numbers of cattle, sheep, goats, pigs and poultry were about 21-25, 6-10, 1-5 and 6-10 respectively. In general, therefore, the numbers of animals owned by individuals is not great, though there are some larger units. Thus 6 or 7 large-scale poultry farms and one sheep unit of 26-30 animals were encountered. It is also important to note that in many peri-urban villages, goats are

banned, because of the damage they do to crops (Holland *et al.*, 1996b, p.43, 60, 75, 109).

Regarding the total numbers of animals in the peri-urban zone, Kindness (Kindness, 1999, p.12) made a rough estimate by multiplying the livestock census figures for the Ashanti region by the proportion of land lying within the Kumasi peri-urban zone, which was thought to be about 0.3. The resulting figures, which must include the KMA as well as the peri-urban, are shown in Table 4.4.

**Table 4.4. Estimated numbers of livestock in the Kumasi area for 1996**

| Cattle | Sheep  | Goats  | Pigs  | Poultry |
|--------|--------|--------|-------|---------|
| 6,500  | 72,022 | 55,482 | 5,706 | 686,052 |

Tentative conclusions can be reached; there are about twice as many cattle in the KMA area as there are in the peri-urban zone, about four times as many pigs and there are considerably more sheep and goats in the peri-urban area than the city.

### *Cattle*

#### *General observations*

Cattle in the Kumasi area occupy a very different position to that at Hubli-Dharwad, as there is no religious constraint to beef eating. Indeed it can be said that the Ghanaian is essentially a meat-eater. In contrast, many Ashanti do not drink fresh milk. This may be due to their intolerance to milk constituents, particularly lactose, which is genetically determined and at a high level in certain African peoples. Unless stated otherwise, information for this section has been obtained from Akyeasi (1999).

Most of the information summarised below on cattle relates to the urban situation and there is practically none that is definitely peri-urban. Observations on both situations are included in this chapter.

*Characteristics of cattle production systems*

Most information was obtained on urban systems, and these will be considered first. With regard to diseases, there is a mixed approach to the control of major epidemic diseases such as rinderpest and foot and mouth disease. Survey results gathered from 45 cattle keepers in the city revealed that about half (49%) practised vaccination, 18% knew the importance of sanitation and followed sanitary practices and 38% treated symptoms as they arose (Akyeasi, 1999). Nearly all of the respondents sought veterinary advice when an animal fell sick, but not all farmers were confident of the expertise of the vets consulted. The major diseases appear not to be widespread, for only about one-fifth of the farmers said they had had trouble in the past. However, about two-thirds reported outbreaks of a skin disease affecting genitals and the udder. An important feature of cattle keeping in the city is that there is no trypanosomiasis there as the vector, the tsetse fly (*Glossina* spp.), needs bush country in which to reproduce.

Cattle are kept at night in kraals in most cases, but there are instances of housing and of tethering near the homestead. By day most animals are taken-out to graze, either under the eye of a herdsman or tethered. Zero grazing is practiced by some and the general picture on feeding practice is summarised in Table 4.5.

**Table 4.5. Feeding practices for cattle in Kumasi**

| Basic practice                | Frequency | Source of carried feed<br>(Percent respondents) |
|-------------------------------|-----------|---|
| Pasture grazing               | 53%       | Not applicable                                  |
| Stall feeding plus grazing    | 29%       | Grass (47%)                                     |
| Tethered grazing plus feeding | 9%        | Household waste (49%)                           |
| Stall feeding                 | 9%        | Spent grain and maize bran (9%)                 |

Source: Akyeasi (1999).

The main household wastes used are cassava and plantain peels, taken from the home and from the many 'chop bars' in the city. Cut grass comes from undeveloped land and grazing can be found at specific locations (Buokrom Estate, Sepe-Antoa roadside, Sepe-Timpuon, Nakwadwom, Tafo Nhyiaso and the Kronom-Kodie roadside). On average animals are driven 3 km/day to grazing sites and have a 3 km walk to the kraal. The majority of owners think that grazing is plentiful or moderately available and only 9% believe it to be scarce.

Cattle ownership is so restricted in the peri-urban area that it is not surprising that no information on husbandry systems is to be found in project reports. In the

peri-urban zone, the Fulani cattle herders from the north are present (Blake *et al.*, 1997a, p.47; Holland *et al.*, 1996a, p.48) and it can be assumed that their practices follow traditional lines.

*Numbers and breeds*

It is difficult to estimate the number of cattle kept in the KMA area. However, Akyeasi (quoted in Critchley, 1998, p.22) gives the composition of a typical herd as established from his survey data and estimates the number of 'regular' cattle-keepers to be about 500. He also mentions that there may be as many as 2,000 speculators who keep cattle for short periods (3-10 months) in the city. Assuming that the typical herd corresponds to his survey results (5 bulls, 10 cows, 3 young bulls and 5 heifers; total 23) then there must be not less than 11,500 animals at any one time in the hands of 'regular' farmers and many more owned by speculators.

Survey results suggest that about half the animals are of the West African Shorthorn breed, with roughly equal representation from the N'dama and Zebu/Sanga for the balance. New breeding animals are obtained from several sources, most (69%) coming from the Kumasi abattoir! The abattoir must be rather more than a slaughterhouse. It imports animals from other parts of Ghana, presumably for sale as well as slaughter.

*Marketing*

Milk: Even though lactose intolerance is prevalent in Ghana, there is still a demand for fresh milk and milk products. Most cattle owners (73%) milk their cows but only half of them used the milk at home. In most cases, herdsman in charge of animals carry out milking and the sale of this milk represents their daily wage. Milk is processed into 'wagashi' (cheese) and 'noonah' (yoghurt) and both these products would have much-reduced lactose content. There is nonetheless a good market for fresh milk, as evidenced by the ease with which the local university farm sells its daily production.

Meat: Animals for slaughter mostly pass through the city abattoir and only about a quarter are sold on the hoof at the kraal or homestead. Major purchasers of meat are the 'chop bar', of which there are many in Kumasi. Consumption of meat among the cattle owners is high, averaging more than 20 kg per family each week.

*Manure*

Little use is made of manure and in most cases it is simply thrown away. Some respondents made use of it on their fields and there is limited appreciation of its worth as a soil conditioner and fertiliser in urban and peri-urban areas (Holland *et al.*, 1996b, pp.31, 44, 61, 93, 110)

*Pigs**General observations*

Unless otherwise stated, the source of information about pigs in Kumasi is Anyinadu (1999). In general terms, pig keeping in Kumasi City appears to be profitable and owners are contented with their enterprises. There is, however, considerable pressure of them to move out of central locations to the peri-urban zone at nearest. This pressure comes from the local authority and is a continuation of the process that has already led to the housing of pigs and the introduction of exotic breeds over the past twenty-five years or so.

*Characteristics of pig production systems*

As was reported for cattle, there are few pigs in the peri-urban zone and little information on their husbandry (Holland *et al.*, 1996a, p.46). Therefore, most of what follows is relevant for urban systems. Though they are present in Ghana, the reports consulted make no mention of vaccination against erysipelas, foot and mouth disease, etc. However, survey results show that most pig keepers take veterinary precautions involving the use of worming agents, antiseptics and insecticides. In common with most small-scale producers throughout the world, they are not heavy users of professional veterinary services, preferring to carry out their own diagnosis and the advice of the local pharmacist. Professional services and drugs are thought to be very expensive.

It seems likely that the small scale of their operations and the dispersed location of the piggeries protect the farmers from the threat of widespread disease. However, some 40% are to be found in Nakwa Dwom and this location must be at greater risk than others.

All the pigs recorded during the R6799 inception phase were Large Whites originating from European stock and there were no Ashanti (Dwarf) Blacks, the local strain of the widely distributed West African breed. This breed is reputed to have a degree of typanotolerance, but this would not be a necessary trait for housed animals kept in an urban environment.

Most breeding animals are bought from other farmers in the KMA area, the UST or the Ghana Livestock Research Station near Accra. The extent of breeding, as opposed to rearing of purchased weaners, is not clear from the information available nor is it possible to distinguish between the number of sows/gilts in Kumasi and the total number of pigs.

All animals are kept securely penned and are provided with shade. With regard to feeding, extensive use is made of various wastes and by-products. Among the by-products are bran (maize, wheat, rice) from the milling industry, brewers' grains and, to a limited extent, palm kernel and cotton seed cakes. The 'chop bar' and the home-kitchen provide peel from cassava, yam and plantain, and leaves of various fruits and vegetables. Fishmeal and by-products of the fishing industry are widely used. Farmers appreciate the need to supply a reasonable amount of good quality protein to their animals. In general most (68%) of respondents believed that the quality of the feed used was either good or satisfactory and they were satisfied with the animals' performance.

Advice on pig keeping is sought by about one-third of the farmers on a regular basis, one-third receive occasional advice and the remainder receive no advice at all. There is a general perception that the pig is considered unimportant by the MOFA.

*Numbers*

There appear to be about 100 pig units in the KMA area, but only 10 or so 'keep' 70-100 animals each year, the remainder 'keep' 2-60 per year. The modal number of animals kept by each farmer is 16, so there must be about 1,600 pigs (possible only sows and gilts, see above) in Kumasi at any one time.

*Marketing*

There is little problem in selling pigs in Kumasi to local traders. The animals are rarely slaughtered in the city as the abattoir is Muslim operated and only 4-5 pigs are killed there each day. Most animals are slaughtered 'within houses in the KMA area', which may mean at the home of the purchaser, or by the farmer him/herself. Most pig meat is consumed fresh and there are only a few sausage or meat loaf makers. Demand for processed pork is high and this area deserves more attention. Pig skins and bristles are not utilised in the city.

Most pig farmers (80%) think that production has increased over the past 20 years and will continue to do so; they attribute this in part to improved marketing. Possible barriers to enhanced production are the costs of feed and drugs and the space for piggeries.

#### *Manure*

There is little attempt to make effective use of pig manure in Kumasi. Survey results showed that only 45% of the respondents used it for gardening or made it those using the dung in this way disposed of part by throwing it away.

### ***Poultry production systems***

#### *General observations*

Poultry production around Kumasi has been described by Kwakuyi (1999) who concentrated on those producers maintaining units of a reasonably large scale and excluded 'backyard' poultry keeping. Consequently there is a dearth of information on the latter aspect and it is not possible to form any opinion on the importance of the 'backyard' bird to livelihood strategies and wellbeing. Her description of the units surveyed gives the impression that the larger poultry production units are organised along modern lines.

#### *Poultry husbandry*

Essential features of the poultry production are indicated in the Table 4.6. It is important to note that this table relates to the larger units surveyed by Kwakuyi (1999) which lay in the peri-urban area.

Poultry are widely owned in the peri-urban villages. Supplies are obtained from the city in many cases (Holland et al., 1996b, p. 29, 44, 60, 76, 110). A high proportion of the people keep a few birds each on a 'backyard' basis which are free to forage for feed, but no further information is presented. However it seems safe to assume that the birds lead the precarious existence typical of such birds throughout the world (Holland et al., 1996a, p. 47).

#### *Numbers*

There are not fewer than 92 poultry units in or close to the city. This figure was deduced from the membership lists maintained by local societies interested in poultry production, so it is very possible that there are many more, owned by non-members. The survey considered units ranging in size from less than 5,000 birds to those with more than 10,000. The distribution by unit size was as follows: Up

to 5,000 birds: 14 units; 5,000 to 10,000 birds: 62 units; more than 10,000 birds: 16 units.

**Table 4.6. Aspects of poultry husbandry in Kumasi**

| Aspect                     | Narrative summary  | Reference                            |
|----------------------------|--|--------------------------------------|
| Type of unit               | All the farm studies had layers and only about one-third had broiler units due to the general unpopularity of tender broiler meat and the seasonal nature of the broiler market.   | Holland <i>et al.</i> (1996a, p. 46) |
| Breed of birds and sources | Breed not clear, but probably hybrid types purchased from hatcheries such as Darko Farms Ltd. Darko maintain a web site (www.darkofarms.com) which claims an annual production of 5 million day-old-chicks. They have a strong USA connection. Some larger producers have their own hatcheries, but parent stock not stated. | Holland <i>et al.</i> (1996a, p. 46) |
| Veterinary                 | Normal precautions taken against Newcastle disease, Gumboro and Coccidiosis by all farmers. Professional veterinary advice is sought in cases of disease outbreaks.  | Holland <i>et al.</i> (1996a, p. 46) |
| Housing                    | Generally on deep litter (bedding material not stated in survey, but it is likely to be sawdust or wood shaving), see [R6448/02: 93]). Only 5% use battery cages, possibly due to the difficulty of handling moist manure from the cages.  | Holland <i>et al.</i> (1996b, p. 93) |
| Feeding                    | Maize-based meals prepared by most and little compound feed is bought in. Wheat bran, fish meal and oyster shell (for Ca) used. All owners regard their feed as good or satisfactory.  | Holland <i>et al.</i> (1996a, p. 46) |

#### *Marketing of eggs and birds*

There are a number of channels for egg marketing. About 22.5% of farmers sell exclusively from the farm and 10% have their own outlets in the city. The most important marketing route is through traders, usually women, who buy the eggs and sell them retail. There are also wholesalers (Holland et al., 1996a, p. 46). Culled birds find a ready sale, either to customers calling at the farm or through market outlets. Prices seem to be good as the demand for poultry meat is increasing. Peri-urban produce is either taken to Kumasi or is purchased by traders from the larger units (Holland et al., 1996b, p. 30,43).

*Manure*

City manure disposal is not well organised, possibly because there is no traditional use in crop production. However, most farmers make it available for horticulture, though some find that there is little call for the material and have to throw it away. In the peri-urban area 67% is reported to be used (Kindness, 1999) {e.g. Holland *et al.*, 1996a, p.46; 1996b, p.31, 93, 110). Refer to Chapter 3.

***Small ruminant production systems****General observations*

Unless otherwise stated, information about sheep and goats (shoats) has been taken from Kwame (1999). As is often the case in Africa, both sheep and goats are managed similarly and so are considered jointly.

*Sheep and goat husbandry*

Table 4.7 provides a summary of sheep and goat husbandry in Kumasi Metropolitan Assembly (KMA).

Sheep and goats in the peri-urban villages are widely owned and a little information on their husbandry is available. They are mostly allowed free-range at all times, or they may be penned until taken out to graze under the eye of a shepherd in the afternoon. Of interest are the practices of imposing fines on owners that allow their animals to damage crops (Holland *et al.*, 1996b, p. 60, 75, 109) and headage levies on stock (*ibid*, p. 60). Vegetable wastes and crop residues are again fed (*ibid* p. 43).

*Numbers*

The number of animals in Kumasi city has not been accurately estimated and the information summarised above was based on a survey conducted in four areas of the city, which were chosen on the basis that the shoat population there was known to be high. In these suburban areas the number of flock owners interviewed was 50 with an average flock size of about 10.

**Table 4.7. Aspects of goat husbandry in Kumasi**

| Aspect                    | Narrative summary  |
|---------------------------|--|
| Breeds                    | Sheep: 86% Djalonka (alias Djallonké or West African Dwarf), 14% others. Goats: 100% West African Dwarf.   |
| Housing                   | 88% in pens or in home compound, 12% within the house.   |
| Feeding                   | All owners use household vegetable wastes, including that from 'chop bars'. Animals are grazed on undeveloped land and recreational areas. Also used are brewers grains, cut guinea grass and crop residues. |
| Veterinary                | Diarrhoea is common, also ectoparasites. Veterinary help is called for when animals fall ill.  |
| Sources of breeding stock | The majority of new animals come from local markets, but a few from further afield, depending on breed.  |
| Problems                  | Diseases (as above), housing.  |

Source:Kwame (1999)

*Marketing of sheep and goats*

Most animals are sold on the hoof by barter, major customers being the numerous 'chop bars'. About 300 shoats are slaughtered at the abattoir daily. Meat retailers operate close to the abattoir and enjoy a good trade. The source of these animals was not stated in the report. The market for the animals is good and numbers are said to be increasing. The Revenue: Cost Ratio for stall-feeding: grazing: stall-feeding + grazing has been estimated as 1.4: 2.4: 1.9 per animal unit. Most of the profit (78%) goes to the owner of the animals. Neither sheep nor goats milk is marketed, though some owners, especially from the Sahelian countries may consume it themselves.

*Manure and wool*

No measures are taken to conserve manure for fertiliser purposes and there was no mention of wool in the reports consulted.

***Small animal production systems****General observations*

Rabbits, grass cutters, snails, bees and the giant rat are kept in the Kumasi urban area. Solomon (1999) who collected data from 19 urban locations provides information on these. As he interviewed only 21 respondents, i.e. about one per



village, it is possible that his finding may not be representative of Kumasi and its environs, unless a high degree of homogeneity exists between location and production system. On the other hand, it seems likely that systems of production for each species will vary greatly between units and it may be impossible to form a general picture of production methods.

Interpretation of his findings is difficult as his report contains several contradictory statements. For example, 'the standard of living of the (*small animal*) farmer is comparable with that of the average Ghanaian and to some extent a modest good living.' 'Generally, low income levels characterise small animal farmers with the exception of farmers with additional work such as the civil servants whose average income annually ranges from 1,900,000 cedis'.

One is left with the impression that small-animal keeping is a part-time activity for a range of people, including schoolchildren, professionals, artisans and those who farm in other ways on a full-time basis. Its importance to livelihoods is hard to judge, as it seems that the animals are kept as much for the pleasure they give as for food or sale. The scale of production is small, e.g. the average number of female rabbits kept was only 7, and no examples of large scale, intensive units such as are found in the West are reported in Solomon (1999).

#### *Husbandry*

Table 4.8 summarises key features of the husbandry systems employed.

#### *Numbers*

The total number of animals in the Kumasi urban and peri-urban areas appears not to have been established, but it is probably not very many.

#### *Marketing*

Animals are sold for meat and honey is produced. There is no processing of meat or honey other than some meat may be smoked prior to sale. Non-specific use of wax, shells etc is made. Solomon (1999) quotes the following prices:

Grass cutters 30,000 to 40,000 cedis; Rabbits 12,000 to 20,000 cedis; Bottle of honey 3,500 cedis; Three snails 1,000 cedis; Giant rat 5,000 cedis.

#### *Manure*

Manure is kept for home use in some cases. Other than this there is no indication of use, possibly a reflection of the small quantity available.

**Table 4.8. Husbandry of small animals in Kumasi**

| Aspect                    | Narrative summary   |
|---------------------------|---|
| Reasons for keeping       | For cash and home use and for aesthetic reasons   |
| Housing                   | Cages of one sort or another or in small enclosures.  |
| Feeding                   | Crop residues, roots, vegetables and fruits, forage grasses, agricultural by products, household residues etc. are used.  |
| Animal breeds             | <u>Rabbits</u> : some exotic rabbits, e.g. new Zealand Whites and Flemish Giants are kept as well as a local type.<br><u>Grass cutters</u> : <i>Thryonomys swinderianus</i> , (indigenous)<br><u>Snails</u> : <i>Achatina achatina</i> and <i>Archachiatina marginata</i> (indigenous)<br><u>Bees</u> : <i>Apis mellifera adansonii</i><br><u>Giant Rat</u> : <i>Cricetomys gambianus</i> |
| Veterinary                | Diarrhoea, skin diseases and worm infestations are important.   |
| Constraints on production | The most important appears to be lack of credit, which would enable keepers to provide better housing. Also mentioned by respondents was feeding, disease and technical knowledge.  |

Source: Solomon (1999)

### ***Fish farming systems***

#### *General observations*

The survey conducted by Agyapong (1999). of the urban and peri-urban areas of Kumasi was very thorough and provides a comprehensive account of current practices.

#### *Husbandry*

Table 4.9 provides a brief account of the principal features of fish-farming practices. Constraints to the expansion of fish farming include the high cost of feed and of transporting poultry manure, the non-availability of fingerlings and of some feed items, capital and credit (especially for pond construction). Additionally, landowners are unwilling to rent land for pond construction, marketing is poor, the Fisheries Department is understaffed and there are instances of water shortages when pond are not supplied from permanent water courses.

### Numbers

There are 94 fish farmers in and around Kumasi, managing 122 ponds, of which 38 provided information for the survey. In terms of annual production, output has been estimated to be about 150 tonne. However, this may not include any fish taken by the farmers.

### Marketing

The marketing structure for fish harvested from Kumasi ponds appears to be very inefficient. Due to the fact that most fish farmers do not have the necessary (expensive) nets and transport, the Fisheries Department usually harvests for them once a year. Larger fish are caught by the Department and sold to the general public, restaurants, 'chop bars' and processors. The latter prepare salted fish (koobi). Prices are about 3,000 cedi per kg for catfish and 1,500 cedi for tilapia.

This system of marketing is not satisfactory and purchasers complain about the price of the fish, which compares unfavourably with those caught from the wild. There are also complaints about the size of the fish and their freshness. The small size of fish may in part be due to the failure of the Department to net the ponds at the optimum time, resulting in overpopulation and restricted growth.

## Changes in production systems due to urban pressures

### Cattle

Cattle-keepers in Kumasi City are under a variety of pressures, including:

- The local authority's attitude to animals in the city.
- Farmers' attitude to stall-feeding.
- High cost of production relative to that in other parts of Ghana and other countries.

The KMA authorities look with disfavour on cattle keeping and have attempted to move animals out of the centre of the city to the peri-urban zone. The farmers, who believe that moving to the outskirts would increase the risk of trypanosomiasis and increase production costs, have resisted this pressure (Akyeasi, 1999, p.30).

**Table 4.9. Fish farming in and near Kumasi**

| Aspect                                    | Narrative summary  |
|---|--|
| Breeds                                    | Species most frequently farmed are tilapia (mostly <i>Oreochromis niloticus</i> ) and catfish (mostly <i>Heterobranchus</i> sp.). <i>Clarias</i> sp. and <i>Chrysichthys</i> sp., <i>Chana obscura</i> and <i>Heterotis niloticus</i> are also cultivated. |
| Source of fingerlings                     | Most farmers obtain fingerlings from the Fisheries Department. Costs: 100-130 cedis for catfish and 50 cedis for tilapia. The Department brings the fingerlings to the ponds 11% of farmers obtain stock from the wild.                                    |
| Stocking density and species combinations | Normal practice is 3-5 fingerlings per m <sup>2</sup> . 90% of farmers stock with tilapia and <i>Heterobranchus</i> sp. in ratio of 10:1.  |
| Nature of water body                      | Ponds constructed in valley bottoms, the majority having earth banks, which are poorly maintained. Sizes ranged from 12 m <sup>2</sup> to 54,000 m <sup>2</sup> , depths mostly are in the range 1.5 to 2 m. Most ponds cannot be drained.                 |
| Feeding                                   | All farmers practice feeding. maize bran, brewers' grains, groundnut husk and paste, leaves, coconut fibre are used. Most use groundnut husk and maize bran. Most feed twice daily.  |
| Harvesting                                | Most farmers do not have nets for harvesting, or transport to markets, so usual practice is for the Fisheries Department to harvest once yearly.   |
| Fertilising and liming                    | 68% of farmers use poultry manure to increase the nutrient level of the water. Liming with slaked lime (to suppress disease) is not regularly carried out and only 18% followed this practice.   |
| Extension                                 | 71% of farmers consult the Fisheries Department regularly. Advisory literature is available from the Department.   |

Source: Agyapong (1999).

The casual attitude to manure disposal must be one reason for the authorities dislike of the animals and it is possible that better use of the manure would lead to a change in attitude, as well as being cost-effective from a crop production standpoint.

With regard to stall feeding, so long as grazing is available within the city and is plentiful enough, a case can be made for keeping cattle in Kumasi. The extra costs in terms of time and labour of stall-feeding, together with the sensible

use of biomass produced within the city that might otherwise be wasted argue against any change to current practices. Survey results showed that only four or five farmers thought that intensification of production would be worthwhile (Akyeasi, 1999, p.30).

Additional pressures placed on the livestock keeper include the gradual loss of grazing to urban development, and for those wishing to embark on cattle keeping and/or increase the scale of operation, the costs involved in livestock purchase. They rank constraints in the order:

Credit: disease: feeding: housing in the ratios 52: 31: 17: 16.

Disease as a factor appears to rest on the high and rising cost of medication (Akyeasi, 1999b, p.29).

### ***Pigs***

In the past there has been considerable pressure on pig keepers to abandon free ranging production systems in favour of more intensive systems. Legislation was introduced that led to the housing of pigs and the use of animals more suited to these conditions, such as the Large White (Yorkshire in the USA), which has much better performance than the indigenous Ashanti (Anyinadu, 1999, p.46). No doubt this pressure arose from the damage that the roaming pig can cause to crops, the danger to road traffic, noise etc.

Notwithstanding, a measure of intolerance to pig husbandry in the city remains, centred on their smell and noise. Added to these annoyances is the danger that the effluent from some piggeries may find its way into water bodies and cause pollution (Anyinadu, 1999, p.45). The above pressures are directed against the 'city pig' but there is one major opposing pressure, the increasing demand for pork and pork products, which may prevail.

### ***Poultry***

The poultry industry in around Kumasi appears to be well accepted by the populace and poultry farmers are not subjected to adverse pressures of any kind arising from urbanisation. The main barriers to the expansion of the industry are the capital costs involved in setting up a unit (land acquisition, buildings, and equipment) and funding the first throughput (day-old-chicks, drugs, feed) (Kwakuyi, 1999, p.53).

### ***Shoats***

There are indications that the smells associated with shoats and their manure in the city are an irritation to neighbours of the farmers. The increasing demand for meat in Kumasi may cause the level of production to increase still further (Kwame, 1999, p.37).

In the peri-urban areas, theft of animals is mentioned as a problem, perpetrated by city dwellers, in the farmers' view (Holland *et al.*, 1996b, p. 30, 44, 76). Labour costs are rising due to competition from city employers offering alternative forms of employment [e.g. Holland *et al.* (1996b, p. 44)], land is increasingly scarce, in some cases due to speculation, (Holland *et al.*, 1996b, p. 44, 93) and farm sizes are falling (*ibid*, p. 60).

### ***Small animals***

Small animal keepers are subject to much the same sorts of pressures as large-animal farmers, i.e. lack of land, complaints from neighbours about smells and decreasing availability of cheap feeds and credit. Several of these pressures are of course common to rural farmers (Solomon, 1999, p.72).

### ***Fish farming***

Fish farming in Kumasi is a relatively new venture, having started in Ashanti in 1972. Its expansion to its present size is evidence of the demand in the city. Other than this there appear to be few urban pressures on the industry. However, there must be other pressures of a commercial or technical nature, as several ponds have been abandoned and several farmers have ceased raising fish (Agyapong, 1999, p.82).

### **Characteristic of stakeholders**

#### ***Cattle***

Most of the cattle owners interviewed in the city were Ghanaians and the major came from the north of the country; there were a few from Mali and a single European. In contrast, herdsman hired by the owners were mostly from Mali. Most of the cattle are to be found in old, high density, low class residential areas of Aboabo and Mossi Zongo (Akyeasi, 1999).

Cattle owners do not appear to be particularly poor. The average capital value of stock was about 12.5 million cedis and it was reckoned by Akyeasi (1999) that a profit of around 0.5 million cedis could be made by fattening an animal over a period of 8-10 months. Further, the herdsmen seem to be better off than are those in other forms of manual labour.

Owners often had other sources of income, including office work, transport operations and skilled manual work, but the majority (60%) also trade in cattle as well as keep them. The position of cattle farming in the economy of the city is illustrated by the fact that over 80% of respondents kept the animals for profit and few for consumption or social reasons.

The formulation of new policies in this sector has to reconcile positive and negative aspects of urban agriculture. At present, the case for keeping them in the urban and peri-urban zones is underpinned by the efficient utilisation of forage on undeveloped land and waste vegetable material plus freedom from trypanosomiasis. Negative factors are increasing intolerance to the animals and the haphazard way in which their dung is disposed. As in Hubli-Dharwad, official policy is in favour of moving them out of the city to, at closest, the peri-urban zone. How this might be supported by an external agency is the problem that must be faced and answered.

### ***Pigs***

Survey results provide an excellent account of the characteristics of the pig farmers of Kumasi and Table 4.10 provides a brief summary. The most striking feature of this table is that only 25% of respondents are full-time farmers, others have an important secondary occupation, such as civil servant or artisan. While it is possible to make a living from pigs alone (15% had no other enterprise), the majority have an alternative way of making money. The scale of production noted above also clearly indicates that pig keeping is a part-time exercise in Kumasi (Anyinadu, 1999, p.39).

### ***Poultry***

The characteristics of the farmers interviewed are summarised in Table 4.11.

There is no evidence that any of the larger poultry-unit owners were poor. As can be seen from Table 4.11 many had another professional occupation or trade while the balance derived their livelihoods from poultry farming. It seems probable that the latter were in a larger way of business, but this should be

confirmed. There is ample evidence of the profitability of poultry keeping (Kwakuyi, 1999, p.51) when the units are close to markets. However, some producers in the peri-urban area complain about the cost of transport of eggs to the city (Holland *et al.*, 1996b, p. 29, 92).

**Table 4.10 Characteristics of Kumasi pig farmers**

| <b>Aspect</b>           | <b>Narrative summary</b>   |
|-------------------------|--|
| Ethnic origin           | 20% from North Ghana; remainder are Akans (Ashanti, Fanti, Kwahu), Frafra or Grushie, i.e. non-Muslims.                      |
| Occupation              | 15% have no occupation other than pig keeping, 25% farm other crops or animals, and 60% have an important second occupation. |
| Age distribution        | About 33% aged <20 – 30; 30% aged 31-50 and 33% over 50.   |
| Sex and Marital status. | 92% males. 75% married, 10% single, the balance divorcees or widowers.   |
| Educational background  | 2.5% illiterate, 10% primary school, 57.5% middle school and 30% secondary/higher education.                                 |
| Number of children      | 35% have no children, average family size of those with children = 4.  |

*Source:* Anyinadu (1999)

### ***Shoats***

Table 4.12. summarises the sheep and goat farmers' characteristics for the urban area.

In the peri-urban area it seems that there may be large flocks, owned by newcomers to the industry. The number and significance of such flocks is not clear but they were found in two of the six villages where PRA was carried out [Blake *et al* (1997, p.51, 55); Holland *et al.* (1996a, p.46)]. Such flocks, however, appear to be better managed.

**Table 4.11 Characteristics of Kumasi large-scale poultry keepers**

| Aspect                                       | Narrative summary   |
|--|---|
| Ethnic origin                                | 80% Ashanti; 20% Fanti or from N. Ghana.  |
| Sex  | Mostly owned by men (Blake <i>et al.</i> (1997a, p.46).   |
| Occupations                                  | 40% exclusively poultry farmers, 55% had another profession and 5% another trade.   |
| Age  | Most aged 41-60 years.  |
| Educational background                       | Middle school: 17.5%<br>To O and A-level: 45%<br>Graduates/professional training: 37.5%   |
| Marital status/children                      | All married, family size 3-13 children (mode of 6)  |
| Caretakers (i.e. those caring for the birds) | All farms employed caretakers. Most are men but two wives care for the birds. Most caretakers are educated, some to graduate level.   |
| Training and advice                          | It is not clear whether or not the farmers had had formal training in poultry husbandry, but most believed that this to be highly desirable.<br>All farmers took professional advice from government, university or private sources on aspects of husbandry |

Source: Kwakuyi (1999)

**Table 4.12 Characteristics of Kumasi sheep and goat keepers**

| Aspect                      | Narrative summary   |
|-----------------------------|---|
| Ethnic background           | 56% from N. Ghana, 30% Akan, 14% others   |
| Age                         | 84% aged 30-60 years  |
| Shepherds/goatherds         | 72% are the children of owners, 18% owners themselves, 10% relatives of owners.   |
| Reasons for keeping animals | 66% for cash income and the balance for cash and home consumption. Some owners (24%) keep the animals for secondary reasons, e.g. as a matter of pride or as an offering (14%). |

Source: Kwame (1999)

### *Small animals*

Key features are summarised in Table 4.13.

**Table 4.13. Characteristics of small-animal keepers in Kumasi**

| Aspect             | Narrative summary  |
|--------------------|--|
| Sex                | All respondents keeping animals were males.  |
| Standard of Living | Not clear, see above.  |
| Ethnic affiliation | Ga, Frafra, Dagati, Ewe, Fanti and Ashantis were all represented. Akrans are the only people to keep snails. |
| Other occupations  | Various, ranging from schoolchildren to civil servants. All appear to have been part timers.                 |

Source: Solomon (1999)

### *Fish farmers*

Table 4.14 summarises key features of the fish-farming community.

**Table 4.14. Characteristics of fish farmers in Kumasi**

| Aspect             | Narrative summary   |
|--------------------|---|
| Sex                | 92% of farmers were males.  |
| Education          | About 70% of farmers had received secondary or tertiary education.  |
| Ownership of ponds | All ponds were owner by farmers or, in one case, by a company   |
| Ownership of land  | About 70% owner the land where the pond was located, the rest leased the land.  |
| Record keeping     | All farmers are poor record keepers, which makes accurate estimates of their annual crop difficult to estimate and handicaps their management of the ponds. |

Source: Agyepong (1999)

### **Livelihood strategies of poor households**

The situation is similar for peri-urban Hubli-Dharwad. There is a little information on husbandry methods, but again the association between livestock ownership, wealth and other money-earning activities has not been established.

**The effects upon the poor of changes to the PUI land use driven by urban development, strategy options and interventions**

Access to land and security of tenure in the villages around Kumasi are problems, but some farmers appear to be resigned to these [e.g. Holland *et al.* (1996b, p.30)]. Another problem of an urban nature is theft. Access to credit, poor extension support and veterinary services, and, for pigs and poultry the cost of feeding stuffs and transport charges are more general in character.

Solving the general problems in a sustainable way clearly requires the strengthening of links between the farmers and the governmental services supplying credit, extension and veterinary support.